



**GCCN**  
GIPPSLAND  
CLIMATE CHANGE  
NETWORK



# **LOW CARBON GROWTH PLAN FOR GIPPSLAND:**

## **Phase 1, Selected Measures Report**

**FINAL REPORT**

October 2013

REPORT PREPARED FOR GCCN BY ENERGY EFFICIENT STRATEGIES



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*Please note -*

There are two components to the Phase 1, Selected Measures Report:  
Final Report (this document), October 2013  
Appendices, August 2013

**Disclaimer:**

The views, conclusions and recommendations expressed in this report are those of Energy Efficient Strategies. Where outside sources have been sought (stated in the acknowledgements), this has been noted in the text and the express permission gained before the information has been included.

While the authors have taken every care to accurately report and analyse a range of data in this report, the authors are not responsible for the source data, nor any use or misuse of any data or information provided in this report, nor any loss arising from the use of this data.

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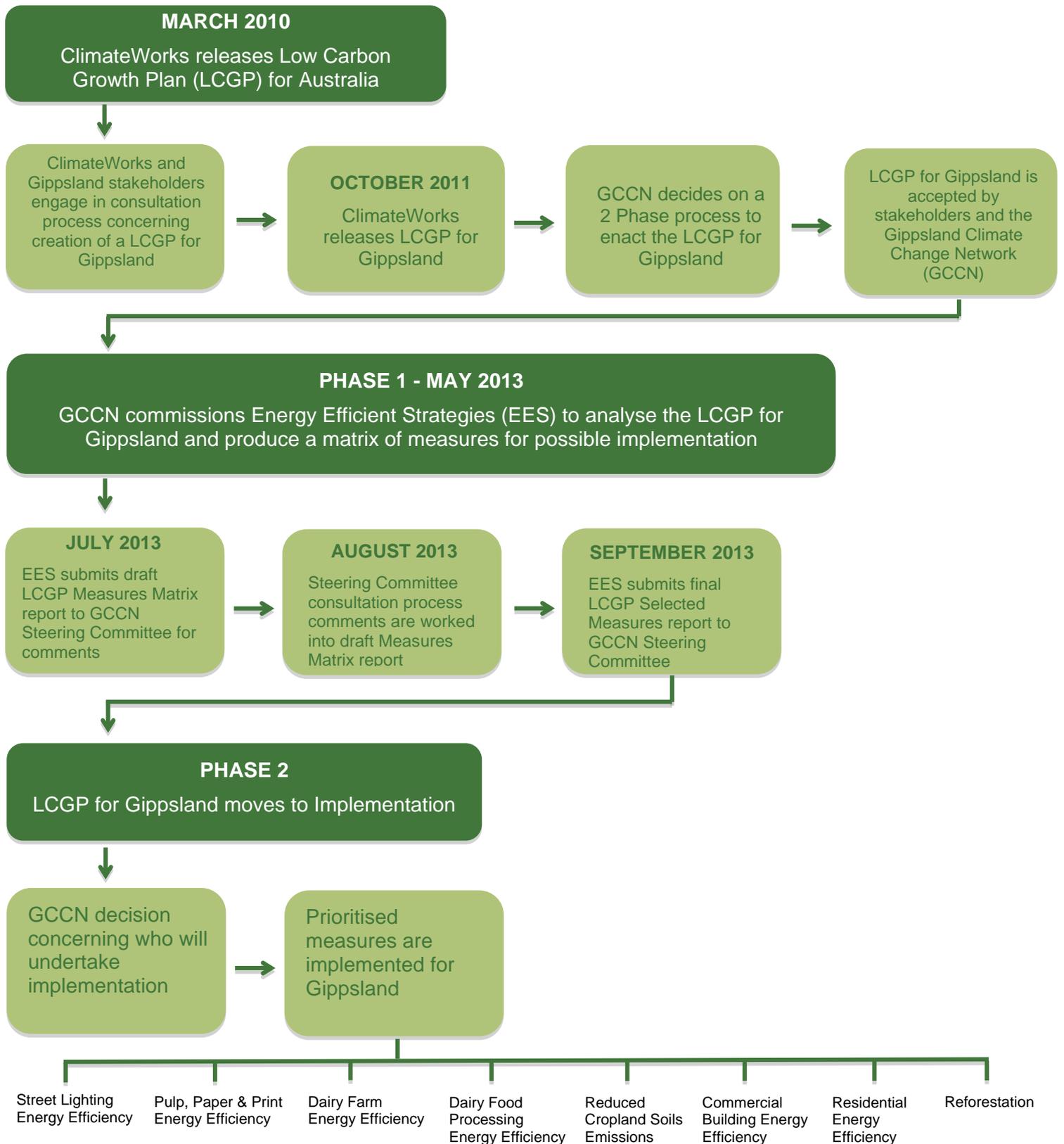
## Executive Summary

The *Low Carbon Growth Plan for Gippsland* ('*The Plan*') was released in October 2011, and identifies a range of emission reduction opportunities that can be achieved for the lowest cost in the Gippsland region. *The Plan* was developed with the participation of members of Gippsland's business, industry and government community. It identifies actions with the potential to save businesses and households \$100 million per year across the region, by implementing a range of measures to improve energy efficiency, increase land productivity and generate cleaner, distributed energy. The measures also reduce greenhouse gas emissions, helping the region proactively transition towards a low carbon future and increase resilience to future carbon price increases. Capturing the identified opportunities would generate \$800 million in inward investment, helping to stimulate the local economy, and providing for new jobs and skilling of the local workforce. Under business as usual, Gippsland's emissions are expected to rise by 9% above 2000 levels by 2020. By implementing all the opportunities identified in *The Plan*, Gippsland could reduce its emissions by 10% below 2000 levels by 2020.

*The Plan* was originally written and developed by ClimateWorks, with the assistance and participation of members of Gippsland's business, industry and government community. Many of these organisations are members of the Gippsland Climate Change Network (GCCN), a not for profit network of around 50 member organisations across State government departments and agencies, local government, private business, education providers, community groups and other organisations, covering the six local government areas in the Gippsland region. The GCCN works to provide a forum for action to mitigate and adapt to climate change in the Gippsland region. The GCCN is managing the work to further develop this implementation plan for Gippsland.

This document marks the completion of Phase 1 that reviewed and analysed measures in *The Plan*. Through a stakeholder consultation process, it nominates the measures that have been identified as the highest priority actions for implementation. These measures will enable cost effective emissions abatement for a variety of important sectors in the Gippsland region and economy in the short to medium term.

# Low Carbon Growth Plan for Gippsland – Process



## Key Steps for Measure Implementation:

- COLLABORATE
- IDENTIFY
- REPORT
- PROMOTE

## ***Sectors and Selected Measures***

Under *The Plan*, Gippsland was split into four main sectors involving possible actions for emissions abatement:

- Sector 1 – Manufacturing, Mining and Freight
- Sector 2 – Commercial and Services
- Sector 3 – Households
- Sector 4 – On the Land

Together, these four sectors comprise a diverse range of potential measures, stakeholders, challenges, opportunities, and abatement potential. Each of these four sectors have priority measures selected in the final listing. The selected measure types fall broadly into the following two categories:

- Energy efficiency
- Soil carbon, forestry practices and livestock

The priority measures that have been selected for implementation in Phase 2 include (Measure ID as per numbered points below):

1. Street Lighting Energy Efficiency
2. Pulp, Paper and Print Energy Efficiency
3. Dairy Farm Energy Efficiency
4. Dairy Food Processing Energy Efficiency
5. Reduced Cropland Soil Emissions
6. Commercial Building Energy Efficiency
  1. Commercial Building Lighting
  2. Commercial Building Heating, Ventilation and Air Conditioning (HVAC)
  3. Commercial Building Electronics and Appliances
  4. Commercial Building Water Heating
  5. Commercial Building Insulation
  6. Commercial Building Energy Waste Reduction
7. Residential Energy Efficiency
  1. Residential Lighting
  2. Residential Heating, Ventilation and Air Conditioning (HVAC)
  3. Residential Appliances and Electronics
  4. Residential Building Improved Thermal Efficiency
8. Reforestation
  1. Strategic Reforestation of Productive Land with Environmental Forest
  2. Reforestation of Less Productive Land with Timber Plantation

### 3. Reforestation of Less Productive Land with Environmental Forest.

The Measure ID in the numbered points above is used throughout this report. Measures are documented in this order (although these are not necessarily in priority order).

These measures have a combined potential abatement of 673 ktCO<sub>2</sub>e<sup>1</sup>, and their implementation will increase the resilience of local economies and save money for businesses and householders in Gippsland. They will also show the wider community that Gippsland is serious about taking action on emissions abatement, not only through future measures but also through the promotion of existing achievements undertaken by key stakeholders in the region.

More working information on the screening and evaluation of all measures contained in *The Plan* that led to the selection of the above measures for implementation in Phase 2 is contained in the associated appendices to this report.

### **GCCN Role**

For the emissions abatement actions in the selected measures to be successful in their implementation, the key role for GCCN to play is recommended to revolve around the following four key steps:

- **Collaborate**
- **Identify**
- **Record**
- **Promote**

#### **Collaborate**

Work with stakeholders to develop action plans, business cases, and in identifying funding opportunities. Facilitate relationship networking between stakeholders within industry sectors or among different industries where there is found to be a common goal. As far as possible, work within existing frameworks to save resources by avoiding duplication. Inter-Council collaboration in Gippsland concerning the implementation of the selected measures will be critical to success.

#### **Identify**

Cooperate with stakeholders involved in the selected measures to identify possible abatement gaps in programs and projects, and develop plans and strategies to fill these. Concentrate on opportunities that have easy to achieve outcomes, or where the possible reward for effort is large.

#### **Record**

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<sup>1</sup> This is the full potential abatement, as taken from the ClimateWorks Plan for the selected measures. Depending on implementation, there may be challenges in achieving this full potential abatement.

Develop and implement a process that will allow easy reporting and recording of project outcomes, program works and abatement actions that have been carried out in the selected measures. Work with key stakeholders to store this data and information, and enable a sharing process so other stakeholders can make use of lessons and experiences.

### **Promote**

Publish and promote the actions undertaken by stakeholders that work towards reducing emissions in Gippsland. Depending on the action and selected measure, inform other industry participants, government stakeholders or the general community, and raise awareness of what is being done. Outcomes that could encourage other stakeholders to undertake similar changes should be especially highlighted.

There are six critical stakeholders that need to buy in, for Gippsland's low carbon growth plan to be successful. They are:

- Bass Coast Shire Council
- Baw Baw Shire Council
- East Gippsland Shire Council
- Latrobe City Council
- South Gippsland Shire Council
- Wellington Shire Council

These regional Councils not only have important links to the businesses and communities that the selected measures are focused on, but also have the stakeholder connections, personnel, know-how and funding opportunities to make them a reality. The importance of not only Council involvement in *The Plan*, but Council cooperation with each other, cannot be stressed enough. The Gippsland Local Government Network could be used as the facilitating organisation in this process.

### ***Movement from Phase 1 to Phase 2***

The identification of a priority list of selected measures through this report is Phase 1 in a two Phase project undertaken by GCCN to implement *The Plan*. Phase 2 of this project will involve the implementation of the selected measures, using the processes set out in the applicable sections of this document.

A section in the main body of the report outlines a discussion with Sam Smith, the Future Proofing Geelong Program Manager, who has worked on the implementation of a Low Carbon Growth Plan for Geelong. Her experiences highlighted the resource requirements that will be needed for GCCN to successfully implement the selected measures: they are not insignificant. Adequate human resources, extensive planning, stakeholder connections, role flexibility, skills in persuasion and an eye for detail will all be necessary in Phase 2.

The sections in the main body of this report outlining the selected measures contain two main parts. The key text is enclosed in a shaded box, and includes the following:

- Measure Comments – overall comments concerning the measure;
- Recommended GCCN Role – outlining the possible role for GCCN to play in measure implementation;
- Measure Status – discussion on the status of the measure in Gippsland<sup>2</sup>;
- Examples of Implementation – where possible, an example is given of the measure already being implemented in the Gippsland region.

Following this boxed text, the information and process involved in identifying the measure for selection is outlined. This includes any additional stakeholder input that was received during the report consultation stage.

### ***Matrix Creation***

The key part of the process for Phase 1 was the creation of a screening and evaluation matrix of measures found in *The Plan*. Initially, all measures were investigated and each important aspect was considered and evaluated using a range of metrics.

Through stakeholder input and the guidance and local knowledge of the GCCN Steering Committee, the measures in *The Plan* have been split into measures for implementation in Phase 2, and measures to be excluded from this process. The excluded measures can be found in Appendix A through E, while the selected measures are outlined in further detail in sections of the main body of this report.

Two core indicators have been used in the analysis to allow quick comparison of each measure:

- Traffic lights indicating practicality level; and a
- Draft measure score out of 10.

Although these indicators are somewhat independent of each other, they should be used in conjunction with each other to formulate a final opinion of the suitability of the measure for advancement to final selection.

Three different coloured traffic lights have been used:

- Green – indicates the measure is ‘good to go’ from a practicality point of view. This is not to say that there are no barriers or challenges regarding implementation, but that these could be overcome under normal circumstances, and the positive aspects of the measure mean the effort is worthwhile;
- Orange – indicates the measure is plausible, although there are significant practical challenges and barriers involved in the implementation of the measure;

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<sup>2</sup> Note – it is possible that this doesn’t cover all aspects of the measure status, all care has been taken to include as much information as available at the time of writing.

- Red – indicates the measure has a significant roadblock or other issue in the way of implementation.

A score out of 10 attempts to incorporate all considerations for the measure and provides an informed judgement of the sector and measure (noting that this is to some extent subjective). Stakeholder input was also used to define final scores. This input was very important, as it showed aspects of the measures that weren't initially realised or known. Scores are subjective.

Also included for each measure are notes (and a link where applicable) to any other information that might be useful in its assessment<sup>3</sup>, and a comment section providing any general comments, the pros, the cons, and a conclusion based on the initial EES investigation of the measure. Where stakeholder input was received for a measure, this was also included.

Following the consultation process and stakeholder input, another two factors were added to the matrix – *Status* and *GCCN Role*. The content entered for these will hopefully aid in providing guidance in the second Phase of this project.

Initially, the availability of funding was investigated through a search of the GrantsLink website at <http://grants.myregion.gov.au/>. Also used were Victorian State Government websites, Low Carbon Australia and AusIndustry websites. Following the consultation phase of this report process, funding sources noted by steering committee members were an important addition to the content of the selected measures. Of course, funding programs change constantly due to various reasons, and especially in an election period.

A major unknown is what the outcomes for the Federal Carbon Farming Initiative will be – this program is one of the key funding sources for the On the Land sector.

