Hazelwood HEALTH STUDY

A Latrobe Community Wellbeing Barometer

Community Wellbeing Stream Technical Report

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This report has been prepared for the Hazelwood Health Study by the **Community Wellbeing Stream.**

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Disclaimers

This report presents a preliminary analysis which has not been submitted to independent peer review. Subsequent scholarly manuscripts which undergo independent peer review may vary in their findings or interpretation**.**

While we have endeavoured to record all data used for the Community Wellbeing Barometer accurately, we acknowledge the possibility that the custodians of each of the data sources may have made adjustments and re-released data in the time since we completed our data collection.

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Document History

Version Number	Date	Approved By	Brief Description
1.0	11 September 2024	HHS Senior Project Manager	Submitted to the Department of Health

Abbreviations

ABS	Australian Bureau of Statistics
AER	Australia's Environment Report
AIHW	Australian Institute of Health and Welfare
AOD	Alcohol and other drugs
ATSI	Aboriginal and Torres Strait Islander
CIV	Community Indicators Victoria
CIW	Canadian Index of Wellbeing
CSA	Crime Statistics Agency
CW	Community Wellbeing
DHAC	Department of Health and Aged Care
DII	Digital Inclusion Index
EPA	Environment Protection Authority
gC/m^2	Measurement for carbon emissions from wild fires
GPHN	Gippsland Primary Health Network
GRP	Gross Regional Product
HHS	Hazelwood Health Study
HMF	Hazelwood Mine Fire
LCC	Latrobe City Council
LGA	Local Government Area
LHIZ	Latrobe Health Innovation Zone
LRH	Latrobe Regional Hospital
LVA	Latrobe Valley Authority
NHWDS	National Health Workforce Dataset
OECD	Organisation for Economic Co-operation and Development
NHWDS	National Health Workforce Dataset
$PM_{2.5}$	Particulate matter 2.5 micrometres or less in diameter
PM_{10}	Particulate matter 10 micrometres or less in diameter
RWS	Regional Wellbeing Survey
SA3	Statistical Area level 3
SEHQ	School Entrant Health Questionnaire
SEIFA	Socio-Economic Indexes for Areas
SHA	Social Health Atlas
VAHI	Victorian Agency for Health Information
VGCCC	Victorian Gambling and Casino Control Commission
VGV	Valuer-General Victoria
VicHealth	Victorian Health Promotion Foundation
VLGGC	Victorian Local Government Grants Commission
VPHS	Victorian Population Health Survey
VWHA	Victorian Women's Health Atlas

Executive summary

This report presents the findings of work carried out by the Community Wellbeing Stream within the Hazelwood Health Study in Years 6-10 (2019-2024). Previously, in Years 1-5, the Community Wellbeing Stream's focus was on the impact of the 2014 Hazelwood mine fire on the Latrobe community. In Years 6-10 of the study, our focus has broadened to consider the impact of other events that have occurred since the mine fire. The research presented here contributes to answering one of the Stream's key research questions:

- **What factors are indicative of current and future changes in community wellbeing?**

The 2014 Hazelwood mine fire in the Latrobe Valley placed a spotlight on a community long impacted by structural change and natural disasters. In this context, a retrospective measure of community wellbeing (CW) was envisaged to monitor underpinning contributors to CW and better understand the impacts from the mine fire and other events. Specifically, the aim was to develop a tool, which we have called a Community Wellbeing Barometer, to monitor changes in CW over time in the local government area (LGA) of Latrobe City. Latrobe City is an LGA located in the centre of the Latrobe Valley region in Gippsland, Victoria. The time period considered was 2008-2023. A deliberate and guiding intention for the barometer was to provide a readily comprehensible and easily extendable tool that could be utilised by other agencies and stakeholders, and in other localities. Consistent with this aim, data informing the barometer was limited to ongoing and publicly available datasets. The method for compiling data was intentionally restricted to a straightforward approach. While we acknowledge that this approach has several limitations, the utility of the barometer remains a key strength.

