

Goldfields Esperance Regional Climate Alliance

Net Zero Emissions Baseline Study



Prepared for
Goldfields Esperance Regional Climate Alliance

Version	Author	Date	Description of changes
V0a	Paul Brown, Ankit Kamra, Jenny Frieden	27/11/2022	Drafting
V0b	Evan Davies and Sophie Beard	12/12/2022	Review and update
V1a	Evan Davies	15/12/2022	Draft for Submission
V1b-g	Jenny Frieden, Roman Aizengendler, Paul Brown and Evan Davies	14/02/2023	Revised based on client feedback
V2a	Evan Davies	20/02/2023	Final for Submission
V2b	Evan Davies	09/03/2023	Revision of Exec Summary

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About Ironbark Sustainability

Ironbark Sustainability is a specialist consultancy that works with government and business around Australia by assisting them to reduce energy and water usage through sustainable asset and data management and on-the-ground implementation. Ironbark has been operating since 2005 and brings together a wealth of technical and financial analysis, maintenance and implementation experience in the areas of building energy and water efficiency, public lighting and data management. We pride ourselves on supporting our clients to achieve real action regarding the sustainable management of their operations.

Our Mission

The Ironbark mission is to achieve real action on sustainability for councils and their communities.



Ironbark are a certified B Corporation. We have been independently assessed as meeting the highest standards of verified social and environmental performance, public transparency, and legal accountability to balance profit and purpose.

Foreword

In July 2021, the Goldfields Voluntary Regional Organisation of Councils (GVROC), a partnership between nine Local Government Authorities (LGA) in the Goldfields-Esperance (GE) region, was selected to participate in the Western Australian (WA) Government's Regional Climate Alliance (RCA) pilot program. The program is part of the WA Climate Policy, and encourages regional LGAs to work together to address climate change and reduce greenhouse gas emissions.

The GVROC RCA Working Group, which includes representatives from each GVROC LGA member, Regional Development Australia, Goldfields Esperance (RDAGE) and the Goldfields-Esperance Development Commission (GEDC), was formed in early 2022 to identify and deliver local climate change adaptation and mitigation projects.

GVROC commissioned consultants, Ironbark Sustainability to undertake this project, which was partly funded through the RCA program in partnership with the Goldfields Esperance Development Commission (GEDC) and each GVROC member.

The collective challenge for the GE region is to reduce greenhouse gas emissions by finding sustainable cost-effective ways to integrate renewable energy sources such as wind power, concentrated solar thermal energy production and hydrogen into the energy requirements for the mining and agriculture industries, regional cities and towns and remote communities. Therefore, in conjunction with this project, GVROC undertook a renewable energy audit of the GE region in 2022.

The GE region is recognised as one of the world's most significant minerals provinces, historically with respect to gold and nickel production, but increasingly the renewable energy minerals needed for battery and other technologies is driving the rate and nature of use of shared infrastructure.

Most of the larger organisations in the region's mining sector have announced emission reduction targets in line with the Paris Agreement. Significant work by many parts of the sector has already been undertaken to reduce emissions, such as the transition to renewable power, the use of electric vehicles and machinery, the production of downstream battery minerals, and investments in hydrogen as a future energy source.

Agriculture is also booming closer to the coast, with between 2 – 3 million tonnes of grain exported from the Esperance Port annually. Livestock numbers have declined as grain production has expanded and the region's farmers are seen as highly innovative.

Precision Agriculture farming practices by large broadacre cropping enterprises has already resulted in increased production that optimises inputs, leading to increased profitability and minimised losses from such things as fertiliser.

In 2022, Fortescue Future Industries started engaging with farm owners, along with other stakeholders, to develop a green hydrogen industry. This rising new industry could potentially provide farmers with low-cost and sustainable alternatives for ammonia, transport, water and seasonal energy storage that will further reduce agriculture's emissions.

GVROC has a vision for the GE region to be thriving, clean, green and economically resilient and this guiding study, by developing outputs, including carbon emission reporting and monitoring

tools and frameworks, provides measurable targets that will support future emissions reduction projects.

The intent of this work was to primarily provide emissions reduction monitoring tools and targets to reduce carbon emissions from each GVROC LGA corporate operations, but to also better understand community emissions where LGAs could be targeting action and showing leadership in their communities.

The climate challenge is something that cannot be tackled at the level of the individual or household in each community. Rather it must be viewed as a collaborative effort across all levels of government, industry, energy providers and individual community members, which requires a shared vision, data and strategies, which this study endeavours to provide.

A handwritten signature in black ink, appearing to read "M Cullen".