### ***Research and Implementation Issues***

The ClimateWorks Low Carbon Growth Plan for Gippsland is a 'broad overview document' that does an excellent job of identifying possible actions that could reduce emissions in the Gippsland region from each of the four sectors investigated. The Low Carbon Growth Plan aims to identify a range of opportunities across the region, and hence is necessarily limited in the detail it can provide on any one measure. Similarly, while this report provides another level of detail to the ClimateWorks Plan, it cannot be completely comprehensive. The purpose of this Phase 1 report was to provide an initial screening of measures that may be suitable for implementation in Phase 2, as well as a package of resources and information for each measure that could form the basis of a work plan, within a very limited budget.

There is a balance that was required during the identification of the priority measures and scoring of each measure – undertaking an appropriate level of analysis and research for each measure. Care was required to avoid an

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<sup>3</sup> Note that initially this was a 'high level' search, it should by no means be regarded as including all available information. Input from stakeholders was important in finding local contacts and further information about the selected measures.

overwhelming level of documentation and analysis, but still provide enough detail to allow an informed decision about the priority measures that have been selected at the end of Phase 1 using the agreed evaluation process. It is hoped that this balance has been achieved, and that the move from Phase 1 to Phase 2 is smooth and successful through the guidance provided in this report.

During the drafting of this report, there were several a consultation processes that provided input from the GCCN Steering Committee and interested stakeholders. This input provided a range of considerations and key pieces of information that were initially missing from measure sections and the report in general. As far as possible, specific stakeholder comments and feedback was included into the final report.

Despite the valuable stakeholder feedback and the hours of research that has gone into this report, there are still many unknowns and areas of uncertainty. Some recommendations may turn out to be unsuitable after deeper investigation. The complexity and difficulty in the successful implementation of each of the selected measures should not be underestimated. However, this Phase 1 report provides a firm foundation for the implementation of selected measures in Phase 2.

### Low Carbon Growth Plan for Gippsland - Selected Measures Matrix

Sector	Measure ID	Cost A\$/tCO <sub>2</sub> e	Reduction Potential -ktCO <sub>2</sub> e	Term	Measure Type	Implementati on Body/ Stakeholders	Regional Responsibility	Funding Possibilities	Key Constraint	Status	Recommended GCCN Role	Practicality Level	Score (/10)
2	Measure 1 - Street lighting energy efficiency	-57	2.3	Medium	Energy efficiency	Councils, Energy distributors, Energy retailers	Local Council decision and/or energy distributor.	CEEP, Low Carbon Australia loans (both closed) – significantly funding has been received by the region for this measure	Cost effectiveness <sup>4</sup> , contracts distributors	Gippsland Councils have received CEEP 1 or 2 funding, with All 6 Councils either have upgrade projects underway or in planning stages.	Collaborate Identify Record Promote  Support Councils through meeting and relationship facilitation – within Gippsland and with a wider network of stakeholders. Promote and record the outcomes of the measure, to build social capital and enable future evaluation	Green	9

<sup>4</sup> Additional stakeholder input – *Business cases normally show savings for this measure.*

Sector	Measure ID	Cost A\$/tCO <sub>2</sub> e	Reduction Potential -ktCO <sub>2</sub> e	Term	Measure Type	Implementation Body/ Stakeholders	Regional Responsibility	Funding Possibilities	Key Constraint	Status	Recommended GCCN Role	Practicality Level	Score (/10)
1	Measure 2 - Pulp, paper and print energy efficiency	-96	31.9	Medium	Energy efficiency	Australian Paper, Metso Corporation	Possible through discussions	Unknown – possibly Innovation Grants or AusInd Clean Tech Program	Proving cost effectiveness	Aust Paper has undertaken energy efficiency improvements at its facilities. Opportunities may still exist for further actions.	Collaborate Identify Record Promote  Provide support to Aust Paper through meeting and relationship facilitation. Promote the measure across the region and enable other stakeholders to learn from Aust Paper's experiences. Record actions and outcomes to enable future evaluation.	Green	8
4	Measure 3 - Dairy farm energy efficiency	-84	10.1	Long	Energy efficiency	Farmers, Farming bodies, DEPI, Dairy Aust, Gipps Dairy	Possible through targeted program	Possibly Innovation Grants or AusInd Clean Tech Program, DRET smarter energy use on dairy farms program, Gipps Dairy programs	Payback periods	Dairy Aust has secured federal funding from DRET to deliver 'Smarter energy use on Aust dairy farms'. It is expected that this measure would fall within the scope and intent of that program.	Collaborate Identify Record Promote  Provide support to a key farming organisation – possibly Dairy Aust. Promote the measure across the regions to inform stakeholders and the public, and encourage others to take similar actions. Record actions and outcomes to enable future evaluation.	Green	8

Sector	Measure ID	Cost A\$/tCO <sub>2</sub> e	Reduction Potential -ktCO <sub>2</sub> e	Term	Measure Type	Implementati on Body/ Stakeholders	Regional Responsibility	Funding Possibilities	Key Constraint	Status	Recommended GCCN Role	Practicality Level	Score (/10)
1	<b>Measure 4</b> - Dairy food processing energy efficiency	-82	107.8	Long	Energy efficiency	Dairy Manufacturers Sustainability Council is the relevant peak body, Gipps Dairy, Dairy Aust. Agribusiness Gippsland	Possible through discussions	Possibly a range – AusInd Clean Tech Food and Foundries key	Capital investment	There are different levels of action being undertaken by various processors, including at Burra Foods Korumburra, Ceres Natural Foods Drouin, and Murray Goulburn Co-op Leongatha	Collaborate Identify Record Promote  Provide support to key manufacturers organisation(s) – possibly Dairy Manufacturers Sustainability Council. Promote the measure across the regions to inform stakeholders and the public, and encourage others to take similar actions. Record actions and outcomes to enable future evaluation.	Green	8
4	<b>Measure 5</b> - Reduced cropland soil emissions	-110	2.9	Medium	Soil carbon	Farmers, Farming bodies, DEPI, Ag businesses and consultants, Fertilizer Companies, CMAs, Government bodies?	Maybe possible through targeted program(s)	Possibly a range – Carbon Farming Initiative key	Requires behaviour change	Trials concerning fertilizer use have been conducted in the Gippsland region for some time.	Collaborate Identify Record Promote  Provide support to key farming support organisations – possibly Gippsland CMAs and Landcare Groups. Promote the measure across the regions to inform stakeholders and the public, and encourage others to take similar actions. Record actions and outcomes to enable future evaluation.	Green	8

Sector	Measure ID	Cost A\$/tCO <sub>2</sub> e	Reduction Potential -ktCO <sub>2</sub> e	Term	Measure Type	Implementati on Body/ Stakeholders	Regional Responsibility	Funding Possibilities	Key Constraint	Status	Recommended GCCN Role	Practicality Level	Score (/10)
2	<b>Measure 6 – Commercial Building Energy Efficiency</b>												
2	<b>Measure 6.1</b> Commercial building lighting	-77	28.6	Short	Energy efficiency	SMEs, Building owners, Sustainability Victoria, Government bodies?	Possible through targeted program	Possibly a range – VEET scheme key, EUAs	Proving cost effectiveness, split incentives, information availability	Different aspects of each of the commercial building energy efficiency measures have been implemented in Gippsland – both the Energy Rating Label scheme and the VEET Scheme are supported in the region.	Collaborate Identify Record Promote  Support Councils through meeting and relationship facilitation – within Gippsland and with a wider network of stakeholders. Put together information packs for SMEs and businesses concerning the measures. Lobby for the introduction of EUAs. Promote and record the outcomes of the measure, to build social capital and enable future evaluation	Green	8
2	<b>Measure 6.2</b> Commercial building heating, ventilation and air conditioning (HVAC)	-165	54.0	Long	Energy efficiency	SMEs, Building owners, Government bodies?	Possible through targeted program	Possibly a range – VEET scheme key	Proving cost effectiveness, split incentives		Green	7	
2	<b>Measure 6.3</b> Commercial building electronics and appliances	-84	79.9	Medium	Energy efficiency	SMEs, Building owners, Government bodies?	Possible through targeted program	Possibly a range – VEET scheme key	Proving cost effectiveness		Green	7	
2	<b>Measure 6.4</b> Commercial building water heating	-23	8.8	Long	Energy efficiency	SMEs, Building owners, Government bodies?	Possible through targeted program	Possibly a range – VEET scheme key, EUAs	Proving cost effectiveness, split incentives		Green	7	
2	<b>Measure 6.5</b> Commercial building insulation	-37	34.0	Medium	Energy efficiency	SMEs, Building Owners, Government bodies?	Possible through targeted program	Unknown – possibly a range?, EUAs	Proving cost effectiveness, split incentives		Green	7	
2	<b>Measure 6.6</b> Commercial building energy waste reduction	-141	59.0	Medium	Energy efficiency	SMEs, Building owners, Government bodies?	Maybe possible through targeted program	Possibly a range – dependent on action undertaken, EUAs	Identifying targets and proving cost effectiveness		Green	6	

Sector	Measure ID	Cost A\$/tCO <sub>2</sub> e	Reduction Potential -ktCO <sub>2</sub> e	Term	Measure Type	Implementation Body/ Stakeholders	Regional Responsibility	Funding Possibilities	Key Constraint	Status	Recommended GCCN Role	Practicality Level	Score (/10)
3	<b>Measure 7 - Residential Energy Efficiency</b>												
3	<b>Measure 7.1</b> Residential lighting	-90	19.9	Short	Energy efficiency	Householders, Lighting retailers, Government bodies?	Possible through targeted program	Possibly a range – VEET Scheme key	Information, technology change	Different aspects of each of the residential energy efficiency measures have been implemented in Gippsland – both the Energy Rating Label scheme and the VEET Scheme are supported in the region.	Collaborate Identify Record Promote	Green	8
3	<b>Measure 7.2</b> Residential heating, ventilation and air conditioning (HVAC)	-171	4.6	Medium	Energy efficiency	Householders, Builders, Building companies, Government bodies?	Possible through coordination and targeted program	Possibly a range – VEET scheme key	Information, capital		Support Councils through meeting and relationship facilitation – within Gippsland and with a wider network of stakeholders. Put together information packs for householders concerning the measures. Promote and record the outcomes of the measure, to build social capital and enable future evaluation	Green	7
3	<b>Measure 7.3</b> Residential appliances and electronics	-141	39.3	Medium	Energy efficiency	Householders, Appliance retailers, Government bodies?	Possible through encouragement/ education program	Possibly a range – VEET scheme key	Information availability and proving cost effectiveness		Green	7	
3	<b>Measure 7.4</b> Residential building improved thermal efficiency	-139	24.4	Long	Energy efficiency	Householders, Builders, Building companies, Developers, Building organisations, Government bodies?	Possible through coordination and targeted program	Unknown – possibly a range?	Proving cost effectiveness, rental split incentives		Green	7	
4	<b>Measure 8 - Reforestation</b>												
4	<b>Measure 8.1</b> Strategic reforestation of productive land with environmental forest	24	87.4	Long	Reforestation	Farmers, Land owners, DEPI, DPCD, Landcare Groups, CMAs, Government bodies?	Possible through targeted program	Possibly a range – Landcare Grants key, CFI	Funding and community attitudes	Gippsland has a history of rotational timber plantations, specifically in the Strzeleckis, and logging operations in the	Collaborate Identify Record Promote  Provide support to key forestry and land use organisations –	Green	7

Sector	Measure ID	Cost A\$/tCO <sub>2</sub> e	Reduction Potential -ktCO <sub>2</sub> e	Term	Measure Type	Implementati on Body/ Stakeholders	Regional Responsibility	Funding Possibilities	Key Constraint	Status	Recommended GCCN Role	Practicality Level	Score (/10)
4	<b>Measure 8.2</b> Reforestation of less productive land with timber plantation	4	21.4	Long	Reforestation	Land owners, Timber companies, CMAs, Vic Forests	Possible through encouragement program	Possibly a range – CFI key, possibly also Landcare Grants?	Abatement continuation?	region's State forests.  There is also a long history of Council, CMA, Landcare,	possibly Gippsland CMAs, Landcare Groups and the forestry sector. Promote the measure across the regions to inform stakeholders and the public, and encourage others to take similar actions. Record actions and outcomes to enable future evaluation.	Green	7
4	<b>Measure 8.3</b> Reforestation of less productive land with environmental forest	26	65.0	Long	Reforestation	Farmers, Land owners, DPI, DPCD, Landcare Groups, CMAs, Government bodies?	Maybe possible through targeted program	Possibly a range – CFI key, possibly Landcare Grants,	Funding and site identification	landowner and community group actions concerning reforestation measures.		Green	8

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## Low Carbon Growth Plan for Gippsland - Phase 1 Final Outcomes

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- Sector 3 – Households
- Sector 4 – On the Land

Together, these four sectors comprise a diverse range of potential measures, stakeholders, challenges, opportunities, and abatement potential.

## Sector 1 – Manufacturing, Mining and Freight

Gippsland's manufacturing, mining and freight sector employs just over one tenth of the regional workforce, yet generates one third of the regional economic output. This illustrates the key role these sectors play in the economic wellbeing of the region. Much of this manufacturing is focused on the processing of meat, dairy and other food products produced on Gippsland's fertile agricultural land, and the manufacture of paper products from timber harvested in Gippsland's extensive forests. Mining (including oil and gas extraction) is the second smallest sector in terms of employment numbers, yet is the third largest sector in comparative regional output. Natural gas is extracted offshore from extensive reserves in the Bass Strait (where one fifth of Australia's crude oil is also extracted) and is then processed and distributed to Melbourne, NSW, South Australia, Tasmania and the ACT.

## Sector 2 – Commercial and Services

Almost two thirds of Gippsland's working population work in the commercial and services sector, the largest employing sectors are office based businesses, non retail food, health and education. Many commercial and services businesses in Gippsland are SMEs, who typically lack the resources to identify and invest in energy efficiency retrofits. The region's buildings were constructed at a time before we had building efficiency standards, and many have not been substantially upgraded to improve energy efficiency since then. Gippsland's dispersed population also means that opportunities are highly fragmented, and can therefore be harder to capture.

## Sector 3 – Households

By 2020 it is estimated that there will be 110,000 households in Gippsland, an increase of 16% over this decade. Most of this population growth is expected around the key regional centres of Warragul, Wonthaggi, Latrobe Valley, Sale, Bairnsdale, Leongatha and Cowes. This will also see 15,000 new homes built over this period to accommodate the growing population. Most Gippsland residents live in separate houses, with just 9% of the population living in units, townhouses or apartments.