The utility of the barometer resides in its ability to reflect changes in multiple aspects of CW over time with some confidence. Given this, the barometer provides a tool for understanding the key health, social, economic and other factors that contribute to CW that may help inform policy makers and other stakeholders. A rigorous process was used to evaluate the inputs into the barometer and the resultant measured outcomes. This included external validation through comparison with independently reported composite measures of different aspects of CW, as well as consultation with community stakeholders who reviewed initial barometer findings and assessed them against their own understanding of changes in CW in Latrobe. To provide context for the development of the barometer, the report reviews literature on monitors designed to measure CW, with Australian and international examples. Key events and policy initiatives theorised to influence CW in Latrobe are represented in a timeline.

The barometer includes five domains (listed below). Each domain has approximately five associated themes, assessed by three to five independent datasets, resulting in 68 measures. These measures were drawn from nineteen publicly available data sources. In order to compare Latrobe and Victoria-wide CW, data were analysed at the LGA/SA3 and state levels. Domains and their themes include:

- Health – 17 measures associated with physical and mental health and wellbeing;
- Economy – 11 measures associated with money or financial transactions;
- Environment – 14 measures associated with physical surroundings and their quality;
- Services and infrastructure – 14 measures associated with support or facilitation that meets community needs; and,
- Social connections – 12 measures associated with social connection, engagement and participation.

When linear trend analysis was undertaken, it was apparent that most of these domains were trending upward over time (indicating increasing CW), except that of health. Applying a polynomial trend, a technique more responsive than linear trend analysis to yearly change, gave a more nuanced picture of CW over the considered time period. The polynomial trend for overall CW data (where the five domains were combined into a single composite measure of CW) showed a general decline from a high point in 2008 before rising from 2016. CW peaked in 2022. Shifts in wellbeing measures and domains were broadly consistent with events theorised by the research team and by the expert panel of local stakeholders as impacting Latrobe CW.

The barometer, subject to limitations, provides *proof-of-concept* for a method of synthesising publicly available data to assess overall CW, as well as changes to CW within each of the five domains. Extensions over time will

allow for greater confidence and so provide a way to monitor ongoing CW in Latrobe. This research report, in conjunction with the companion report on *Community Wellbeing in the Latrobe Valley since the Hazelwood Mine Fire* (Yell et al., 2024), provides a quantitative and qualitative evidence base for mapping community wellbeing in Latrobe. It offers insights into the overarching strengths and capacities within the community that contribute to CW. This will be of value to local and state governments in planning and allocating resources to further enhance these capacities, as well as to the advocacy efforts of community groups and stakeholders.

1. Introduction

This report presents the findings of work carried out by the Community Wellbeing Stream within the Hazelwood Health Study in Years 6-10 (2019-2024). The Hazelwood Health Study is a longitudinal study, funded by the Victorian Department of Health, identifying health and wellbeing effects of the 2014 Hazelwood mine fire (HMF) and associated smoke event. The Community Wellbeing Stream is a collaboration involving researchers from Federation University, James Cook University, the University of Newcastle and Monash Rural Health.

Previously, in Years 1-5, the Community Wellbeing Stream's focus was on the impact of the 2014 Hazelwood mine fire on the Latrobe Valley community. In Years 6-10 of the study, our focus has broadened to consider other events that have occurred since the mine fire. In the ten years since the mine fire, community members living in this region have also experienced other disasters including local bushfires and floods, the smoke from the Black Summer bushfires, and the COVID-19 pandemic, with adverse impacts for the community. There have also been positive initiatives, whether delivered by government or driven by the community, which are likely to have influenced CW. Community initiatives include the formation of the Gippsland Pride Initiative, the development and increasing success of the Morwell International Rose Garden Festival and Morwell Neighbourhood House's People's Kitchen, to name just a few. In line with the Hazelwood Mine Fire Inquiry's (HMFI) recommendations, the state government has designated Latrobe a Health Innovation Zone (LHIZ), established a Latrobe Health Assembly (LHA) and appointed a Latrobe Health Advocate (although this latter role was terminated in June 2024). The Latrobe Valley Authority (LVA) was established to mitigate economic and employment impacts of mine closures (after the closure of Hazelwood in 2017) and in conjunction with local government, steered major infrastructure grants from the state government resulting in new sporting and cultural facilities being built, among other projects and initiatives. However, in 2024 it was also announced that the LVA would be discontinued and its work folded into Regional Development Victoria.