Malcolm Cullen

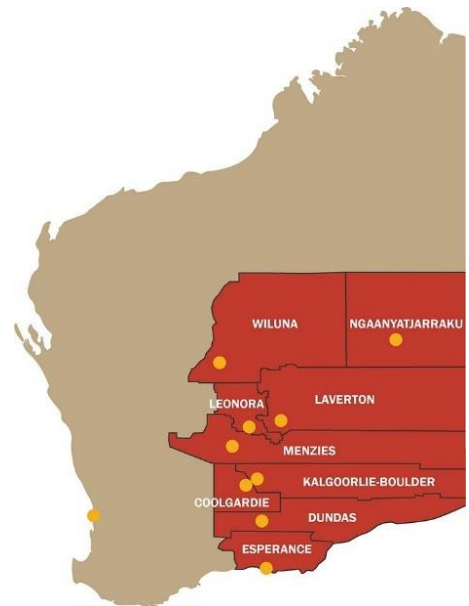
GVROC Chair



1. Executive Summary

The Goldfields Voluntary Regional Organisation of Councils (GVROC) formed the Goldfields Esperance Regional Climate Alliance in 2021. GVROC comprises nine Local Government Authorities: the Shires of Ngaanyatjarraku, Wiluna, Menzies, Laverton, Leonora, Coolgardie, Dundas, Esperance and the City of Kalgoorlie Boulder (these are referred to as Shires throughout this document unless specifically discussing the City of Kalgoorlie-Boulder).

The GVROC region is vast, covering a land area of around 940,000km², encompassing red deserts, expansive mineral wealth, the magnificent Great Western Woodlands, and the iconic white, sandy beaches of the Southern Ocean. The 55,000 people of the region live in one of the most beautiful, natural, safest, and least populated areas of the world.



This baseline study for net zero emissions combines the outputs of several pieces of work:

- Development of current corporate (Shire operations) greenhouse gas inventory for each Shire
- Detailed breakdown of community emissions beyond that provided on the snapshotclimate.com.au website
- Development of a Regional Net Zero Emissions Options for Shire corporate operations
- Engagement with key stakeholders including Shire staff, resource companies, agricultural agencies and to align with consultancy work for a regional renewable energy audit

These are briefly summarised below and detailed further within this report.

1.1 Regional Community Emissions

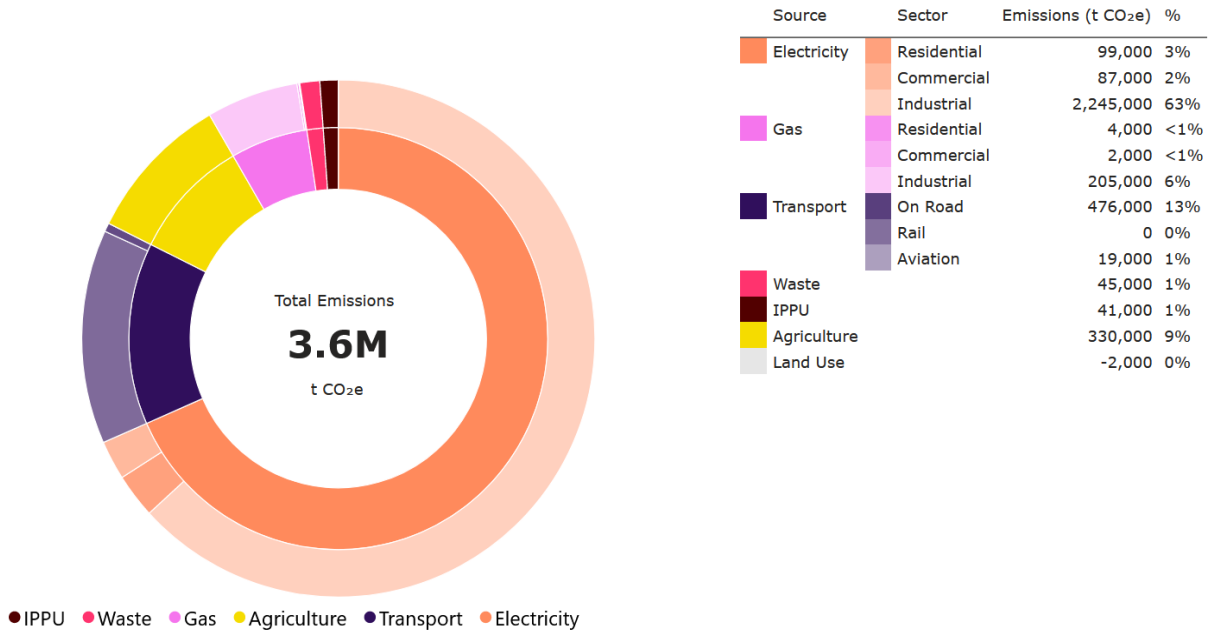
For the 2020 calendar year, Ironbark estimates the regional emissions as approximately 3.6 MtCO₂e.¹ As seen in Figure 1, the largest source of emissions was electricity and gas from the industrial sector, which comprised around 69% of emissions in the region. On-road transport accounted for 13% of emissions and agriculture for 9%. Residential and commercial emissions from waste, electricity and gas were all minor contributors to emissions at a regional scale.