## Sector 4 – On The Land

Land based activities are a key economic driver in Gippsland. Agriculture, Forestry and Fishing is the fourth largest sector in terms of regional output and the third largest in terms of employment, providing jobs for almost 10,000 Gippsland residents. This also ensures it is a significant contributor to the region's greenhouse gas emissions, with land based activities contributing 1.3 million tonnes of emissions per year. The region has over one million hectares of agricultural land, and extensively forested public land. Parts of Gippsland – particularly around the Macalister Irrigation District – are prime dairy land, producing 22% of Australia's milk. The region also produces excellent pasture for beef and lamb, and reliable water resources are attracting a growing horticulture industry. Despite some climate and soil variability across the region, Gippsland's fertile soils and water security are expected to see an intensification of agricultural activity in the future, and the region is positioning itself as the future food bowl for Victoria and Australia. Gippsland has also

developed extensive local expertise in reducing emissions from land based activities.

Each of these four sectors have priority measures selected in the final listing. The selected measure types fall broadly into the following two categories:

- **Energy efficiency**

The key concept behind energy efficiency can be described as ‘getting more for less’. Energy efficiency underpins many forms of emissions abatement, and is the most important response that can be undertaken to reduce energy bills. It is a response that is found through each of the four sectors, from downsizing equipment or installing ceiling insulation, to choosing more efficient appliances or replacing an old lighting technology with a new one.

- **Soil carbon, forestry practices and livestock**

There are many avenues for emissions abatement when considering current forestry and farming practices. Increasing the sequestration of carbon in the soil is one key measure, as is reforestation of marginal land. Co-benefits of these actions can include providing biodiversity security and increased pasture productivity. Combating the emissions from cropping and livestock are also potential abatement measures that could allow large emissions reductions.

### Selected Measures

The priority measures that have been selected for implementation in Phase 2 include (Measure ID as per numbered points below):

1. Street Lighting Energy Efficiency
2. Pulp, Paper and Print Energy Efficiency
3. Dairy Farm Energy Efficiency
4. Dairy Food Processing Energy Efficiency
5. Reduced Cropland Soil Emissions
6. Commercial Building Energy Efficiency
  1. Commercial Building Lighting
  2. Commercial Building Heating, Ventilation and Air Conditioning (HVAC)
  3. Commercial Building Electronics and Appliances
  4. Commercial Building Water Heating
  5. Commercial Building Insulation
  6. Commercial Building Energy Waste Reduction
7. Residential Energy Efficiency
  1. Residential Lighting
  2. Residential Heating, Ventilation and Air Conditioning (HVAC)
  3. Residential Appliances and Electronics
  4. Residential Building Improved Thermal Efficiency

## 8. Reforestation

1. Strategic Reforestation of Productive Land with Environmental Forest
2. Reforestation of Less Productive Land with Timber Plantation
3. Reforestation of Less Productive Land with Environmental Forest.

The Measure ID in the numbered points above is used throughout this report. Measures are documented in this order (although these are not necessarily in priority order).

These measures have a combined potential abatement of 673 ktCO<sub>2</sub>e<sup>5</sup>, and their implementation will increase the resilience of local economies and save money for businesses and householders in Gippsland. They will also show the wider community that Gippsland is serious about taking action on emissions abatement, not only through future measures but also through the promotion of existing achievements undertaken by key stakeholders in the region.

### ***GCCN and Key Stakeholder Roles***

For the emissions abatement actions in the selected measures to be successful in their implementation, the key role for GCCN to play is recommended to revolve around the following four key steps:

- **Collaborate**
- **Identify**
- **Record**
- **Promote**

#### **Collaborate**

Work with stakeholders to develop action plans, business cases, and in identifying funding opportunities. Facilitate relationship networking between stakeholders within industry sectors or among different industries where there is found to be a common goal. As far as possible, work within existing frameworks to save resources by avoiding duplication. Inter-Council collaboration in Gippsland concerning the implementation of the selected measures will be critical to success.

#### **Identify**

Cooperate with stakeholders involved in the selected measures to identify possible abatement gaps in programs and projects, and develop plans and strategies to fill these. Concentrate on opportunities that have easy to achieve outcomes, or where the possible reward for effort is large.

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<sup>5</sup> This is the full potential abatement, as taken from the ClimateWorks Plan for the selected measures. Depending on implementation, there may be challenges in achieving this full potential abatement.

## Record

Develop and implement a process that will allow easy reporting and recording of project outcomes, program works and abatement actions that have been carried out in the selected measures. Work with key stakeholders to store this data and information, and enable a sharing process so other stakeholders can make use of lessons and experiences.

## Promote

Publish and promote the actions undertaken by stakeholders that work towards reducing emissions in Gippsland. Depending on the action and selected measure, inform other industry participants, government stakeholders or the general community, and raise awareness of what is being done. Outcomes that could encourage other stakeholders to undertake similar changes should be especially highlighted.

There are six critical stakeholders that need to buy in, for Gippsland's low carbon growth plan to be successful. They are:

- Bass Coast Shire Council
- Baw Baw Shire Council
- East Gippsland Shire Council
- Latrobe City Council
- South Gippsland Shire Council
- Wellington Shire Council

These regional Councils not only have important links to the businesses and communities that the selected measures are focused on, but also have the stakeholder connections, personnel, know-how and funding opportunities to make them a reality. The importance of not only Council involvement in *The Plan*, but Council cooperation with each other, cannot be stressed enough. The Gippsland Local Government Network could be used as the facilitating organisation in this process.

Other key stakeholder groups that are important for selected measures include<sup>6</sup>:

- Agribusiness Gippsland
- Australian Paper
- Dairy Australia
- Dairy Manufacturers Sustainability Council
- Department of Environment and Primary Industries (DEPI)
- Department of Planning and Community Development (DPCD)
- Gippsland's Catchment Management Authorities
- Gipps Dairy
- Sustainability Victoria
- VECCI

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<sup>6</sup> Please note that this is not an exhaustive list, there may be other important stakeholder groups depending on the measure.

## ***Movement from Phase 1 to Phase 2***

The identification of a priority list of selected measures through this report is Phase 1 in a two Phase project undertaken by GCCN to implement *The Plan*. Phase 2 of this project will involve the implementation of the selected measures, using the processes set out in the applicable sections of this document.

A later section outlines a discussion with Sam Smith, the Future Proofing Geelong Program Manager, who has worked on the implementation of a Low Carbon Growth Plan for Geelong. Her experiences highlighted the resource requirements that will be needed for GCCN to successfully implement the selected measures: they are not insignificant. Adequate human resources, extensive planning, stakeholder connections, role flexibility, skills in persuasion and an eye for detail will all be necessary in Phase 2.

The sections outlining the selected measures contain two main parts. The key text is enclosed in a shaded box, and includes the following:

- Measure Comments – overall comments concerning the measure;
- Recommended GCCN Role – outlining the possible role for GCCN to play in measure implementation;
- Measure Status – discussion on the status of the measure in Gippsland<sup>7</sup>;
- Examples of Implementation – where possible, an example is given of the measure already being implemented in the Gippsland region.

Following this boxed text, the information and process involved in identifying the measure for selection is outlined. This includes any additional stakeholder input that was received during the report consultation stage.

## ***Matrix Creation***

The key part of the process for Phase 1 was the creation of a screening and evaluation matrix of measures found in *The Plan*. Initially, all measures were investigated and each important aspect was considered and evaluated using following metrics:

- The details of energy reduction;
- The cost per tonne of abatement;
- The timeframe of the measure (short, medium, long term);
- The type of measure;
- The likely main implementation body or stakeholders;
- The level of regional responsibility for implementation;
- Existence of any feasibility studies or proposals (to ascertain implementation readiness) or an assessment of activity already being undertaken;

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<sup>7</sup> Note – it is possible that this doesn't cover all aspects of the measure status, all care has been taken to include as much information as available at the time of writing.

- The feasibility or practicality of implementation in the Gippsland region.

Through stakeholder input and the guidance and local knowledge of the GCCN Steering Committee, the measures in *The Plan* have been split into measures for implementation in Phase 2, and measures to be excluded from this process. The excluded measures can be found in Appendix A through E, while the selected measures are outlined in further detail in later sections.

As noted, there are four different sectors included in *The Plan*. These sectors cover many aspects of the Gippsland region, community, economy and environment<sup>8</sup>. They include:

- Mining, Manufacturing and Freight;
- Commercial and Services;
- Households;
- On the Land.

There are a total of 47 individual measures across all these sectors.

A cost curve approach was used to document each measure. This comprises of two key aspects:

- The \$ cost per tonne of CO<sub>2</sub>e, which has been expressed in 2010 real dollars (also includes the private cost of capital – energy taxes, retail margins and subsidies etc);
- The amount of potential CO<sub>2</sub>e abatement, in kt.

Each measure was also been split into different types of response and normally has a number of assumptions attached (as given in the detailed measure discussion in later sections of this report), which outline what is required for the full abatement potential to be achieved during the timeframe.

Measures were considered independently on their own merits. Indicators were used to guide the evaluation of each measure, with these based off how plausible the measure would be to implement as part of the GCCN project<sup>9</sup>.

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<sup>8</sup> Note that power generation was been excluded from the ClimateWorks analysis as this is a State wide industry that happens to be physically located in Gippsland.

<sup>9</sup> This is an important point to note – each measure has been assessed on its merits for implementation in the GCCN project, NOT as an assessment/score of the action itself.

## Indicators

Two core indicators have been used in the analysis to allow quick comparison of each measure:

- Traffic lights indicating practicality level; and a
- Draft measure score out of 10.

Although these indicators are somewhat independent of each other, they should be used in conjunction with each other to formulate a final opinion of the suitability of the measure for advancement to final selection.

Three different coloured traffic lights have been used:

- Green – indicates the measure is ‘good to go’ from a practical point of view. This is not to say that there are no barriers or challenges regarding implementation, but that these could be overcome under normal circumstances, and the positive aspects of the measure mean the effort is worthwhile;
- Orange – indicates the measure is plausible, although there are significant practical challenges and barriers involved in the implementation of the measure;
- Red – indicates the measure has a significant roadblock or other issue in the way of implementation.

A score out of 10 attempts to incorporate all considerations for the measure and provides an informed judgement of the sector and measure (noting that this is to some extent subjective). These considerations include:

- The *cost per tonne of abatement* – this was the base measure for the ClimateWorks Plan;
- The *total amount of abatement potential* – this is an important component in the ClimateWorks Plan. It must be noted that a consideration of how the measure would achieve the full abatement potential has been incorporated in the draft score, as well as the total amount;
- *Timeframe* – some weight was given to this component. For shorter term measures - quicker realisation; or longer term measures – the practicality of implementing a program that may have to last until 2020 to receive full abatement potential;
- *Measure Type* – these fall into a number of broad categories;
- *Implementation Body/Stakeholders* – a first pass judgement on who might be the main bodies and stakeholders that will need to be engaged for the measure to be successfully implemented (a smaller number of stakeholders or decision makers can be a positive attribute);
- *Regional Responsibility* – a note on how the measure might be possibly implemented in the Gippsland region, by the GCCN Steering Committee or associated stakeholders;
- *Funding Possibilities* – a first pass assessment on possible funding avenues for use in implementation of the measure;

- *Key Constraint* – a judgement on what is considered the key constraint in the way of full implementation of the measure.

Stakeholder input was also used to define final scores. This input was very important, as it showed aspects of the measures that weren't initially realised or known. Scores are subjective. It is also important to note that the first two dot points above, and to some extent the third dot point, are as set out in *The Plan*, were not reanalysed in any part of this Phase 1 process.

Also included for each measure are notes (and a link where applicable) to any other information that might be useful in its assessment<sup>10</sup>, and a comment section providing any general comments, the pros, the cons, and a conclusion based on the initial EES investigation of the measure. Where stakeholder input was received for a measure, this was also included.

Following the consultation process and stakeholder input, another two factors were added to the matrix – *Status* and *GCCN Role*. The content entered for these will hopefully aid in providing guidance in the second Phase of this project.

## Funding

ClimateWorks released a funding document to go along with *The Plan* and an assumptions and bibliography document. They have stated that this funding document is now out of date and not applicable. Partly this has come about due to the time between the publication and the creation of this report, with the application process finishing for many avenues, and also because the political landscape has changed at both a Federal and State level since *The Plan's* completion.

Initially, the availability of funding was investigated through a search of the GrantsLink website at <http://grants.myregion.gov.au/>. Also used were Victorian State Government websites, Low Carbon Australia and AusIndustry websites.

Following the consultation phase of this report process, funding sources noted by steering committee members were an important addition to the content of the selected measures. Of course, funding programs change constantly due to various reasons, and especially in an election period. A major unknown is what the outcomes for the Federal Carbon Farming Initiative will be – this program is one of the key funding sources for the On the Land sector.

Funding for this project has been provided through Regional Development Australia Gippsland Committee, from the members of the Gippsland Local Government Network, and from the GCCN. The bank – MECU – will also conditional support for Phase 2 of the project.

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<sup>10</sup> Note that initially this was a 'high level' search, it should by no means be regarded as including all available information. Input from stakeholders was important in finding local contacts and further information about the selected measures.

## **Key Points for Consideration - Future Proofing Geelong Experiences**

A discussion was held with Sam Smith, the Future Proofing Geelong Program Manager<sup>11</sup>, concerning their implementation of the ClimateWorks Low Carbon Growth Plan for Geelong. Sam was kind enough to share some of the lessons and experiences that came out of the process. These should be kept in mind when considering the potential issues faced in implementing a Low Carbon Growth Plan for Gippsland (the points from Sam Smith are in *italics*, followed by a key point to consider).

### **Concerning the Situation**

*The Geelong Plan covers municipal boundaries, plus many of the big emitters in the area, abatement work had already been undertaken by some of these.*

Key point – best to work with stakeholders on improving or aiding with existing projects and programs.

*There are 10,000 SMEs in the region, and 7.5k heritage listed buildings – thus, many challenges. The building stock is aging, so along with the SMEs, these were targeted as key areas to work with.*

Key point – tightly target areas of work to get the best return for effort.

*Initially the plan was Council driven – with two approaches: top down (large organisation involvement, sustainability covenant etc) and bottom up (grassroots movements with communities etc), but found there have been many challenges – State Government policy changes in particular.*

Key point – build redundancy into planning for measure implementation and be flexible with approaches.

### **Concerning Funding**

*Funding difficulties (State and Federal Government policy changes connected), which created major issues – did 18 months of ground work, building trust and relationships only to find the funding gone by the time of implementation.*

Key point – identify measures that are least affected by outside funding requirements, actions that ‘pay for themselves’ may be best.

*Future Proofing Geelong now employs a bid writer to target funding opportunities, including writing applications and assisting SMEs in application processing.*

Key point – successful implementation of a Low Carbon Growth Plan will require resources – money, time and labour.

*Funding is absolutely critical: making sure it is there available for implementation. Consider what can realistically be done – Future Proofing*

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<sup>11</sup> It should be noted that Future Proofing Geelong would be happy to assist the GCCN, and would value the building of a relationship between the two regions.