1.1 Research questions

Our work in years 6-10 investigated CW and resilience in the light of the HMF and other events and initiatives. Our aims were to determine the strengths and capacities of this community as well as its areas of vulnerability which may need further investment and support. Accordingly, our research questions are:

1. How has the community's wellbeing and recovery from the HMF been impacted by subsequent events (e.g., the closure of the Hazelwood mine and other large local employers, the release of HHS results, initiatives such as the LHIZ, LHA and Latrobe Health Advocate)?
2. What factors are indicative of current and future changes in community wellbeing?
3. What is the relationship between community wellbeing and personal wellbeing? (in conjunction with the Psychological Impacts Stream).

This report will focus predominantly on the second of these three questions and is designed to assess whether identified publicly available retrospective data (e.g., Australian Bureau of Statistics [ABS] or Victorian Population Health Survey [VPHS] measures) may be synthesised to provide a practical indicator of Latrobe CW over time (the specific study aim is stated below). The remaining questions are addressed in a separate report on *Community Wellbeing in Latrobe since the Hazelwood Mine Fire* (Yell et al., 2024).

The capacity of local communities to thrive and prosper rests on a multitude of social, economic, cultural, health and environmental factors. These factors may be stable over time or change in response to external influences

including government decisions, catastrophic natural disasters or human-induced events, or through broader trends in the social, environmental, and economic conditions. Located in Victoria, Australia, Latrobe City, the local government area at the centre of the Latrobe Valley, presents as a defined region which has been, over recent decades, subject to significant human-induced and natural events additional to significant government interventions in health and community development. A key question concerns the region's wellbeing at the level of the community, and how impactful events, experienced in the context of broader change factors, affected this condition. The answer to such questions may be revealed, to some extent, through examination of extant data that is publicly available.

We now provide a brief overview of CW as a theoretical concept based on previous research, followed by the study aim and broad approach to meeting this aim.

1.2 Previous research and defining community wellbeing

CW models recognise that wellbeing arises out of the close relationship between people's health and the living and working conditions which form their social environment (Baum, 2018; Saha. et al., 2020). These factors are sometimes referred to as the social determinants of health (World Health Organization [WHO], 2021). Historical, social, cultural and economic contexts are fundamental to wellbeing, as Wiseman and Brasher (2008) acknowledge in their definition:

> ***Community wellbeing*** is the combination of social, economic, environmental, cultural, and political conditions identified by individuals and their communities as essential for them to flourish and fulfil their potential (p.358, our emphasis).

Previous research on wellbeing talks about wellbeing as a combination of individual and social factors, as CW is more than merely the sum of individual wellbeing of the people in the community (Sirgy, 2011). Atkinson et al. (2017) argue that CW may refer to "living well together at a community scale" or it may refer to the "role that community scale aspects have in facilitating local individual wellbeing" (p.5). Morton (2013), in a review of CW indicators for local government, writes that "personal wellbeing measures people's experiences of their positive and negative emotions, satisfaction, vitality, resilience, self-esteem, and sense of positive functioning in the world", whereas "social wellbeing measures people's experiences of supportive relationships and sense of trust and belonging with others" (p. 174). Generally, the most popular approach is to consider CW from both individual and collective levels. This makes sense as arguably a community cannot be flourishing if its members are not flourishing (VanderWeele, 2019).