The predominance of electricity emissions in the Goldfields Esperance community profile means the decarbonisation of the electricity supply should be the main focus of emissions reduction activities by the region in the short term. Electricity emissions are also highly concentrated across just a small number of mining companies, as

¹ One million tonnes of carbon dioxide equivalent. This measure accounts for the fact that there are multiple greenhouse gases by converting amounts of all gases to the equivalent amount of CO₂.

discussed below. This high concentration of electricity emissions coupled with the availability of existing renewable energy solutions and the geographic isolation of the region provides considerable opportunities for emissions reduction. Emissions reduction opportunities in the Transport and Agriculture sector are also discussed in Section 5.

Figure 1: 2020 Regional Greenhouse Gas Emissions²



1.1.1 Key Emitter Analysis

As part of this work, Ironbark also conducted an analysis of key emitters within each Local Government Area. The emissions data for key emitters has been collated from a range of publicly available datasets including the National Greenhouse and Energy Reporting Scheme (NGERs)³, the Safeguard Registry⁴ and the National Pollutants Inventory.⁵ This data has been geolocated to facilities in the region and enables an estimate of the emissions from local organisations.

In the City of Kalgoorlie-Boulder and the Shires of Coolgardie, Dundas, Laverton, Leonora, Menzies and Wiluna, Ironbark’s analysis found that emissions were highly concentrated in a small number of companies, predominantly Gold and Nickel Mining companies, however also includes some agriculture stations. In Kalgoorlie-Boulder,

² Data from snapshotclimate.com.au, during the delivery of this project additional data from key emitters and Shires have been sourced, resulting in updated data (e.g. waste data is now much higher based on Shire corporate emissions data). The original source data has been used for this Figure.

³ Australian corporations that meet certain thresholds must report their emissions and energy information under the National Greenhouse and Energy Reporting (NGER) scheme. This data is publicly available at: <https://www.cleanenergyregulator.gov.au/NGER/National%20greenhouse%20and%20energy%20reporting%20data/Corporate%20emissions%20and%20energy%20data>

⁴ The safeguard mechanism applies to facilities with scope 1 covered emissions of more than 100,000 tonnes of carbon dioxide equivalent (CO₂-e) per year. This data is publicly available at: <https://www.cleanenergyregulator.gov.au/NGER/The-safeguard-mechanism/safeguard-data/safeguard-facility-reported-emissions>

⁵ Industry facilities that exceed an NPI reporting threshold are required to report to the NPI. This data is publicly available at: <https://www.dcceew.gov.au/environment/protection/npi/data/latest-data>

for example, eleven organisations are responsible 1,010,000 tCO₂-e, accounting for 84% of the Shire’s emissions. In the Shire of Esperance on the other hand, 39% of emissions are from agricultural activity and 40% from on road transport.

1.1.2 Emissions Reduction Targets

Ironbark also conducted research into what emissions reduction targets key emitters across the region have in place and analysed the total emissions that are expected to be saved if these targets are met. The approach used to assess the potential impact of emissions reduction targets assumes that emissions reduce in a linear manner until the target is achieved.

This analysis found that 44% of companies/organisations identified through the key emitter analysis had existing emissions reduction targets. These generally included a net zero emissions target by 2050 as well as interim emissions reduction targets typically between 30% reduction by 2030 and 50% reduction by 2035.

If all emissions reductions were met Ironbark estimates that 758,000 tCO₂-e would be saved each year by 2030 and 1,889,000 tCO₂-e by 2050. This represents just over half of the emissions produced for the region in 2020/21.

1.2 Corporate Council Emissions

As part of this project a detailed emissions inventory for the 2021/22 year was prepared for each Shire in the region⁶. Total regional corporate emissions calculated for the period 2021/22 is **76,184 tonnes of CO₂ equivalent (tCO₂e)**⁷.