*Geelong made business plans for aspects of measures and got business and community partners on board with these. Although not a simple process sometimes, this kind of ground work does help.*

Key point – a well thought out and targeted implementation process is essential, even after the initial measure selection and implementation steps identified.

*There is a need to have people working on the ground to achieve things – implementing a Low Carbon Growth Plan is not a simple task and is made harder if the human resources are not available (three people work a couple of days a week each on the Future Proofing Geelong project).*

Key point – successful implementation of a Low Carbon Growth Plan will require resources – money, time and labour.

### **Concerning Stakeholders**

*A key lesson was that there is a need for stakeholders/people to buy into the plan and the process, it is very difficult otherwise.*

Key point – the above text speaks for itself!

*Relationships and trust building are essential – this is especially true when dealing with time poor SMEs. There is still tendency for them to ignore advice/assistance offers if they don't know or trust who is giving them the advice/assistance.*

Key point – this comment came out through the consultation process for measure selection. It is important that this is adequately considered when measures are being implemented. Again, this work will take resources to undertake.

### **Concerning the Outcomes So Far**

*A Sustainability Covenant was enacted – this is intended as a MOU between parties. Initially it had 7 signatories, but once launched, others came on board. It was written by the EPA, and is for 3 years to help assist in embedding changes bought about through the implementation of the plan – currently 2 out of 3 years into this process.*

Key point – it is unknown whether this strategy would be effective in a Gippsland context, the regions are very different in geographical and community structure.

*A clean technology cluster has been developed with local research organisations to help grow the local economy.*

Key point – achieving legacy outcomes like this from the Gippsland Low Carbon Growth Plan would be fantastic.

*Best implemented measures (both going great) – retrofitting large facilities (sporting, community etc) through grants, awareness raising activities.*

Key point – the Gippsland measures involving street lighting and commercial energy efficiency both fit this example.

*Worst measures – major difficulties were found with some of the measures outlined in the ClimateWorks plan, these were not considered for implementation.*

*Also found that there were large challenges even in the (seemly) straight forward actions – street lighting contractual arrangements have caused great difficulty in implementation, unlocking barriers for some measures is difficult, there are also big capital requirements for some actions which makes them very hard to get off the ground.*

Key point – it is hoped that the Phase 1 matrix and consultation process has removed the least plausible measures, as well as identifying the challenges involved in the selected measures.

*Most important future thing to consider is measurement and evaluation, thought needs to be given on how this would happen down the track.*

Key point – it is recommended that a capacity for measurement and evaluation be built into every measure selected for implementation, its importance shouldn't be understated in spite of the resources that will be required to achieve this.

## ***Final Note***

The ClimateWorks Low Carbon Growth Plan for Gippsland could be seen as a 'detailed overview document'. It does an excellent job of identifying possible actions that could reduce emissions in the Gippsland region from each of the four sectors investigated. That said, a Low Carbon Growth Plan aims to identify a range of opportunities across a region, and is hence limited in the detail it can provide on any one opportunity. Similarly, although this report provides another level of detail to the ClimateWorks Plan, it should be noted that it won't be completely comprehensive.

There is a balance that was required during the identification of the priority measures and scoring of each measure – undertaking an appropriate level of analysis and research for each measure, without impinging on the report as a whole, but still providing enough detail to allow an informed decision about the priority measures to select at the end of Phase 1. It is hoped that this balance has been achieved, and that the move from Phase 1 to Phase 2 is smooth and successful through the guidance provided in this report.

As part of drafting this report, there was a consultation process that requested input from the GCCN Steering Committee and interested stakeholders. This input provided considerations and key pieces of information that were initially missing from measure sections and the report in general. Specific stakeholder comments were assessed on merit and included where applicable.

In spite of the stakeholder input and the hours of research and work that has gone into the creation of this report, there will still be unknowns, areas of uncertainty, and unsuitable recommendations. The complexity and difficulty in the successful implementation of each of the selected measures, and the task in general, should not be underestimated.

This report includes a number of Appendices, including:

- A matrix of excluded measures;
- Draft measure sections that include measure details and aspects concerning scoring etc;
- Commentary on aspects of the report creation;
- Discussion of the different measure types.

While the information contained in these Appendices is of interest, it is not considered critical to the implementation of the selected measures.

## Measure 1 - Street Lighting Energy Efficiency

### Measure Comments:

Street lighting energy efficiency came through the consultation process as the most plausible measure for implementation. The key reasons for this is are the availability of funding for lighting upgrades, and the regional Council's openness to change. That said, there are still complex facets regarding measure implementation, with the contractual relationship between Councils and energy distributors a hurdle that will need to be negotiated before implementation can fully occur.

### Recommended GCCN Role:

It is recommended that the role for GCCN be to provide support to Councils in through meeting and relationship facilitation – both within the Gippsland region and with a wider network of stakeholders. The value of learning from other experiences will be critical in making sure the implementation of this measure is efficient and smooth for all parties.

Once implementation has been completed, it is recommended that promotion of the measure across the regions be conducted to inform the public and other stakeholders of the street lighting changes that have been undertaken. This will build social capital in regards to energy efficiency actions being undertaken by local governments, and may also encourage individuals to take their own actions.

Outside consultation concerning this measure has provided a valuable contact for GCCN and Councils, on stakeholder experience with the implementation of this measure in other regions:

*Judy Bush, The Northern Alliance for Greenhouse Action (NAGA)<sup>12</sup>.*

Understanding and recording energy efficiency actions that have been undertaken in this area (and connected to this measure) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

### Measure Status:

Gippsland Councils have received CEEP 1 or 2 funding, with all 6 Councils either have lighting upgrade projects underway or in planning stages.

### Examples of Implementation:

NAGA is an alliance of the Moreland Energy Foundation and the Councils spanning the northern metropolitan region of Melbourne. Like GCCN, NAGA shares information, coordinates emissions reduction and adaption activities, and cooperates on the research and development of innovative projects. One of the key projects that NAGA has been involved in is the upgrading of street lighting. NAGA Website - <http://www.naga.org.au/climate-change-action/streetlighting.html>

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<sup>12</sup> Contact details available on request.

Although this is a difficult space for implementation, many Councils around Victoria have identified it as a key area of action, resulting in emissions abatement and energy cost savings.

Information concerning the work being undertaken in Gippsland include:

Baw Baw Shire - <http://www.cleanenergymap.gov.au/baw-baw-shire-council-street-lighting>

Bass Coast Shire - <http://www.cleanenergymap.gov.au/bass-coast-shire-council-street-lighting>

South Gippsland Shire - <http://www.cleanenergymap.gov.au/south-gippsland-shire-council-street-lighting-upgrade>

**Measure Action:** *Replace current streetlights with energy efficient T5 lamps.*

**Cost (A\$/tCO<sub>2</sub>e):** -57

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 2.3

**Assumptions:**

- 100% of light bulbs replaced by 2020
- 60% of electricity savings potential
- Upfront cost of \$300 per street light for fixture, average lifespan of 30 years, and incremental upfront cost of \$40 per light bulb

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Councils, Energy distribution companies, Energy retailers, Lighting consultants, Lighting installers

**Regional Responsibility Level:** Measure already being undertaken in several of the regional councils, with other councils applying for funding

**Existence of Other Information (click for link):**

[PWC Streetlighting Barriers Report](#)

[Australian Government website streetlight publication](#)

[Municipal Association of Victoria, Local Government website publication 1](#)

[Municipal Association of Victoria, Local Government website publication 2](#)

**Practical Implementation Considerations:** There is a difficulty in the historical relationship between councils, energy distributors (who own the lighting infrastructure), and energy retailers (who supply the electricity) – contractual arrangements and decision inertia have meant the most efficient lighting choice is not always installed/upgraded to. This has changed in recent times and change is possible, allowing this measure to be implemented.

### **Funding Opportunities:**

Additional stakeholder input –

- Business cases normally show savings.
- Significant amount of CEEP funding received for the region.

### **Comments:**

- General - Negative cost, some abatement potential
- Pros – Energy efficiency ‘easy’ to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding, lighting is very straight forward to deal with, work being done in Councils around this measure already, very visible abatement measure
- Cons – Barriers including contractual arrangements with SP AUSNET, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?, stipulation of technology used??
- Conclusion - Measure should be actively considered

### **Additional Information:**

Discussion with Scott Ferraro from ClimateWorks –

*Initially, South Gippsland and Bass Coast received funding and are going ahead with the project. Baw Baw Shire is in process of securing the funding, while East Gippsland, Latrobe City and Wellington are submitting for the next Stage of funding. The Municipal Association Victoria has an implementation team for street lighting.*

Discussion with Judy Bush from NAGA - [www.naga.org.au](http://www.naga.org.au) –

*She said she can give contact details for other Councils in NAGA that have/are dealing with street lighting changes. She gave two other contacts Stuart Nesbitt from Moreland (Council contact) and Paul Brown from Ironbark Sustainability (street lighting expert that has assisted councils in implementing street lighting changes).*

*Council street lighting changes are not that simple. This is a split incentive area where distribution businesses own the lights, but retailers charge for the electricity and the Council pays the bills. It can also be complicated by different distribution businesses in the same Council area.*

*As the lighting is an unmetered supply, the lighting technologies need to be on a load table - T5 LFL (30W) and CFL (40W) side entry bulbs both are. LEDs could be getting closer to being included on the table, although there are issues with a lack of a national standard for them. This, and purchase price are the biggest issues for LEDs.*

*For a bulk change over, it may be necessary to tender the job out as under the Local Government Act rules, though there is still a lack of clarity about this; some councils have tendered out elements of the process only, such as purchase of the lights (with the distributor undertaking the installation (Yarra Council).) There is not one way of doing it different approaches by different councils.*

*It is noted that street lighting is often the biggest single source of emissions in council owned infrastructure.*

**ClimateWorks Road Map Notes:** N/A

**Key Constraint:** Proving cost effectiveness, contracts distributors

**Practicality Level:** Green

**Draft Score of Measure:** 9/10

## Measure 2 - Pulp, Paper and Print Energy Efficiency

### Measure Comments:

The pulp, paper and print sector is important for the Gippsland region, in particular in the populous area where the Australian Paper facility is based. It has been noted that efficiency actions have already been completed or are in train, but in spite of this, there is still a valuable role for GCCN to play.

### Recommended GCCN Role:

It is recommended that the role for GCCN be to provide support to Australian Paper if required through meeting and relationship facilitation. This could take the form of broader industry engagement of energy efficiency through the Centre for Sustainable Industry at Monash University, with Australian Paper teaching other stakeholders what measures have been the most successful or otherwise for them.

Once implementation is underway, it is recommended that promotion of the measure across the regions be conducted to inform the public and other stakeholders of the changes Australian Paper have undertaken to save energy and money.

Initial meetings with Australian Paper may be required to understand what they consider the best role for GCCN, and how they may be able to assist.

Understanding and recording energy efficiency actions that have been undertaken in this sector (and connected to this measure) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

### Measure Status:

It is known that energy efficiency improvements have been undertaken by Australian Paper, although it is unknown what form these took and what other opportunities might still be available.

### Examples of Implementation:

There is a history of energy efficiency improvements at the Australian Paper Maryvale site. One example is:

*“The 55 MW Maryvale Mill Black Liquor energy facility is connected to the east coast electricity network. The Australian Government’s Renewable Energy Target (RET) scheme has helped make this renewable energy project a reality. In 2002, the Maryvale Mill Black Liquor energy facility became a RET-accredited renewable energy power station, entitling it to create tradable certificates under the RET scheme for the renewable electricity it produces. The sale of these certificates provides an additional revenue stream, helping make this project commercially viable.”* From -

<http://www.cleanenergymap.gov.au/australian-paper-ret>

**Measure Action:** *Energy efficiency opportunities including improving control systems (automated or manual); reduction of duplicated or oversized equipment; boilers and steam distribution systems; waste heat recovery (eg used for pre-heating or other sites); building utilities.*

**Cost (A\$/tCO<sub>2</sub>e):** -96

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 31.9

**Assumptions:**

- Energy savings of 13% overall are achievable by 2020
- Upfront cost of \$140 per MWh saved in one year, average lifespan of 10 years

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Australian Paper, Metso Corporation, Industry bodies, Unions, Government bodies, Other corporations?

**Regional Responsibility Level:** As the Maryvale Mill is located in Gippsland and is a very important feature of the local economy, it is suggested that there can be a close relationship and discussion concerning this measure

**Existence of Other Information (click for link):**

[The Energy Efficiency Exchange, Federal and State Government website](#)

[News article on changes to maintenance program at Latrobe Valley site](#)

[The Australian Paper website](#)

**Practical Implementation Considerations:** Possibly there will be a push back from management concerning any changes?, unknown how many changes have been made already, new maintenance company could be open to discussion?

**Funding Opportunities (click for link):** Unknown funding avenues, possibly through -

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

**Comments:**

- **General** - Reasonable negative cost, reasonable abatement potential
- **Pros** – Energy efficiency is ‘easy’ to achieve, very important sector for Gippsland, simply identifiable actors(?), new international maintenance manager that specialises in the sector
- **Cons** – Barriers, why haven’t these measures been implemented already?, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time? Lifetime of sector?
- **Conclusion** - Measure should be actively considered

**ClimateWorks Road Map Notes:** Medium lock in risk; Relatively simple to implement

**Key Constraint:** Proving cost effectiveness

**Practicality Level:** Green

**Draft Score of Measure:** 8/10

## Measure 3 - Dairy Farm Energy Efficiency

### Measure Comments:

Dairy farming is a very important sector for the Gippsland region, with large areas of both irrigated and unirrigated production existing within its boundaries. Dairy producers are particularly affected by the vagaries of the milk price, causing income levels to be volatile. This means that any measure that can assist the bottom line through lowering energy bills will be useful, provided it can be simply shown how the action can be implemented and be positive to a business.

There is a large cross section of the community involved in the farming sector, and as such, it is expected that there will be varying degrees of acceptance for efficiency measures. Due to this, implementation of the measure should be conducted through an organisation that is known and trusted by stakeholders, increasing the uptake and effectiveness of a program.

### Recommended GCCN Role:

It is recommended that the role for GCCN be to provide support as required to a key farming organisation to enable measure implementation. Possibly Dairy Australia<sup>13</sup> is the best choice, due to their existing role in implementing similar measures.

Once implementation is underway, it is recommended that promotion of the measure across the regions be conducted to inform the public and other stakeholders of the changes that dairy farmers and the industry have undertaken to save energy and money. This may also encourage reticent parties to investigate what changes they can make.

Understanding and recording energy efficiency actions that have been undertaken in this area (and connected to this measure) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

### Measure Status:

Dairy Australia has secured federal funding through the Department of Resources, Energy and Tourism to deliver a project titled 'Smarter energy use on Australian dairy farms'. Aimed at helping dairy farmers use energy more efficiently, this project provides funding for 900 Australian dairy farmers to access on farm energy assessments, workshops and information resources. It is expected that the measure would fit neatly into the DRET project terms of reference.