Attempts at measuring CW are numerous and ongoing (Bagnall, et al., 2017; SGS Economics and Planning, 2024). Associated discussion on suitable approaches and designs that properly encompass this concept remain contested (Atkinson, et al., 2020). Data on CW can include a mix of objective and subjective measures. Subjective data on individuals (such as survey responses on individual life satisfaction) and objective data (on income and educational attainment of individuals), aggregated at population level, can be employed alongside data on aspects of life at community level, such as crime rates (objective measure) or feelings of safety (subjective measure) (Atkinson et al., 2017). However, as Atkinson et al. (2017) point out, "Capturing subjective aspects of local life that are not simply individual but reflect the ways in which people function and feel together is more challenging" (p.5). Therefore, in addition to developing a barometer based on quantitative data, our program of work also includes qualitative data based on in-depth interviews with key informants in the community, to attempt to capture those "subjective aspects of local life" referred to by Atkinson et al. (2017) in more depth and detail. This work is presented in a separate report (Yell et al., 2024).

In developing a barometer, we use publicly available extant data on individual wellbeing that has been aggregated for the local government area of Latrobe. We combine this with data on community-level resources and infrastructure. The measures chosen incorporate both objective and subjective forms of data. Reviews of previous work have resulted in calls for valid longitudinal research and suitable scientific processes (Barrington-Leigh et al.,

2018; Miranti et al., 2020). Ideally, barometers should encompass replicability, transparency of methods, allow for extensions over time, relevance to the selected geographic location, and, as far as practicable, simplicity.

This barometer's value going forward should be judged according to whether the findings resonate with expert perceptions, appraisal and through other forms of external validation. It is important to acknowledge limitations and interpret the outcomes of this study with caution, particularly at this proof-of-concept stage.

1.3 Study aim and approach

The overarching study aim was to compile and analyse publicly available data that collectively reflect CW and monitor changes over time for a selected region. We define the region as the local government area (LGA) of Latrobe City, an LGA located in the centre of the Latrobe Valley region in Gippsland, Victoria (referred to throughout this report as Latrobe). The anticipated result is to provide a practical tool we call the barometer, which can be easily updated as new data and data sources become available. Proof-of-concept will provide a basis for ongoing barometer development. The barometer is designed to inform government, the community and researchers by providing knowledge and support for future regional planning initiatives.

In developing a barometer for the Latrobe community, the research team followed an iterative, principles-based logical approach in selecting and combining existing and publicly available data sources. Broad steps (detailed later in the Method section) encompassed:

1) identifying relevant CW domains informed by previous research efforts;
2) identifying suitable measures meeting inclusion criteria;
3) collecting time series data against each measure to enable monitoring of trends over time;
4) presenting collected data in the form of a barometer depicting measures of wellbeing for each domain;
5) Assessing the validity of the barometer through consultation with community stakeholders, against other composite measures, and through comparison with Victoria-wide data.

In the next section of this report, we provide context for the barometer with an overview of Latrobe's socioeconomic profile, a description on the impacts of the HMF and a timeline of events impacting Latrobe CW.

2. Context

2.1 Socioeconomic profile of Latrobe City

According to the ABS's Socio-Economic Index for Areas (SEIFA), the Latrobe City LGA is one of the most disadvantaged areas in the country (ABS, 2021a). Latrobe City has an ageing population, with a higher proportion of people 65 years and over (21.1%) than the state average (16.8%) (Gippsland Primary Health Network [GPHN], 2022). A high proportion of the population (28%) experience very high disadvantage (GPHN, 2022), with highest disadvantage located in Morwell. The 2014 HMFI quoted Department of Health statistics showing Latrobe residents had a lower life expectancy than the state average, higher number of emergency and mental health presentations, fewer GP's and higher unemployment (Teague et al., 2014, p.254). Unemployment continues to be high in Latrobe (6.6%) compared to a state average of 5.0% (ABS, 2021b).