Shire’s corporate emissions have been calculated based on the guidelines provided by the Australian NGERs methodology and the WRI GHG Protocol Corporate Standard. To align with best practice and to set Shire up for possible carbon neutral certification, the inventory has been developed with the view to meet Climate Active requirements as much as possible. As a result, it includes Scopes 1, 2 and 3 emissions, and has an emphasis on completeness

Issues in data availability across different shires did result in a number of gaps within the emissions inventories, which have been noted in Section 3. With the exception of waste emissions⁸, however, most emissions gaps are expected to be minor.

For the first year of inventory, data not being able to be collected is common, however, this should set a trigger to start improving the processes and data collection procedures at each Shire to be able to develop emissions inventories on an annual basis (or at least every 3 years).

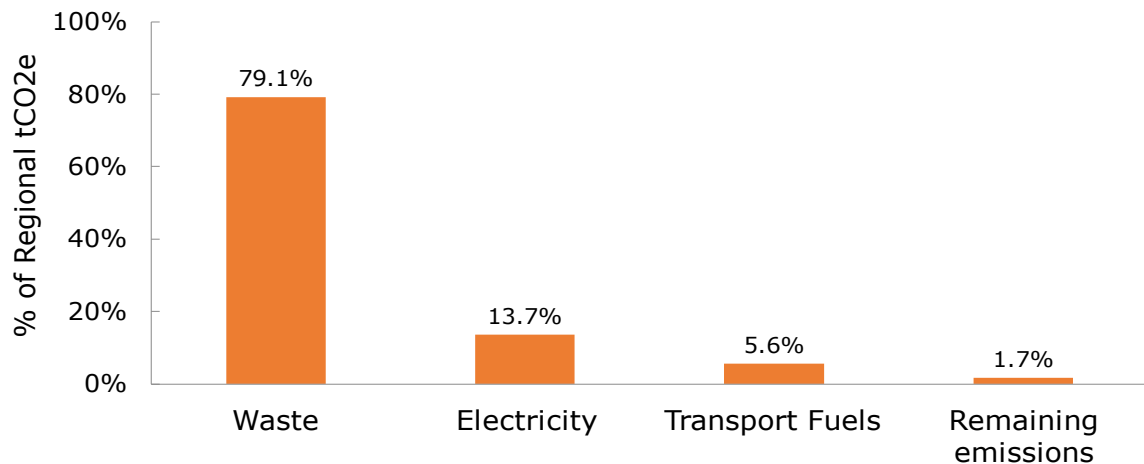
Figure 2 provides an overview of the regional corporate inventory for Goldfields Esperance Regional Climate Alliance by sector.

⁶ With the exception of Wiluna, where data was not provided to complete the analysis.

⁷ This includes emissions from waste from the City of Kalgoorlie-Boulder, however, activity data for waste was not available for the remaining Shires.

⁸ Emissions resulting from the disposal of waste to landfill and wastewater treatment

Figure 2: 2021/22 Regional Corporate greenhouse emissions by sector



Major emissions sources include:

- **Waste** (79%; 60,265 tCO₂e) including emissions from waste disposal to landfill, treatment of wastewater & discharge and corporate waste
- **Electricity consumption** (13.7%; 10,424 tCO₂e) including shire operations, street lighting, open space lighting, field lighting
- **Transport fuels** (5.6%; 4,229 tCO₂e) including diesel, petrol usage across fleet and plant equipment

The remaining emissions sources (Water Consumption, Stationary Fuels, Natural Gas, Corporate Waste, Staff Travel, Air Travel, Lubricants, Hire Cars and Taxis, Asphalt & associated construction materials, and Office Paper) contribute ~2% to the overall emissions inventory.

1.2.1 Net Zero Emissions Options for Corporate Operations













There are significant opportunities for GVROC Shires to reduce emissions across all major sources. Table 1 provides a summary of recommended emissions reduction opportunities.

Key actions to reduce emissions from Shire Corporate Operations include:

- Maximising behind the meter solar potential on high and medium energy use sites or sites reliant on diesel generation.
- Replace all remaining non-LED streetlights in line with best practice and Australian standards.
- Conduct energy audits and optimisation plans for key energy use sites.
- Commit to developing key sustainability policies to drive best practice energy efficiency and sustainable design and procurement across the region.
- Create a program to phase out all gas systems across the region and replace with electric alternatives.
- Develop a Sustainable Fleet Policy and a Fleet Transition Plan to effectively manage the complete transition of the Shires fleet to electric vehicles by 2035.

- In the short term complete long-term planning for waste to transition these operations to zero emissions.