See here for information:

- <http://www.dairyaustralia.com.au/Animals-feed-and-environment/Milking-cows/Free-energy-assessments-for-your-farm.aspx>

- <http://frds.dairyaustralia.com.au/events/smarter-energy-use/>

### Examples of Implementation:

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<sup>13</sup> A Dairy Australia contact is available on request.

The Macalister Demonstration Farm has implemented this measure and shown that it is a very cost effective action for farmers to make use of:

*“A measure that was identified during a dairy energy audit was the installation of a heat recovery unit on the refrigeration compressor to lower the temperature of refrigeration gasses. This not only improves the cooling efficiency of the system by traps heat from the milk that would otherwise be wasted in the atmosphere. Performance data suggests that the gain from a heat recovery unit may be equivalent to lower the temperature of the milk entering the vat by 2-3° C while the heated water could be used as a feed for the hot water services. In both instances this is an energy saving.”* From - <http://www.macalisterdemonstrationfarm.com/wp-content/uploads/2012/03/Information-Sheet-10-Refrigeration-heat-Extraction-June-11.pdf>

**Measure Action:** *Installation of a heat recovery unit on the refrigeration compressor lowers the temperature of refrigeration gases.*

**Cost (A\$/tCO<sub>2</sub>e):** -84

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 10.1

**Assumptions:**

- Assume that systems are replaced when current systems fail and that half of these upgrade to an efficient system
- Average savings of 19% on refrigeration and water heating energy use
- Penetration rate of 33% of farm systems by 2020

**Measure Type:** Energy Efficiency

**Timeframe:** Long

**Implementation Body/Stakeholders:** VFF, Dairy industry bodies, Co-ops, Farmers, DEPI, Dairy Australia, Gipps Dairy

**Regional Responsibility Level:** Should be ‘relatively’ easy to define how and where there can be input into this measure – possibly through a targeted program after identifying actors? Very important sector for Gippsland

**Existence of Other Information (click for link):**

[Macalister Demonstration Farm website](#)

[Macalister Demonstration Farm publication](#)

[Department of Primary Industry website](#)

[Dairy Australia website](#)

**Practical Implementation Considerations:** Costs to change equipment, lack of understanding of how, where and when to change things – will impact on the ability of farmers to do this. A large number of actors, would require long term coordination to get full value from this measure

**Funding Opportunities:** Possible funding avenues include -

[Gardiner Foundation: Working in Dairy Communities](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[Grow your Business](#)

[Grow your Business – Business Development Plan](#)

Additional stakeholder input –

*Gipps Dairy is rolling out Dairy Australia smarter energy use project. Dairy Australia has received fund through Clean Energy -*

<http://frds.dairyaustralia.com.au/events/smarter-energy-use/>

<http://www.dairyaustralia.com.au/Animals-feed-and-environment/Milking-cows/Free-energy-assessments-for-your-farm.aspx>

**Comments:**

- **General** - Reasonable negative cost, low abatement potential
- **Pros** – Energy efficiency is ‘easy’ to achieve, very important sector for Gippsland, relatively simply identifiable actors(?), umbrella groups to work with?, funding possibilities?, Macalister Demonstration Farm
- **Cons** – Many individual actors, barriers like why haven’t these measures been implemented already?, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?
- **Conclusion** - Measure should be actively considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; Relatively simple to implement

**Key Constraint:** Payback periods

**Practicality Level:** Green

**Draft Score of Measure:** 8/10

## Measure 4 - Dairy Food Processing Energy Efficiency

### Measure Comments:

Like dairy farming, dairy food processing is a very important sector for the Gippsland region, supporting Gippsland's large areas of irrigated and unirrigated dairy production. Processing sites in Gippsland include:

- Burra Foods, Korumburra
- Fonterra, Darnum
- Jindi Cheese, Jindivick
- Maffra Cheese, Tinamba
- Murray Goulburn, Leongatha and Maffra
- National Foods, Morwell
- Organic Dairy Farmers, Warragul(?)
- Tarago River Cheese, Neerim South
- United Dairy Powder, Poowong

As can be seen from the number of individual processors and sites, this sector provides the local Gippsland economy with essential revenue and jobs. It has been noted that efficiency actions have already been completed or are in train, but in spite of this, there is still a valuable role for GCCN to play with bringing lessons and experiences to a wider audience or providing support as required to stakeholders.

### Recommended GCCN Role:

It is recommended that the role for GCCN be to provide support to a key manufacturer organisation – possibly the Dairy Manufacturers Sustainability Council is the best choice, due to their status and connections<sup>14</sup>, although Dairy Australia<sup>15</sup> Gipps Dairy and Agribusiness Gippsland are also important stakeholders. This could take the form of broader industry engagement of energy efficiency through the Centre for Sustainable Industry at Monash University, with GCCN facilitating meetings and relationships as required.

Once implementation is underway, it is recommended that promotion of the measure across the regions be conducted to inform the public and other stakeholders of the changes that the dairy industry have undertaken to save energy and money.

Initial meetings with the Dairy Manufacturers Sustainability Council may be required to understand what they consider the best role for GCCN is.

Understanding and recording energy efficiency actions that have been undertaken in this sector (and connected to this measure) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

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<sup>14</sup> Targeted outreach to other processors may be required if they are not included in the Dairy Manufacturers Sustainability Council membership.

<sup>15</sup> A Dairy Australia contact is available on request.

### Measure Status:

There are different levels of action being undertaken by various processors, including those examples given below. It is unknown what opportunities still exist in this area, although it should be noted that Dairy Australia and milk companies have Carbon Farming Futures extension and outreach grants<sup>16</sup> available that may assist with the measure implementation depending on the stakeholder and site.

### Examples of Implementation:

Actions are being undertaken by dairy food processors in Gippsland already, one such example is Burra Foods in Korumburra:

*“Burra Foods will install economisers on two boilers, a condensate recovery system on an evaporator, and lag steam network pipes (lagging) at its facility in Korumburra, Victoria. The project is expected to reduce the carbon emissions intensity of the equipment by 9% and will result in savings of \$86,000 in energy costs per year.”* From -

<http://www.cleanenergymap.gov.au/burra-foods-pty-ltd>

A similar example of action has been undertaken by Ceres Natural Foods in Drouin. See - <http://www.cleanenergymap.gov.au/ceres-natural-foods-pty-ltd-pacirote-unit-trust-ta-pureharvest>

And Murray Goulburn Co-op in Leongatha -

<http://www.cleanenergymap.gov.au/murray-goulburn-co-operative-co-limited-ret>

**Measure Action:** *Energy efficiency opportunities including heat recovery from services, VSD control fans, pumps and air compressors, new system cooling technology.*

**Cost (A\$/tCO<sub>2</sub>e):** -82

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 107.8

### Assumptions:

- Energy savings of 13% overall are achieved by 2020
- Upfront cost of \$155 per MWh saved in one year, average lifespan of 15 years

**Measure Type:** Energy Efficiency

**Timeframe:** Long

**Implementation Body/Stakeholders:** Dairy industry bodies, Co-ops, Manufacturing corporations, Farmers, DEPI, Government bodies, Dairy Manufacturers Sustainability Council, Gipps Dairy, Dairy Australia, Agribusiness Gippsland

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<sup>16</sup> These will probably be subject to changes in funding and availability post the 2013 Federal election.

Additional stakeholder input –

*Dairy Manufacturers Sustainability Council is the relevant peak body -*  
<http://dmisc.com.au/index.php/contacts/>

*Gipps Dairy/Dairy Australia, Agribusiness Gippsland are all stakeholders.*

**Regional Responsibility Level:** Should be ‘relatively’ easy to define how and where there can be input into this measure – possibly through discussions and a targeted program after identifying actors? Very important sector for Gippsland

**Existence of Other Information (click for link):**

[The Energy Efficiency Exchange, Federal and State Government website](#)

[ClimateWorks case study](#)

Additional stakeholder input – *Dairy Australia and the milk companies have CFF extension and outreach grants that may help with this measure.*

**Practical Implementation Considerations:** Costs to change equipment (large sunk costs in the industry), lack of understanding of how and where to change things – both will impact on the ability of companies to do this. Probably a number of actors, would require some coordination and discussions to get full value from this measure

Additional stakeholder input – *Murray Goulburn already have cogeneration in place in Leongatha.*

**Funding Opportunities (click for link):** Unknown funding avenues, possibly:

[Clean Technology Food and Foundries Investment Program](#)

[Gardiner Foundation: Working in Dairy Communities](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

**Comments:**

- **General** - Reasonable negative cost, high abatement potential
- **Pros** – Energy efficiency is ‘easy’ to achieve, very important sector for Gippsland, relatively simple to identify actors(?)
- **Cons** – Barriers, why haven’t these measures been implemented already?, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?
- **Conclusion** - Measure should be actively considered

**ClimateWorks Road Map Notes:** Medium lock in risk; Relatively simple to implement

**Key Constraint:** Capital investment

**Practicality Level:** Green

**Draft Score of Measure:** 8/10

## Measure 5 - Reduced Cropland Soil Emissions

### Measure Comments:

The Gippsland region is primarily a rural region, and as such, contains large areas of farmland. Farming end uses include dairy, beef, intensive small scale horticulture, and cropping. These forms of farming require inputs, both fertilizer, water and machinery based, which can have corresponding environmental impacts on the health of the associated biodiversity, water and soil ecology. Measures that both help to address these impacts, as well as to increase the effectiveness and efficiency of inputs, will be valuable to land users. The adoption of a measure that reduces cropland soil emissions through reduced inputs should help to meet these goals.

There is a large cross section of the community involved in the farming sector, and as such, it is expected that there will be varying degrees of acceptance for this kind of measure. Due to this, implementation of the measure should be conducted through an organisation that is known and trusted by stakeholders, which should increase the uptake and effectiveness of a program.

### Recommended GCCN Role:

It is recommended that the role for GCCN be to provide support as required to a key farming organisation to enable measure implementation. The Gippsland region's CMAs and Landcare groups are possibly the best choice, due to their existing role in implementing similar measures. Targeted workshops in conjunction with CMAs and Landcare groups (dependant on the farming region in question) could also be used to increase measure uptake, and ensure that the CFI is being taken advantage of.

Once implementation is underway, it is recommended that promotion of the measure across the regions be conducted to inform the public and other stakeholders of the changes that farmers have undertaken to reduce emissions and save money.

Understanding and recording instances of on farm actions that have been undertaken in this area (and connected to this measure) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

### Measure Status:

Trials concerning fertilizer use have been conducted in the Gippsland region for some time now, with a West Gippsland CMA website providing details. Of particular interest are the following:

- DPI Victoria, Watkins M & Nash D (2012), Phosphorus and Nitrogen changes in soil and soil water after cultivation
- DPI Victoria, Gourley C & Adams S (2012), Determining production gains from N. P. K. inputs on Australian dairy farms
- DPI Victoria & CSIRO (2011/12), Victorian Soil Carbon Project (VSCP) Initial Findings
- Bass Coast Landcare Network (2008/09), Summer pasture cropping and soil health demonstration site

See -

<http://www.wgcma.vic.gov.au/index.php/publications/regional-menu/284-the-gippsland-soil-trial-directory.html>

#### **Examples of Implementation:**

There are a number of examples of trials around the State that have received funding, which if not concerning the measure detail, are connected to the measure. See –

- <http://www.cleanenergymap.gov.au/yarram-yarram-landcare-network-farm-trials>

- <http://www.cleanenergymap.gov.au/botanical-resources-australia-agricultural-services-pty-ltd-farm-trials>

- <http://www.cleanenergymap.gov.au/monash-university-farm-trials>

- <http://www.cleanenergymap.gov.au/southern-farming-systems-ltd-farm-trials-gippsland>

- <http://www.cleanenergymap.gov.au/university-melbourne-nitrification-inhibitors>

- <http://www.cleanenergymap.gov.au/wimmera-catchment-authority-farm-trials>

- <http://www.cleanenergymap.gov.au/crop-facts-pty-ltd-farm-trials>

**Measure Action:** *For cropland that has 3 or more cultivations, reduce tillage to zero. For cropland that is cultivated less than 3 times per year, reduce tilling to 1 or 2 times.*

*Use fertilisers more efficiently: adjust application rates based on precise estimated of crop needs, place Nitrogen more precisely in soil, avoid application in times when susceptible to loss, use coated, slow release fertilisers.*

**Cost (A\$/tCO<sub>2</sub>e):** -110

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 2.9

#### **Assumptions:**

##### *Reduced tillage*

- No till: Penetration increases from 5% in 2010 to 35% in 2020
- Reduced till: Penetration increases from 40% in 2010 increasing to 60% in 2020
- Reducing tillage practices can reduce emissions at a weighted average rate of 0.30 tCO<sub>2</sub>e/ha/yr
- *Fertiliser usage*
- Apply to approx. 37,000 ha of cropping land, improve Nitrogen application to reduce fertiliser use by 25%, reducing emissions by 0.03 tCO<sub>2</sub>e/ha/yr
- Penetration rate increases from 65% in 2010 to 90% in 2020

**Measure Type:** Soil Carbon

**Timeframe:** Medium

**Implementation Body/Stakeholders:** CMAs, Farmers, Farming bodies, DPI, Federal and State Government, Ag businesses and consultants, Fertilizer companies, Ag equipment manufacturers?, VFF

**Regional Responsibility Level:** Implementing this measure will have challenges, but can be successful with the effective use of Gippsland's expertise in understanding and responding to these issues

**Existence of Other Information (click for link):**

[International Panel on Climate Change website](#)

[CSIRO website](#)

[Australian Government website on soil carbon 1](#)

[Australian Government website on soil carbon 2](#)

**Practical Implementation Considerations:** There are a number of barriers to this measure – with strong discussion surrounding soil carbon and how to improve it. Definitely opportunities to increase the effectiveness and efficiency of fertilizer use, with good kick on effects for water and lakes systems. Unsure about the amount of actual tillage that occurs in the Gippsland region – crop types govern this part of the measure to some degree. Probably many actors

**Funding Opportunities (click for link):** Possibly funding avenues:

[Carbon Farming Initiative](#)

[Regional Natural Resource Management Planning for Climate Change Fund](#)

[Carbon Farming Futures](#)

[CFI Tranche 3](#)

[Environmental Stewardship Fund](#)

[National Environmental Research Program](#)

[Victorian Landcare Grants](#)

**Comments:**

- **General** - Reasonable negative cost, low abatement potential
- **Pros** – Agriculture a very important sector in Gippsland, fertilizer changes have merit considering the issues in the Gippsland Lakes and the importance of that area to the region, funding from Federal programs?
- **Cons** – enforcement of tillage requirements?, 'easy to say, hard to do', large number of actors, barriers, may be a response that occurs naturally over time?, funding from Federal programs?
- **Conclusion** - Parts of the measure should be considered?