Data from the 2021 Census indicates that the LGA continues to experience poorer health compared to the state of Victoria overall. For example, there were more people living with long-term health conditions (9.5% compared to 8%) and a much higher proportion of people suffering from three or more long-term health conditions (5.1% compared to 2.9%) in Latrobe compared to the Victorian average (ABS, 2021b). According to the 2020 Victorian Population Health Survey (VPHS), 29% of the Latrobe LGA residents reported that they perceived themselves to have poor or fair health, the highest proportion of all 80 Victorian LGAs (Victorian Agency for Health Information [VAHI], 2020). Around 18% of residents reported that they did not feel valued by society (4th highest ranking), and 25% of people rated their life satisfaction as low or medium (11th highest ranking) (VAHI, 2020). The events listed below, including the HMF, therefore impacted upon an already disadvantaged community.

2.2 The Hazelwood mine fire

The HMF burnt from 9 February until approximately 25 March 2014 (Teague et al., 2014). It began as a grass fire then spread into the Morwell open cut coal mine adjacent to the Hazelwood power station. Smoke and ash from the burning coal affected nearby communities, particularly the adjacent town of Morwell, with community members reporting a range of health symptoms. During the 45-day period, local communities within the Latrobe Valley, particularly Morwell, were impacted and at times "overwhelmed" (Teague et al., 2014, p. 257) by smoke, ash and raised carbon monoxide levels from the HMF. Local communities became increasingly concerned about the perceived health risks of exposure to the smoke and gas emissions from the burning coal, with residents reporting ill health in themselves, family members, neighbours and friends (Yell et al., 2017). This fire, initially treated as a fire emergency, "evolved into a chronic technological disaster … and a significant and lengthy environmental and health crisis" (Teague et al., 2014, p.28; see also Yell et al., 2019; Duffy & Whyte 2017).

2.3 Timeline of events

The timeline below (Figure 1) presents key events impacting the Latrobe community, particularly over the last ten years. A more detailed narrative of these events is available in our companion report on *Community Wellbeing in Latrobe since the Hazelwood Mine Fire* (Yell et al., 2024), which presents a qualitative analysis of community perceptions of wellbeing based on interview data.