Table 1: Summary of abatement opportunities

Action	Emissions Source	Cost	Abatement	Timeframe ⁺
 Streetlighting Upgrade	Electricity	\$	Medium	Short
 Sustainable Policies for Works Program	Electricity Natural Gas Concrete & Asphalt Waste	\$	Low	Short
 Energy Audits and Efficiency at Key Sites	Electricity Natural Gas	\$	Low	Short
 Battery Storage	Electricity Stationary Fuel	\$\$	Medium	Long
 Purchase and generation of Offsets	Offset	\$\$	Very High*	Medium
 Behind the Meter Solar	Electricity	\$\$	Medium	Medium
 Gas Transition	Natural Gas	\$\$	Low	Medium
 Passenger Vehicle Transition	Transport Fuel	\$\$	Low	Short
 Solar Farm	Electricity Offset	\$\$\$	Very High	Long
 Utility Vehicle Transition	Transport Fuel	\$\$\$	Medium	Medium
 Heavy Vehicle Transition	Transport Fuel	\$\$\$	Medium	Long
 Waste	Landfill gas	\$\$\$	Very High	Long

+ Timeframes: Short (6 months - 2 years), Medium (2 - 10 years), Long (10+ years)

* Offsets are not considered true abatement opportunities as they do not avoid greenhouse gas emissions. They should be used as a final step to achieve net zero emissions, offsetting any unavoidable emissions once all other available abatement actions have been implemented.

1.3 Recommendations

Below is a summary of the key recommendations for the Goldfields Esperance Regional Climate Alliance (GERCA) to undertake to reduce emissions across the region. These have been divided into recommendations that support the reduction of emissions from council operations and services, and that support emissions reduction across the communities.

It is important to note that these recommendations are broad in their nature, given that this study is focussed at a regional level. It will be up to individual Councils to

adopt their own strategies for emissions reduction and reporting, based on their capacity and resources, which varies significantly across the nine LGAs.

Although none of the GVROC members at this stage are tracking and reporting on their individual emissions, some of the larger Councils are engaging with industry to collaborate on issues such as improved waste management, water, and renewable energy infrastructure.

Some of the GVROC members have already collaborated on projects to upgrade solar and LED street lighting; Electric Vehicle charging stations; and renewable energy upgrades in partnership with Horizon Power and Western Power.

This Baseline Study provides the data for the GERCA to identify and further develop regional strategies and apply for grants to support sustainable emissions reduction activities that can be tracked and reported on over time.

Council Emissions

1. Support member councils to develop and report their emissions inventories annually. This will enable councils and the GERCA to start tracking emissions from council operations as well as the impact of emissions reduction actions.
2. Support member councils to address emissions inventory data gaps, as outlined in Appendix A.
3. Work with member councils to develop corporate emissions reduction targets.
4. Support member councils to identify and implement actions to reduce emissions from their operations, as per the key opportunities identified in Table 1 and in line with any established emissions reduction targets.

Community Emissions

5. Continue monitoring which organisations are the key emitters in the region (i.e. those accounting for large proportions of emissions).
6. Collect and report commitments and annual progress by key emitters and actors within the region.
7. Use the information collected on key emitters and their commitments to engage with companies to:
 - a. Provide assistance where needed for those organisations with ambitious commitments;
 - b. Work with those organisations without commitments or with commitments that lack ambition to develop ambitious targets;
 - c. Explore opportunities for collaboration between organisations to achieve emissions reductions.
8. Work with GEDC to develop a regional community emissions reduction target.
9. Identify programs and initiatives where councils have direct control over community emissions (e.g. waste and some infrastructure), or where council intervention can unblock barriers (e.g. planning, transport planning, arts and culture, community health), and/or accelerate action (e.g. promote state government subsidies).

10. Monitor key indicators of community emissions reduction and communicate progress. Examples of areas to track include: electric vehicles (EV), EV charging (public and private), solar PV, battery storage, grid scale renewables, offset programs (including through the Emissions Reduction Fund (ERF))
11. Monitor and communicate regional emissions and progress.
12. Explore regional solutions to corporate and community emissions reduction, for example a regional street lighting upgrade project⁹, an EV roadmap¹⁰ or solar and battery bulk buys.¹¹

⁹ See the Lighting the Regions website for an example of where this has been done well: <https://www.cvga.org.au/lighting-the-regions.html>

¹⁰ An example was developed by the Western Sydney Regional Organisation of Council, covering things like corporate fleet transition plans and an EV charging infrastructure master plan: <https://wsroc.com.au/media-a-resources/reports/summary/3-reports/317-western-sydney-electric-vehicle-roadmap-2022-2030>

¹¹ See for example: <https://shinehub.com.au/mitcham/>