**Additional Information:**

Discussion with Glenn Marriott, from Ag-Challenge Consulting –

*There are options to reduce fertilizer inputs – on site use of effluent vs imported materials.*

*Areas of cropping – Bairnsdale/Lindenow, Longford, Thorpdale, South Gippsland (Bass). Can reduce the tillage perhaps for some types of crop, but not all. How do you grow carrots with zero tilling? How much broad acre cropping is in Gippsland? In our experience, most people over sow pasture rather than tilling – for dairy farms<sup>17</sup>.*

*In some instances, farmers apply phosphorus when available levels are adequate due to limited testing or knowledge. Research into unlocking unavailable phosphorus and phosphorus use efficiency is ongoing and may lead to reductions in its application.*

*Additional stakeholder input – The current extension and outreach programs aimed at soil health and the ever rising cost of inputs will relatively quickly change the possibly held perception that ‘phosphorus is constantly needed’. Soil tests, a greater emphasis on soil husbandry, on farm trials to increase soil carbon (organic matter), and awareness of the importance of soil biology (micro and macro organisms), and a range of practices such as application timing, will improve fertilizer use both quickly and dramatically.*

**ClimateWorks Road Map Notes:** Low risk of lock in; Relatively simple to implement

**Key Constraint:** Requires behaviour change

**Practicality Level:** Green

**Draft Score of Measure:** 8/10

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<sup>17</sup> Additional stakeholder input – *This is possibly not true. A lot of dairy farmers cultivate paddocks to renovate these days, and also put in crops that are not over sown.*

## Measure 6 - Commercial Building Energy Efficiency

Through the stakeholder consultation process, comments were received suggesting that the implementation process may be more efficient if the commercial building energy efficiency measures were combined into a single measure. After consideration, the following individual measures have been combined:

- Commercial building lighting;
- Commercial building heating, ventilation and air conditioning (HVAC);
- Commercial building electronics and appliances;
- Commercial building water heating;
- Commercial building insulation;
- Commercial building energy waste reduction.

These measures have a combined potential emissions abatement of around 265 kt of CO<sub>2</sub>e. There is a positive cost for this abatement (ie undertaking these actions will save money above the implementation cost).

### Measure Comments:

Commercial building energy efficiency is probably the most important grouping of measures in this report. If they can be successfully implemented, businesses and SMEs throughout Gippsland will be able to save money through reduced energy costs, and possibly improve productivity through increased workplace comfort (ie improved lighting, building shell thermal characteristics, and better heating and cooling). With the saved money going into the pockets of local businesses and SMEs, this may mean local economies get a boost. Along with these cost savings, there is a possibility of significant emissions abatement.

There are many complexities when dealing with and improving commercial building energy efficiency. Businesses and SMEs often find energy billing difficult to deal with as it can be bundled with other costs, regarded as a fixed cost, sometimes due to the perceived minor role it plays in overall expenditure, it may simply be ignored. Building managers or business owners may not have the time or knowledge to be able to implement successful energy efficiency improvements, or they may be confused or unaware of possible actions.

The largest issue to deal within the field of commercial building energy efficiency is that of split incentives. These occur when one party buys a piece of equipment or a building, but another party pays the energy bills associated with the equipment or building's use. There is no incentive for the owner party to do anything to improve any aspect of energy efficiency, as they are not subject to the action of market forces of energy costs. The user party on the other hand, has to deal with energy costs that could be reduced, but has no power in undertaking actions that would do just that. The issue of split incentives is a complex and difficult one but if it could be solved, even in part, a big impact could be made.

Combining these six measures, even though they are related, is a difficult task. As with many energy efficiency measures, useful information delivered effectively is the key, followed by convincing SMEs to trust those who provide it.

**Recommended GCCN Role:**

It is recommended that the role for GCCN be to provide support to Councils through meeting and relationship facilitation. This could also be in creating stronger links in the region between business groups like VECCI, the State Government, energy retailers, and other related stakeholders, with the aim of increasing the commercial take up of energy efficiency measures. These discussions may also show where the gaps in program implementation for Gippsland are, allowing a better targeting of these areas by stakeholders.

It is suggested that the work with Councils consist of putting together an information pack for SMEs and businesses, that provides details on the energy efficiency actions that can be taken as well as on the associated funding opportunities. Funding could include the VEET/ESI scheme and the Smarter Business Smarter Resources program, both of which provide assistance for many aspects of these measures.

Another aspect of measure implementation could be to highlight to the Victorian State Government, that the possible viability of EUAs be investigated for Regional Victoria.

An EUA is an 'Environmental Upgrade Agreement', that allows building owners to access low interest loans to retrofit premises for the purpose of improved energy efficiency. These have been implemented for Melbourne through the Sustainable Melbourne Fund (SMF), with a similar system implemented in NSW and SA.

For implementation in Gippsland, EUAs would require a change to the Local Government Act. If this was completed, it would allow the same opportunity presently available to commercial building owners in Melbourne, to be available to building owners in regional Victoria.

The existing EUA programs in Melbourne are all part administered in conjunction with local Councils, as Councils have the responsibility for collecting loan repayments through Council rates, and the SMF is responsible for negotiations and loan establishment. EUAs also enable the costs of the upgrades to be passed onto tenants and the loan stays with the building not the owner, thereby bypassing the issue of split incentives.

It is suggested, for this to be successful, work should be undertaken with other regional alliances to ensure that EUAs can be rolled out in regional Victoria through changes to the Local Government Act.

Once implementation is underway, it is recommended that promotion of the measures across the regions be conducted to inform the public and other stakeholders of the changes that SMEs and businesses have undertaken to reduce emissions and save money.

Understanding and recording actions that have been undertaken in this area (and connected to these measures) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

**Measure Status:**

Different aspects of each of these commercial building energy efficiency measures have been implemented in Gippsland. Both the Energy Rating Label Scheme for appliances and electronics, and the VEET scheme measures are supported in the region (VEET includes water heater upgrades, commercial lighting upgrades, electric motor upgrades etc). There are also various programs run by the local Councils to aid businesses and SMEs in improving their workplace energy efficiency.

It is the extent and success of commercial energy efficiency programs that is unknown, with understanding this and filling any gaps in implementation being the key to this measure.

**Examples of Implementation:**

Unfortunately, it is difficult to find specific examples of measures that have been implemented in the Gippsland region in this space. There are many actions approaches that can be undertaken though. The following example is from the Hunter Region in NSW:

*The Energy Hunter - Our Clean Energy Future project aims to assist approximately 2,000 Small and Medium Enterprises (SMEs) to identify, manage and improve their energy efficiency. Across the Hunter Region of New South Wales, the project will deliver energy efficiency information through: real-time energy displays in up to 500 businesses; a project database; technical real-life case studies; a range of 'how to' guides and mobile applications.*

From - <http://www.cleanenergymap.gov.au/hunter-business-chamber>

Another example is the Light\$mart Program from the Darebin City Council:

[http://www.darebin.vic.gov.au/Files/Results\\_of\\_the\\_LightSmart\\_Pilot\\_October\\_2011.pdf](http://www.darebin.vic.gov.au/Files/Results_of_the_LightSmart_Pilot_October_2011.pdf)

### Measure 6.1 - Commercial Building Lighting

Replace CFLs with LEDs, replace inefficient T12s or T8s with new super T8s and T5s, install lighting control systems (dimmable ballasts, photo-sensors to optimise light for occupants in room).

**Cost (A\$/tCO<sub>2</sub>e):** -77

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 28.6

**Assumptions:**

- Energy savings of 24% on average across subsectors
- Incremental upfront cost of \$6/m<sup>2</sup>

**Measure Type:** Energy Efficiency

**Timeframe:** Short

**Implementation Body/Stakeholders:** Corporations, SMEs, Building owners, Councils, Government bodies

**Regional Responsibility Level:** Due to the spread nature of the regional centres in Gippsland, identifying the key commercial buildings requiring this won't be all that simple. Probably possible - ad campaign?

**Existence of Other Information (click for link):**

[ClimateWorks publication](#)

[The Energy Efficiency Exchange, Federal and State Government website](#)

[Green Building Council Australia, website](#)

[Essential Services Commission Victoria, VEET Scheme](#)

[Commercial Building Disclosure, Australian Government website](#)

**Practical Implementation Considerations:** Reasonably straight forward measure to implement, the difficulty lies in identifying the best potential buildings for retrofit. This is a well established sector of energy efficiency, with case studies and measureable results. Possibly technologies have improved since assumptions were made – inclusion of LED?

Additional stakeholder input – *Potential to roll these out in the region if there are changes to the Local Government Act?*

*This measure requires credible information and providers, as well is a point of engagement for time poor SMEs.*

*Possibly would be useful to investigate the Light\$mart program.*

**Funding Opportunities (click for link):** Possibly funding avenues:

[Community Energy Efficiency Program](#)

[Energy Efficiency Information Grants](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[Grow your Business](#)

[Grow your Business – Business Development Plan](#)

[School Energy Efficiency Grants Program](#)

[VEET Scheme](#)

Additional stakeholder input – *Sustainability Victoria has a range of programs*  
- <http://www.sustainability.vic.gov.au/www/html/3601-smarter-resources-smarter-business-program.asp>

**Comments:**

- **General** - Negative cost, good abatement potential
- **Pros** – Energy efficiency ‘easy’ to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding, lighting is very straight forward to deal with
- **Cons** – Unknown number of actors, barriers, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?, stipulation of technology used??
- **Conclusion** - Measure should be actively considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; Relatively simple to implement

**Key Constraint:** Proving cost effectiveness, split incentives

**Practicality Level:** Green

**Draft Score of Measure:** 8/10

## Measure 6.2 - Commercial Building Heating, Ventilation and Air Conditioning (HVAC)

*Install highest efficiency system when current expires; improve HVAC control systems to adjust for building occupancy and minimise re-cooling of air.*

*Experience also shows that significant downsizing of HVAC equipment can be done once other equipment improvements have been implemented (eg lighting, improved insulation for cooking and refrigeration).*

**Cost (A\$/tCO<sub>2</sub>e):** -165

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 54.0

### Assumptions:

- Energy savings of 28% on average across subsectors
- Incremental upfront cost of \$9/m<sup>2</sup>, average lifespan of 20 years

**Measure Type:** Energy Efficiency

**Timeframe:** Long

**Implementation Body/Stakeholders:** Corporations, SMEs, Building owners, Councils, Government bodies

**Regional Responsibility Level:** Due to the spread nature of the regional centres in Gippsland, identifying the key commercial buildings requiring this upgrade won't be all that simple, but probably can be done. Relatively straight forward measure to implement with existing technologies and understanding

### Existence of Other Information (click for link):

[The Energy Efficiency Exchange, Federal and State Government website](#)

[Green Building Council Australia, website](#)

[Essential Services Commission Victoria, VEET Scheme](#)

**Practical Implementation Considerations:** Assumptions say to install 'when current expires' – this may never happen if only parts of the system fail (ie in big bespoke systems), and are replaced. How do you select the 'highest efficiency system'? – this requires knowledge of the systems and some kind of comparison system, harder than it seems

**Funding Opportunities (click for link):** Possibly funding avenues:

[Community Energy Efficiency Program](#)

[Energy Efficiency Information Grants](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[School Energy Efficiency Grants Program](#)

[VEET Scheme](#)

**Comments:**

- **General** - High negative cost, good abatement potential
- **Pros** – Relatively simple measure to implement, known space for abatement, probably simple to find funding
- **Cons** – assumptions say ‘when current expires’, unknown how this would fit into funding timelines etc, also seems to suggest this measure would work best once all over energy efficiency measures have already been implemented
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; More challenging to implement

**Key Constraint:** Proving cost effectiveness, split incentives

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

### Measure 6.3 - Commercial Building Electronics and Appliances

*Replace traditional electronics, appliances, elevators/escalators and kitchen equipment with high efficiency equipment to reduce energy consumption.*

**Cost (A\$/tCO<sub>2</sub>e):** -84

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 79.9

**Assumptions:**

- Energy savings of 20% on average across subsectors for retrofits and 28% for new builds
- Incremental upfront costs of \$10/m<sup>2</sup> for retrofits and \$16/m<sup>2</sup> for new builds, average lifespan of approx. 15 years

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Corporations, SMEs, Building owners, Councils, Government bodies

**Regional Responsibility Level:** Due to the spread nature of the regional centres in Gippsland, identifying the key commercial buildings requiring this won't be all that simple. probably partially possible. ad campaign?

**Existence of Other Information (click for link):**

[ClimateWorks publication](#)

[The Energy Efficiency Exchange, Federal and State Government website](#)

[Green Building Council Australia, website](#)

[Essential Services Commission Victoria, VEET Scheme](#)

**Practical Implementation Considerations:** The assumptions include a very wide range of end uses to be replaced before the full abatement potential can be achieved. The definition of 'high efficiency' equipment can be easier to understand depending on the equipment type considered – labelling for refrigerators (for eg) will enable an informed choice, but understanding the choices in elevator motor efficiencies is a lot more difficult

**Funding Opportunities (click for link):** Possible funding avenues:

[Community Energy Efficiency Program](#)

[Energy Efficiency Information Grants](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[School Energy Efficiency Grants Program](#)

[VEET Scheme](#)

**Comments:**

- **General** - Negative cost, good abatement potential

- **Pros** – Energy efficiency ‘easy’ to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding
- **Cons** – What is the definition of ‘high efficiency’ equipment?, difficult to understand efficiency in some of these product classes, if it ‘ain’t broke why fix it’ attitude
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; Relatively simple to implement

**Key Constraint:** Proving cost effectiveness

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

### Measure 6.4 - Commercial Building Water Heating

*Replace standard gas water heaters with tankless gas, condensing gas, or solar water heater; replace electric water heater with heat pump or solar water heater.*

**Cost (A\$/tCO<sub>2</sub>e):** -23

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 8.8

**Assumptions:**

- Energy savings estimated to be 22% across all subsectors
- Incremental upfront cost of \$6/m<sup>2</sup>, average lifespan of 20 years

**Measure Type:** Energy Efficiency

**Timeframe:** Long

**Implementation Body/Stakeholders:** Corporations, SMEs, Building owners, Councils, Government bodies

**Regional Responsibility Level:** Due to the spread nature of the regional centres in Gippsland, identifying the key commercial buildings requiring this won't be all that simple. Probably partially possible, maybe use an education and ad campaign?