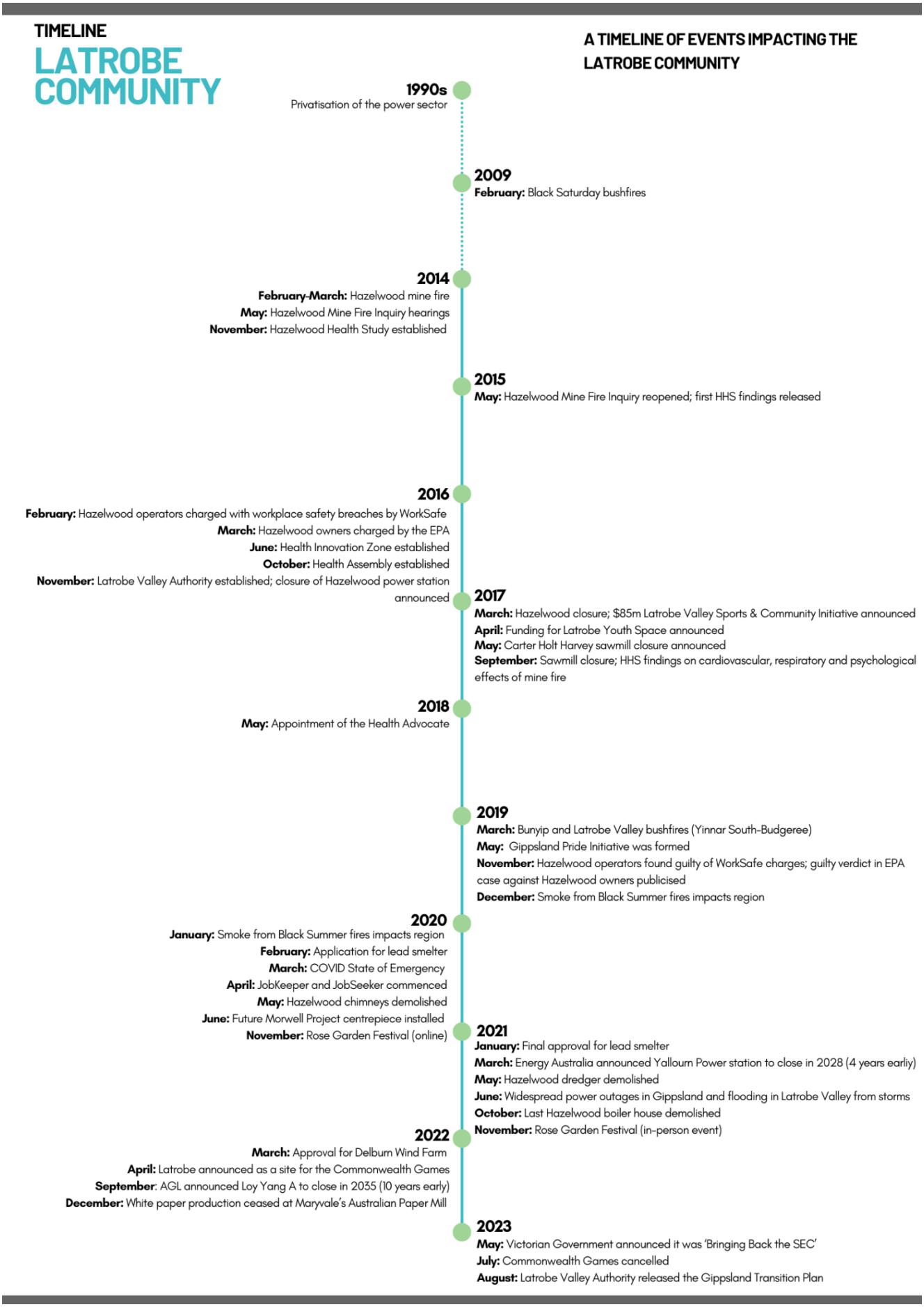

Figure 1. Timeline of events impacting the Latrobe community

3. Review of literature on monitoring community wellbeing

3.1 Introduction

Determining whether communities are thriving and prospering relies, in part, on measuring progress. Traditionally, public discourse on how progress is best measured has focused on Gross Domestic Product (GDP), a marker of economic growth, with little regard for the impact that other factors associated with community members' wellbeing might have on this progress (Hoekstra, 2022, Kim, 2016). Factors like health, education, social relationships and equality, and their contributions to conditions conducive to inclusive and sustainable wellbeing, have often been overlooked (Hoekstra, 2022). More recently, wellbeing has become an alternative measure of progress to GDP-centric approaches (Kim, Kee & Lee, 2015; Kim, 2016), including Australian's 'Measuring What Matters' national wellbeing framework (Australian Government: The Treasury, n.d.).

3.2 What are wellbeing monitors?

International attention is increasingly directed towards developing frameworks and identifying indicators for measuring the collective wellbeing of citizens (Atkinson et al., 2020). This is part of a growing movement associated with developing "wellbeing economies", marking a shift away from defining and measuring progress in only economic terms to considering what wellbeing and quality of life look like, or moving "beyond a focus on 'means', i.e. economic growth, to a focus on the achievement of 'ends', i.e. our collective wellbeing" (Wellbeing Economy Alliance [WEAII], 2021., p.5.). This shift is also linked to recognition of the importance of concepts like diversity and inclusion (Talmage & Knopf, 2017) and the link between wellbeing and the health of the environment (Patrick et al., 2019).

A review of scholarly and grey literature reveals significant effort has been directed toward measuring CW. Given that the factors impacting CW are subject to change over time, tools that can be used to monitor these factors and their impacts are appealing to governments at all levels, as well as community service organisations, groups and advocates. Tools that monitor wellbeing have potential to produce evidence, to inform policies and to encourage decision-makers to take accountability for progress towards goals that serve the interests of the community (Pontifex, 2023). Specifically, wellbeing monitors can offer insights on governance, regulation and decision-making aimed at increasing wellbeing (Sarra and Nissi, 2020). In addition to their use in informing government, CW monitors can be used by citizens to advocate for change (Smale & Hilbrecht, 2017).

