



GREATER WHITSUNDAY
COUNCIL OF MAYORS
powering Australia

” Urban centres are responsible for around three quarters of greenhouse gas emissions...

Comparative analysis of carbon emissions



SUMMARY OF ANALYSIS PREPARED BY SYNERGIES ECONOMIC CONSULTING



Did you know?

MELBOURNE - 402 tonnes per hectare
COAL MINE - 172 tonnes per hectare



ABOUT US

Established in 2012, the purpose of the Greater Whitsunday Council of Mayors is the peak advocacy body representing the Isaac, Mackay and Whitsunday regions.

Our Vision

Think Globally
Act Regionally
Deliver Locally

Our Mission

To create and enhance organisational capacity of Councils; to capture and harness the global opportunities for the benefit of the region

Our leadership



Mayor Anne Baker - Chair Isaac Regional Council



Mayor Greg Williamson Mackay Regional Council



Mayor Andrew Willcox Whitsunday Regional Council



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Comparative Carbon Footprint Assessment

Synergies undertook an analysis for the Greater Whitsunday Council of Mayors (GWCoM), comparing greenhouse gas (GHG) emissions associated with a coal mine in Queensland that Synergies has selected to use as an example of a typical and comparable coal mining operation (referred to as the ‘sample mine’) with GHG emissions arising across the Melbourne metropolitan area.

The table below provides a summary of the two economic areas, including their key activities and corresponding land areas.

Regions of interest

	Sample Mine	Melbourne
Activities	<ul style="list-style-type: none"> Coal mining and processing operation Transport of a portfolio of metallurgical coal products to a port for export markets Transport of thermal coal to a power station 	<ul style="list-style-type: none"> Spans from the central business district to the peri-urban areas. The region hosts a diverse economy, with most major commercial and industrial sectors well represented. Top industries in the region include Health Care and Social Assistance, Retail Trade, Manufacturing, Construction, and Professional Services.
Land area	Land area is defined in two ways: <ul style="list-style-type: none"> Land disturbed by mine: ~6,000 ha <ul style="list-style-type: none"> This is the direct footprint of mining operations Mining lease area: ~20,000 ha <ul style="list-style-type: none"> This is the land area subject to a formal mining lease 	Land area is defined in two ways: <ul style="list-style-type: none"> Greater Melbourne: 999,270 ha <ul style="list-style-type: none"> Sum of all greater capital statistical areas Melbourne’s population-weighted density: 110,402 ha <ul style="list-style-type: none"> Addresses the issue of much of Greater Melbourne being sparsely populated urban land

Note: ha denotes hectare

Comparable emissions intensity estimates for the two areas were derived by:

- calculating total emissions for the sample mine, both as a standalone operation and in combination with other coal supply chain emissions;
- obtaining published estimates of total emissions for Melbourne; and
- deriving emissions intensity estimates by dividing total emissions by the areas of the respective regions.

Emissions were quantified in terms of carbon dioxide equivalent units (or tonnes (t) CO₂-e as appropriate) for a typical year of production. Emissions at the sample mine, including the transport of coal into other sectors of the economy, were estimated using a combination of published sources and Synergies analysis. To estimate the carbon footprint of all economic activity within Melbourne, we applied a 2013 total emission estimate derived by the Global Gridded Model of Carbon Footprints (GGMCF) for Melbourne.¹ These results are summarised in the table below.

¹ Moran, D., Kanemoto K; Jiborn, M., Wood, R., Többen, J., and Seto, K.C. (2018). Carbon footprints of 13,000 cities. Environmental Research Letters, 14(6) pp. 1-9. Data available via <<http://citycarbonfootprints.info/>>.

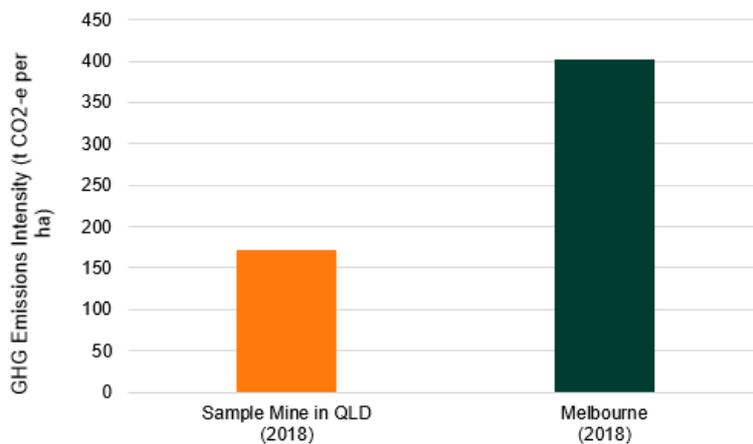
Emissions estimates for sample mine and Greater Melbourne (2018)

	Emissions 2018 (Thousand t CO ₂ -e)
Mine emissions	
Mine only emissions	994
Mine and transport emissions	1,020
Greater Melbourne emissions	
Central emission estimate	44,400
Low – High estimate range	33,200 – 55,600

Source: Department of the Environment and Energy (2018). National Greenhouse Accounts Factors and reports published by mine operator.

The total emissions estimates were converted into emissions intensity estimates to allow comparison of the emissions generated per unit of economically active land in the mine and Melbourne areas. The best estimate of emissions intensity for the sample mine was 172 t CO₂-e per ha whereas for Melbourne it was 402 t CO₂-e per ha. That is, the emissions generated per unit of economically active area in Melbourne is more than twice that of the sample mine.

Comparison of emission intensities (best estimates)



Data source: Synergies modelling