**Existence of Other Information (click for link):**

[Essential Services Commission, VEET Scheme](#)

[The Energy Efficiency Exchange, Federal and State Government website](#)

**Practical Implementation Considerations:** The assumptions include replacing certain water heating technologies with other technologies – it isn't certain that there would be much point in replacing storage gas with other types. Replacing storage electric is worth doing though. There will be constraints about what type of technology can be installed – ie lack of roof space makes solar difficult, no gas connection makes instantaneous gas difficult etc. Doubtful the full abatement can be reached, but targeting electric storage replacement is worth it

**Funding Opportunities (click for link):** Possibly funding avenues:

[Community Energy Efficiency Program](#)

[Energy Efficiency Information Grants](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[School Energy Efficiency Grants Program](#)

**Comments:**

- **General** - Negative cost, low abatement potential
- **Pros** – Energy efficiency 'easy' to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding

- **Cons** – ‘If it ain’t broke why fix it’ attitude, technology stipulation?, large number of actors, barriers, may be a response that occurs naturally over time?, cost constraints
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; More challenging to implement

**Key Constraint:** Proving cost effectiveness, split incentives

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

### Measure 6.5 - Commercial Building Insulation

*Improve building air tightness by sealing areas of potential air leakage, weather strip doors and windows.*

**Cost (A\$/tCO<sub>2</sub>e):** -37

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 34.0

**Assumptions:**

- Energy savings of 18% on average across subsectors
- Incremental upfront cost of \$26/m<sup>2</sup>, average lifespan of 56 years

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Corporations, SMEs, Building owners, Councils, Government bodies

**Regional Responsibility Level:** Due to the spread nature of the regional centres in Gippsland, identifying the key commercial buildings requiring this won't be all that simple. Probably partially possible, maybe use an education and ad campaign?

**Existence of Other Information (click for link):**

[Essential Services Commission, VEET Scheme](#)

[Insulation Council of Australia and NZ report 1](#)

[Insulation Council of Australia and NZ report 2](#)

[ClimateWorks report](#)

[The Energy Efficiency Exchange, Federal and State Government website](#)

[Green Building Council Australia, website](#)

**Practical Implementation Considerations:** This should be relatively simple to implement from a works sense, identifying the key buildings where change is most cost effective will be a lot harder. Difficult to retrofit insulation in some parts of the building. Depending on the building type, improving weather sealing can be difficult as well. Rental split incentives. 'Pink Batts' comes to mind...need to be mindful of this and the attitudes out there

**Funding Opportunities (click for link):** Possibly funding avenues:

[Community Energy Efficiency Program](#)

[Energy Efficiency Information Grants](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[School Energy Efficiency Grants Program](#)

**Comments:**

- **General** - Negative cost, some abatement potential
- **Pros** – Energy efficiency ‘easy’ to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding??
- **Cons** – Unknown number of actors, barriers, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?
- **Conclusion** - Measure should be actively considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; More challenging to implement

**Key Constraint:** Proving cost effectiveness, split incentives

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

## Measure 6.6 - Commercial Building Energy Waste Reduction

*Experience shows that significant savings can be achieved with minimal capital investment by getting rid of or downsizing unnecessary equipment.*

**Cost (A\$/tCO<sub>2</sub>e):** -141

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 59.0

### Assumptions:

- Energy savings in 2020 estimated to be 10% across all end uses
- Incremental upfront cost of A\$4/m<sup>2</sup>

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Corporations, SMEs, Building owners, Councils, Government bodies

**Regional Responsibility Level:** Due to the spread nature of the regional centres in Gippsland, identifying the key commercial buildings requiring this won't be all that simple. Probably partially possible, maybe an education and ad campaign?

### Existence of Other Information (click for link):

[ClimateWorks publication](#)

[The Energy Efficiency Exchange, Federal and State Government website](#)

[Green Building Council Australia, website](#)

[Essential Services Commission Victoria, VEET Scheme](#)

**Practical Implementation Considerations:** At face value, the assumptions in this measure are too broad to target properly. There are possibly many barriers to fully achieving the abatement potential for this measure, due to the 'scattergun' approach. Define unnecessary? – that implies analysis of all end uses, which would require a massive amount of effort. Perhaps if the measure can be targeted to certain known wasteful end uses (ie boiling water units), it would be simpler to implement, but there would be a loss of abatement potential

**Funding Opportunities (click for link):** Unknown funding avenues, possibly:

[Community Energy Efficiency Program](#)

[Energy Efficiency Information Grants](#)

[Innovation Grants](#)

[Clean Technology Investment Program](#)

[Clean Technology Innovation Program](#)

[Grow your Business](#)

[Grow your Business – Business Development Plan](#)

[School Energy Efficiency Grants Program](#)

**Comments:**

- General - Reasonable negative cost, reasonable abatement potential
- Pros – Energy efficiency is ‘easy’ to achieve, commercial sector is important to Gippsland
- Cons – Unknown number of actors, barriers, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?
- Measure possible to do in bits but hard to achieve at scale – measure valuable, but better options

**ClimateWorks Road Map Notes:** Low risk of lock in; Relatively simple to implement

**Key Constraint:** Identifying targets and proving cost effectiveness

**Practicality Level:** Green

**Draft Score of Measure:** 6/10

## Measure 7 - Residential Energy Efficiency

Through the stakeholder consultation process, comments were received suggesting that the implementation process may be more efficient if the residential energy efficiency measures were combined into a single measure. After consideration, the following individual measures have been combined:

- Residential building lighting;
- Residential building heating, ventilation and air conditioning (HVAC);
- Residential building electronics and appliances;
- Residential building improved thermal efficiency.

These measures have a combined potential emissions abatement of around 88 kt of CO<sub>2</sub>e. There is a positive cost for this abatement (ie undertaking these actions will save money above the implementation cost).

### Measure Comments:

The classic way to reduce energy in the home is to change a light bulb – ‘remove an old wasteful incandescent, install an energy saving CFL’. This message has been driven home to householders over the past few years probably with varying degrees of success. Energy efficiency of course, basically means getting more service for less energy, simple to say, often very difficult to implement into practice, particularly in the residential area.

A successful example of a residential energy efficiency program that works, is the Energy Labelling Program that labels appliances and electronics with energy efficiency information and therefore helps when purchasing – ‘the more stars, the more money you save’. A not so successful example could be anything connected to insulation or ‘Pink Batts’, which for various reasons, is political poison and very difficult to deal with.

Assisting Gippsland’s householders in saving money through improving the energy efficiency of their homes, and the efficiency of appliances, electronics and lighting in them, would make an impact. Unfortunately, in spite of the myriad of past and existing programs aimed at doing just that, householders may be either unaware or confused about what actions to take.

Combining these four measures, even though they are related, is a difficult task. As with many energy efficiency measures, useful information delivered effectively is the key, followed by convincing householders to trust those who provide it.

### Recommended GCCN Role:

It is recommended that the role for GCCN be to provide support to Councils through meeting and relationship facilitation. This could also be in creating stronger links in the region between community groups, the State government,

energy retailers, and other related stakeholders, with the aim of increasing the residential take up of energy efficiency measures. These discussions may also show where the gaps in program implementation for Gippsland are, allowing a better targeting of these areas by stakeholders.

It is suggested that the work with Councils consist of putting together an information pack for householders, that provides details on the energy efficiency actions that can be taken as well as on the associated funding opportunities. Funding could include the VEET/ESI scheme, which provides assistance for many aspects of these measures.

Once implementation is underway, it is recommended that promotion of the measures across the regions be conducted to inform the public and other stakeholders of the changes that have undertaken.

Understanding and recording actions that have been undertaken in this area (and connected to these measures) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

**Measure Status:**

Different aspects of each of these residential energy efficiency measures have been implemented in Gippsland. For example, the roll out of CFL bulbs was conducted several years ago by the State Government, the Household Insulation Program was promoted during the GFC by the Federal Government, the Energy Rating Label Scheme for appliances and electronics, and VEET scheme measures are supported in the region (eg standby power controllers, lighting upgrades, fireplace dampers etc).

It is the extent and success of residential energy efficiency programs that is unknown, with understanding this and filling any gaps in implementation being the key to this measure.

### Measure 7.1 - Residential Lighting

*Replace CFL with LED and standard quartz halogen bulbs with high efficiency halogen bulbs.*

**Cost (A\$/tCO<sub>2</sub>e):** -90

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 19.9

**Assumptions:**

*CFLs to LEDs*

- In 2020, 30% of non-living areas and 50% of living area CFLs are replaced by LEDs
- Incremental upfront cost of \$62 in 2010 decreasing to A\$32 in 2030 for LEDs
- *Halogen bulbs*
- 30% energy savings
- Penetration rate increases progressively to 30% above BAU in 2020
- Cost premium of A\$7 per bulb

**Measure Type:** Energy Efficiency

**Timeframe:** Short

**Implementation Body/Stakeholders:** Councils, Government bodies, Householders, Lighting retailers, Lighting manufacturers?

**Regional Responsibility Level:** It should be possible, with good coordination, to set up a targeted program that encourages/informs householders

*Additional stakeholder input – A possible role for GCCN could be to facilitate understanding of VEET and provide some communications materials to help Councils promote to communities.*

**Existence of Other Information (click for link):**

[Essential Services Commission, VEET Scheme](#)

[Australian Building Codes Board website report](#)

[Energy Rating website report 1](#)

[Energy Rating website report 2](#)

[Australian Government report](#)

**Practical Implementation Considerations:** Reasonably straight forward measure to implement, the difficulty lies in identifying the best potential buildings for retrofit. This is a well established sector of energy efficiency, with case studies and measureable results.

**Funding Opportunities (click for link):** Possibly funding avenues:

[VEET Scheme](#)

[Low Income Energy Efficiency Program](#)

[Clean Technology Investment Program](#)

**Comments:**

- **General** - Negative cost, reasonable abatement potential
- **Pros** – Energy efficiency is ‘easy’ to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding, lighting is very straight forward to deal with
- **Cons** – Unknown number of actors, barriers, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?, stipulation of technology used?
- **Conclusion** - Measure should be actively considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; Relatively simple to implement

**Key Constraint:** Information availability, technology change

**Practicality Level:** Green

**Draft Score of Measure:** 8/10

## Measure 7.2 - Residential Heating, Ventilation and Air Conditioning (HVAC)

*New air conditioners and space heaters purchased are in the top performers of their category (named high efficiency). Systems are maintained more frequently (improved duct insulation, correct level of refrigerant and new air filters).*

**Cost (A\$/tCO<sub>2</sub>e):** -171

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 4.6

### Assumptions:

- 20% savings for air conditioners, 20% for gas heaters, 48% for electric heaters and 10% for maintenance
- Penetration rate 30% above BAU in 2020 for air conditioners; 30% above BAU in 2020 for space heaters; 15% above BAU in 2020 for maintenance
- Incremental upfront cost of \$575 for air conditioners, \$800 for gas heaters, \$3,760 for electric heaters and around \$1,150 to cover a 150m<sup>2</sup> house over lifespan of equipment for maintenance

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Councils, Government bodies, Householders, Builders, Building companies, Equipment manufacturers?

**Regional Responsibility Level:** It should be possible, with good coordination, to set up a targeted program that encourages/informs householders

**Existence of Other Information (click for link):**

[Essential Services Commission, VEET Scheme](#)

[Australian Government website](#)

[The Energy Efficiency Exchange, Federal and State Government website](#)

[EnergyRating website factsheet](#)

**Practical Implementation Considerations:** The assumptions state 'new air conditioners and space conditioners' purchased, which is probably reasonable for new builds – also given that there is federal MEPS and labelling for ACs, and a 'voluntary' system for ducted gas units. Very difficult to understand how a program of improved maintenance would be implemented, encouraged or continued. New ducts best practice means a being well sealed duct with an R1.5 insulation characteristic, which could give 15% overall improvement in efficiency from a base case loss of 30% (reduce duct losses by half). There could be some increase in efficiency from regular filter cleaning, but this is labour intensive and not all models require user intervention. Assessing whether 'refrigeration levels' after correct installation is more difficult without specialised equipment (most are pre-gassed at correct levels). Low benefit cost ratio for maintenance of air filters, probably better for ducting improvements or replacement on old units.

**Funding Opportunities (click for link):** Some funding avenues:

[VEET Scheme](#)

[Low Income Energy Efficiency Program](#)

[Clean Technology Investment Program](#)

**Comments:**

- **General** - High negative cost, low abatement potential
- **Pros** – Relatively simple measure to implement, known space for abatement, probably simple to find funding
- **Cons** – Definition of ‘high efficiency’ is difficult to assess for some product classes, maintenance could be difficult to implement/enforce, electric heater efficiency increases??
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; More challenging to implement

**Key Constraint:** Information availability, capital cost

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

### Measure 7.3 - Residential Appliances and Electronics

*New appliances and electronics purchased are in the top performers of their category (named high efficiency).*

**Cost (A\$/tCO<sub>2</sub>e):** -141

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 39.3

**Assumptions:**

- 35% savings for high efficiency appliances compared to new buys, 37% for electronics
- Penetration rate of high efficiency appliances increases from 6% in 2010 to 67% in 2020 compared to 33% in 2020 in BAU
- Penetration rate of high efficiency electronics increases from 9% in 2010 to 57% in 2020 compared to 27% in 2020 in BAU
- Price premium is about 1% for electronics and 12% for appliances

**Measure Type:** Energy Efficiency

**Timeframe:** Medium

**Implementation Body/Stakeholders:** Councils, Government bodies, Householders, Appliance retailers, Equipment manufacturers?

**Regional Responsibility Level:** It may be possible, with good coordination, to set up a program that encourages/informs householders – needs to be targeted at certain appliance types maybe. Probably partially possible, maybe use and education and ad campaign?