3.3 How do wellbeing monitors work?

What most monitors and indices have in common is the identification of indicators, or measures, categorised according to broad domains, or areas of wellbeing. They focus on data pertaining to a specific geographical area, monitoring and reporting on progress, highlighting community issues and have the potential to guide future planning (Davern et al., 2017). Through compilation and analysis, CW monitors bring together disparate data to capture a broad snapshot of CW at any one time, as well as depict changes over time. Tracking indicators over time gives opportunities to assess improvements and decline, what areas of wellbeing need attention, and identify possible interventions (VanderWeele, 2019). However, tracking indicators over time is challenging, particularly when using multiple extant datasets that may have different time points for their data collection.

In terms of how monitors present data, Salvaris et al. (2023) point out that "long-running controversy" (p.8) surrounds the choice between a dashboard format presenting an array of individual measures, or the production of composite indices synthesising underlying measures. According to Michalos et al. (2011), in outlining their approach to the Canadian Index of Wellbeing (CIW), these need not be treated as mutually exclusive. Dashboards provide data on specific measures of wellbeing – for example, data on obesity and other chronic health conditions – whereas composite indices compile data on multiple measures to generate an overall wellbeing indicator, or indicators for specific domains of wellbeing. It is possible for one monitor to present data both ways. For instance, in reference to the CIW, Smale and Hilbrecht (2017) state it "can track changes in well-being over time at the individual indicator level and at the domain level – often referred to as a 'dashboard approach'– and overall in a

composite index of well-being incorporating all eight of the domains" (p.298). Michalos et al. (2011) argue that the composite index used for the CIW is "the door or entry point" into a "comprehensive set of measures" (p.13). This highlights a key benefit of a combined method, which we have adopted for the barometer: "Indices are a useful shorthand… but they do not detract from the more detailed picture that the individual or headline indicators convey" (Salvaris et al. 2023, p. 8). Salvaris et al. (2023) also recommend monitors make use of both objective and subjective measures, a nuanced approach we have also opted to use.

3.4 Subjective and objective measures

A combination of objective and subjective measures is desirable when measuring wellbeing (Davern et al., 2017; Maridal, 2017; Movahed, 2017; Salvaris et al., 2023). Objective measures apply to tangible elements including self-reported behaviours (e.g., volunteering) while subjective measures refer to opinions, perceptions or judgements made by people (e.g., self-report of psychological distress for the health domain). Kim and Lee (2014) identified 53 indices focused on local wellbeing based primarily in the United States, Canada and Australia, highlighting that these focused more on objective data for social, economic, health and environmental domains. They assert, while offering "convenience and value of cross-comparison across communities", reliance on objective measures leads to only partial measurement of wellbeing (p. 541). In their review of approaches to measuring objective and subjective wellbeing, Voukelatou et al. (2021) argue that both are important, especially given the latter "examines people's subjective evaluations of their own lives" (p.280). To an extent, subjective assessments are seen as a means of giving community members a say on "how they feel their lives are going" (Atkinson et al., 2020, p.1905).

Calling for a combined approach, Movahed (2017) argues that supplementing objective indicators with subjective indicators, may help capture the "fuzzier", more abstract emotional, relational and spiritual aspects of health and wellbeing. In the case of health, commonly used as an indicator of wellbeing, objective measures have been readily relied upon; however, while they "allow for an understanding of the baseline situation, they overlook the nuances inherent in the more complex areas of human health" (Movahed, 2017, p.65). For instance, self-reported health status may not only indicate how a person rates their physical health, but also provides some insight into their mental wellbeing.