**Existence of Other Information (click for link):**

[Essential Services Commission, VEET Scheme](#)

[Energy Rating website](#)

**Practical Implementation Considerations:** The assumptions include a very wide range of end uses to be replaced before the full abatement potential can be achieved. The definition of 'high efficiency' equipment can be easier to understand depending on the equipment type considered – labelling for refrigerators (for eg) will enable an informed choice, but understanding the choices in modern efficiencies (for eg) is a lot more difficult

**Funding Opportunities (click for link):** Funding possibilities include:

[VEET Scheme](#)

[Low Income Energy Efficiency Program](#)

[Clean Technology Investment Program](#)

**Comments:**

- **General** - Reasonable negative cost, good abatement potential
- **Pros** – Energy efficiency 'easy' to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding

- **Cons** – What is the definition of ‘high efficiency’ equipment?, difficult to understand efficiency in some of these product classes, ‘if it ain’t broke why fix it attitude’
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Medium risk of lock in; Relatively simple to implement

**Key Constraint:** Information availability and proving cost effectiveness

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

### Measure 7.4 - Residential Building Improved Thermal Efficiency

*Basic retrofit including sealing areas of air leakage, weather stripping doors and windows, insulating attic and wall cavities.*

*In addition, advanced building envelope upgrades to “passive” standard are undertaken in conjunction with regular building renovations. Includes installing high efficiency windows and doors; increasing outer wall, roof and basement ceiling insulation; mechanical ventilation with heat recovery, basic passive solar principles.*

**Cost (A\$/tCO<sub>2</sub>e):** -139

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 24.4

#### **Assumptions:**

*Basic building envelope*

- 30% savings on heating and 20% on cooling
- Cost premium of A\$9/m<sup>2</sup>
- Penetration rate of 12% above BAU in 2020
- *Advanced building envelope*
- 60% savings on heating and cooling
- Cost premium of A\$120/m<sup>2</sup> in 2010 and A\$105/m<sup>2</sup> in 2020
- Penetration rate of 29% of households in 2020 above BAU

**Measure Type:** Energy Efficiency

**Timeframe:** Long

**Implementation Body/Stakeholders:** Councils, Government bodies, Householders, Builders, Building companies, Developers, HIA, Building organisations

**Regional Responsibility Level:** It should be possible, with good coordination, to set up a targeted program that encourages/informs householders

**Existence of Other Information (click for link):**

[Essential Services Commission, VEET Scheme](#)

[Insulation Council of Australia and NZ report](#)

[Australia Government website](#)

[Australian Building Codes Board website](#)

[HIA website report](#)

**Practical Implementation Considerations:** This should be relatively simple to implement from a works sense (insulation improvements especially), identifying the key buildings where change is most cost effective will be a lot harder. Difficult to retrofit insulation in some parts of the building, and depending on the building type, improving weather sealing can be difficult as well. Rental split incentives. ‘Pinkbatts’ comes to mind...need to be mindful of this and the attitudes out there. Improving passive design is a lot harder and

relies a lot on block orientation etc – a better understanding in stakeholders is required for improvements to be made

**Funding Opportunities (click for link):** Possible funding avenues:

[Low Income Energy Efficiency Program](#)

[Clean Technology Investment Program](#)

**Comments:**

- **General** - Reasonable negative cost, reasonable abatement potential
- **Pros** – Energy efficiency is ‘easy’ to achieve, relatively simple measure to implement, known space for abatement, probably simple to find funding
- **Cons** – Unknown number of actors, barriers, upfront cost needs to be countered by demonstrated savings examples, may be a response that occurs naturally over time?
- **Conclusion** - Measure should be actively considered – basic retrofit suggested only

**ClimateWorks Road Map Notes:** Medium risk of lock in; Difficult to implement

**Key Constraint:** Proving cost effectiveness, rental split incentives

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

## Measure 8 - Reforestation

Through the stakeholder consultation process, comments were received suggesting that the implementation process may be more efficient if the reforestation measures were combined into a single measure. After consideration, the following individual measures have been combined:

- Strategic reforestation of productive land with environmental forest;
- Reforestation of less productive land with timber plantation;
- Reforestation of less productive land with environmental forest.

These measures have a combined potential emissions abatement of around 174 kt of CO<sub>2</sub>e. There is a cost for this abatement.

### Measure Comments:

'Planting a tree' is the ultimate cliché action to sequester emissions. With the associated environmental and social benefits, this action would seem to be an excellent measure to implement. Unfortunately, reforestation measures come at a cost – money isn't saved (unlike when dealing with energy efficiency). Funding sources are therefore of utmost importance in the successful implementation of reforestation measures.

For the Gippsland region, actions that are connected to reforestation are in the hands of landowners and the State (ie public and Crown land). In the past, to aid in the implementation of these actions, Landcare groups were created and focussed providing a strong community based drive. Traditionally funded through Federal sources, in recent times the funding for Landcare has become very low and targeted.

Combining these three measures, even though they are related, is a difficult task. It has been suggested to let the resource management priorities decide which measure is undertaken, which will depend on the factors involved for the particular project. Available funding sources are then used to implement the action.

### Recommended GCCN Role:

It is recommended that the role for GCCN to act as a relationship facilitator and information gatherer for organisations involved in and connected to the measures – predominately Landcare, CMAs, Councils and the forestry sector.

It is suggested that the work with CMAs and Councils consist of putting together an information pack for landowners, that provides details on funding opportunities for aspects of these measures. Funding could include Council environmental grants, rate rebates for conservation covenants, Landcare assistance, and the State EcoTender process.

For the forestry sector, identification of the key stakeholders is the first step, followed by workshops/meetings to help both parties understand the measure goals and to work out possible actions that can be undertaken to reach them. This could mean working with the Carbon Farming Initiative concerning rotational plantations.

Once implementation is underway, it is recommended that promotion of the measures across the regions be conducted to inform the public and other stakeholders of the changes that have undertaken.

Understanding and recording actions that have been undertaken in this area (and connected to these measures) is also an important step for GCCN to complete, as to assist any future evaluations or projects.

**Measure Status:**

Gippsland has a history of rotational timber plantation through Gippsland Private Forestry, Hancock Victoria Plantations, Australian Paper, other organisations, and MIS. There are softwood and hardwood plantations in the Strzeleckis extending into the foothills of the Great Divide and into east Gippsland, as well as logging operations in the region's State forests.

Similarly, there is a long history of Council, CMA, Landcare, landowner and community group actions that have worked towards reforestation along waterways, providing biodiversity corridors and re-trees marginal land.

**Examples of Implementation:**

An example of the type of action that is underway in the region connected to these measures is taking place in the Bass Coast Shire:

***Enhancing carbon storage and protecting biodiversity***

*This project will address several issues including, water quality, erosion control, remnant vegetation loss and degradation, pest plant and animal control, and farmers' knowledge of best practice environmental management. The project will address these issues through a targeted revegetation, remnant vegetation protection and enhancement program. It will target landholders through existing networks using a website and newsletter. There are currently 10 Landcare groups with over 900 members, representing more than 60 per cent of the farming families in the Bass coast region. The project also involves holding five field days per year, which will focus on environmental issues that have been identified by the board.*

From- <http://www.cleanenergymap.gov.au/bass-coast-landcare-network-inc>

### Measure 8.1 - Strategic Reforestation of Productive Land with Environmental Forest

*Plant environmental forests on 2% of productive land in line with best practice (wind breaks, riparian plantings, shades islands for livestock).*

**Cost (A\$/tCO<sub>2</sub>e):** 24

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 87.4

**Assumptions:**

- Planting undertaken on approx. 8,150 ha of productive farmland
- Technical emissions reduction potential 10.7 tCO<sub>2</sub>e/ha/yr
- Planting cost \$1,050/ha
- Annual operating cost \$142/ha/year

**Measure Type:** Reforestation

**Timeframe:** Long

**Implementation Body/Stakeholders:** CMAs, Farmers, Land owners, DPI, DPCD, State Government, Federal Government, Landcare groups

**Regional Responsibility Level:** Possibly be able to encourage this measure, there seems to be co-benefits for the region, and there is a long history of similar efforts in the region (CMA riparian zones, windbreaks etc)

*Additional stakeholder input – Wellington Shire Council also provides environmental grants and rate rebates for conservation covenants.*

**Existence of Other Information (click for link):**

[Australian Government website 1](#)

[Australian Government website 2](#)

[Landcare website](#)

[Victorian Department of Primary Industries website 1](#)

[Victorian Department of Primary Industries website 2](#)

[Victorian Department of Primary Industries website 3](#)

[Greening Australia website](#)

[CSIRO report](#)

**Practical Implementation Considerations:** There may be an entrenched 'grass to the fence-line' mentality that would be encountered with this measure. The co-benefits of riparian revegetation (water quality, biodiversity, nutrient abatement etc.) and on farm wind breaks (biodiversity, crop and stock protection, pasture productivity improvements, stock productivity improvements) are well established, but these need to be considered in a holistic sense. Note that 'environmental forests' means mixed species indigenous plantings.

Additional stakeholder input – *Suggest this is less feasible than strategic reforestation of less productive land (grazing, mixed cropping, broad-acre) due to high value of productive land.*

*High value of productive land (irrigated or high rainfall dairy and horticulture), impact of flooding on riparian fencing and plantings.*

**Funding Opportunities (click for link):** Possible funding avenues include:

[Carbon Farming Initiative](#)

[Caring for Our Country, Landcare](#)

[Community Landcare Grants](#)

[Regional Natural Resource Management Planning for Climate Change Fund](#)

[Carbon Farming Futures](#)

[CFI Tranche 3](#)

[Environmental Stewardship Fund](#)

[National Environmental Research Program](#)

[Regional Natural Resource Management Planning for Climate Change](#)

[Victorian Landcare Grants](#)

Note that many of these funding sources may not be available for commercial or semi-commercial forestry operations where the timber is to be harvested in future.

Additional stakeholder input – *State funding for riparian protection has dried up. Federal funding for Landcare is very low and tightly targeted. CFI funding is unlikely to be sufficient to compensate for taking land out of production. Shift away from grants to EcoTender process which is complicated for many farmers.*

**Comments:**

- **General** - Positive cost, good abatement potential
- **Pros** – Planting trees can only be a good thing when considering emissions abatement, positive add on effects when considering waterway health and stock and land productivity, Landcare groups already established, biodiversity corridors
- **Cons** – How much has already been done of this measure?, grass to the fenceline mentality, waterway responsibility? - Council? farmer? CMA?, funding?
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Low risk of lock in; More challenging to implement

**Key Constraint:** Funding and community attitudes

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

## Measure 8.2 - Reforestation of Less Productive Land with Timber Plantation

*Plant timber for harvest on 1,500 ha of less productive land.*

**Cost (A\$/tCO<sub>2</sub>e):** 4

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 21.4

### Assumptions:

- Planting undertaken on 1,500 ha of land by 2020
- Technical emissions reduction potential 14.0 tCO<sub>2</sub>e/ha/yr
- Planting cost \$2,250/ha
- Annual operating cost \$126/ha/yr

**Measure Type:** Reforestation

**Timeframe:** Long

**Implementation Body/Stakeholders:** Land owners, Timber companies, Corporations, DPI, State Government, Sawmills?, Other timber end users?, Landcare groups?, WGCMA

**Regional Responsibility Level:** Should be able to encourage this measure, doesn't seem like a large amount of land area to plant out

### Existence of Other Information (click for link):

[ABC News Online article](#)

[Australian Government website](#)

[Landcare website 1](#)

[Landcare website 2](#)

**Practical Implementation Considerations:** Abatement using timber plantation is an interesting concept, as it can be argued that there isn't actually any (or minimal) abatement achieved if the timber is earmarked for logging. If it is then turned into housing timber (for eg), some of the abatement will continue (stored in the structure), but if it is turned into pulp (for eg), then probably safe to assume no abatement. Who will pay for this measure? Where would it happen? Need a clear definition of 'less productive land' that all parties understand.

Additional stakeholder input – *Recent changes in policy point to an inclusion of long rotation hardwood plantations in the CFI. See new determination on the abatement in short rotation forestry. Gippsland has a long history connected to this measure, through Gippsland Private Forestry, MIS etc.*

**Funding Opportunities (click for link):** Possibly funding avenues:

[Carbon Farming Initiative](#)

[Caring for Our Country, Landcare](#)

[Community Landcare Grants](#)

[Regional Natural Resource Management Planning for Climate Change Fund](#)

[Carbon Farming Futures](#)

[CFI Tranche 3](#)

[Environmental Stewardship Fund](#)

[National Environmental Research Program](#)

[Regional Natural Resource Management Planning for Climate Change](#)

[Victorian Landcare Grants](#)

Note that many of these funding sources may not be available for commercial or semi-commercial forestry operations where the timber is to be harvested in future.

**Comments:**

- **General** - Positive cost, reasonable abatement potential
- **Pros** – Planting trees can only be a good thing when considering emissions abatement, productive use of less productive land
- **Cons** – How is this considered abatement when the timber will be harvested at a later point? Understood that carbon can be sequestered in product once harvested but very difficult to measure/enforce this, requires a clear definition of ‘less productive land’ that all parties understand, what species of trees would be used? - if Pine then biodiversity issues?
- **Conclusion** - Seems to be a good measure on the surface but with some challenges

**ClimateWorks Road Map Notes:** Low risk of lock in; More challenging to implement

**Key Constraint:** Abatement continuation?

**Practicality Level:** Green

**Draft Score of Measure:** 7/10

### Measure 8.3 - Reforestation of Less Productive Land with Environmental Forest

*Plant environmental forests that are not for harvest on less productive land.*

**Cost (A\$/tCO<sub>2</sub>e):** 26

**Emissions Reduction Potential (-ktCO<sub>2</sub>e):** 65.0

**Assumptions:**

- Planting undertaken on approx. 8,650 ha of less productive land
- Technical emissions reduction potential 10.8 tCO<sub>2</sub>e/ha/yr
- Planting cost \$1,050/ha
- Annual operating cost \$83/ha/year

**Measure Type:** Reforestation

**Timeframe:** Long

**Implementation Body/Stakeholders:** CMAs, Farmers, Land owners, DPI, DPCD, State Government, Federal Government, Landcare groups,

**Regional Responsibility Level:** Should be able to encourage this measure, challenges though

**Existence of Other Information:**

Additional stakeholder input – *Each of the five Landcare networks in West Gippsland (Latrobe Catchment, South Gippsland, Yarram, Maffra and District, and Bass Coast) have substantial revegetation/biolink programs and provide various levels of funding and extension to the landholders/farmers providing information of the co-benefits of environmental plantings etc.*

Information on this measure includes (**click for link**):

[Australian Government website 1](#)

[Australian Government website 2](#)

[Victorian Department of Primary Industries website 1](#)

[Victorian Department of Primary Industries website 2](#)

[Landcare website](#)

**Practical Implementation Considerations:** There may be an entrenched 'grass to the fenceline' mentality that would be encountered with this measure. Need a clear definition of 'less productive land' that all parties understand. Are there any co-benefits for the land owner? Who pays for this? Many actors?

**Funding Opportunities (click for link):** Possible funding avenues:

[Carbon Farming Initiative](#)

[Caring for Our Country, Landcare](#)

[Regional Natural Resource Management Planning for Climate Change Fund](#)

[Carbon Farming Futures](#)

[CFI Tranche 3](#)

[Environmental Stewardship Fund](#)

[National Environmental Research Program](#)

[Regional Natural Resource Management Planning for Climate Change](#)

[Victorian Landcare Grants](#)

**Comments:**

- **General** - Positive cost, good abatement potential
- **Pros** – Planting trees can only be a good thing when considering emissions abatement, Landcare groups already established, biodiversity corridors, Federal funding?
- **Cons** – How much has already been done of this measure?, grass to the fenceline mentality, responsibility?, Federal funding?, need a clear definition of 'less productive land' that all parties understand.
- **Conclusion** - Measure should be considered

**ClimateWorks Road Map Notes:** Low risk of lock in; More challenging to implement

**Key Constraint:** Funding and site identification

**Practicality Level:** Green

**Draft Score of Measure:** 8/10