Obtaining data on community members' perceptions of wellbeing is not without challenges. Ideally, fit-for-purpose surveys would be designed and administered to gather data to be incorporated into a monitor but this process is labour-intensive in terms of both time and resources (Davern et al., 2017). In our case, the aim was to utilise existing data sources rather than design new ones, as this makes the model easier to use here and be replicated elsewhere. While much of our data is objective (as it is more frequently reported on by government and other agencies), we have made use of existing survey data where possible to provide a more nuanced understanding of wellbeing. While this comes with some limitations – for instance, sample size in some cases, and lack of control over consistency and frequency of surveys – for our purposes, the benefits outweigh the limitations.

3.5 Where have wellbeing monitors been implemented and what challenges have arisen?

Numerous wellbeing measurement tools have been implemented internationally, nationally and at local government levels. Measuring wellbeing is a key priority of the OECD's Better Life Initiative. For example, 27 of 38 OECD member states have developed wellbeing initiatives, including various frameworks, dashboards and strategic plans aimed at measuring objective and subjective wellbeing (Mahoney, 2023). Examples informed by the Better Life Initiative include Australian Treasury's Measuring What Matters framework; Belgium's Sustainable Development Indicators; Ireland's Wellbeing Framework; Quality of Life frameworks in Canada and Norway; New Zealand's Treasury Living Standards; and the UK's Measures of National Wellbeing (Mahoney, 2023).

In Australia, several state and territory-based frameworks have also been developed or are in development, including those in the Australian Capital Territory (ACT), Western Australia (WA), Tasmania and South Australia (SA) (Salvaris, 2022). These include the ACT Wellbeing Framework (ACT Government, 2020)., which is made up of 12 domains and 56 indicators that can be accessed via a data dashboard. The dashboard enables ACT data to be compared with data for Australia, as well as each state and territory. The dashboard comprises subjective and

objective data depicting changes over time. The Wellbeing Index for South Australia (Preventative Health SA, 2024) has four domains of wellbeing populated by 42 measures and, likewise, presents objective and subjective indicator data over time. However, some indicators have only two data points, depending on the availability of data, which limits the ability to depict changes and trends (at this stage).

Tasmania's Good Life Index aims to produce a "place-based dataset that combines available data with the voices and experiences of the community", including administrative and census data, economic, environmental and social data, and responses from biannual wellbeing surveys (Lester, Seivwright & Kocar, 2022, p.3). In contrast, the Western Australian Community Insight Tool offers only objective data drawn from the Census and other government, health and welfare agencies (Community Insight Australia, 2024). Hundreds of indicators are grouped under 16 categories and can be accessed individually via a mapping tool for each area of WA or via a dashboard that compares regions across 12 key indicators. Comparisons over time where available can be found in reports for each region.

The examples referred to above cover large geographical areas – states/territories or, in the case of WA, regions within the largest state in Australia. It can be difficult defining community and selecting a corresponding geographical area. In their conceptual review of CW, Atkinson et al. (2017, p. 11) point to the challenge of defining community, highlighting the associated limitations in measuring CW, particularly as "community" can be experienced in ways not defined by geographical boundaries. Despite this challenge, they argue that governance still occurs through the "territorial unit of local government" and while there may be limitations associated with defining community in terms of residential/local government boundaries, "what those in the territory do share is the experience of the local authority, its policies and their implementation, which is of crucial interest in supporting community wellbeing" (Atkinson et al., 2017, p. 11).

This focus on the local level is important given dimensions of wellbeing are specific to each community (Sarra & Nissi, 2020) and can be used to assess progress in policy implementation (Giles-Corti et al., 2020). Patrick et al. (2019) advocate for the use of locally relevant datasets to allow for regional specificity in terms of progress: "Given there is evidence to suggest that between and within countries or states there are increasing gaps in wellbeing (OECD, 2015), and that these vary geographically and are getting wider over time… there is a need for indices that provide a local perspective" (p.653). It makes sense then that monitoring of CW would occur at the level of local government. Our barometer uses LGA and SA3 level data specific to Latrobe City. A review of local government CW measurement projects reveals a number of wellbeing monitors have also been implemented at the local level in metropolitan, regional and suburban areas, many with the purpose of informing council decision-making over time. This review also identifies common goals and challenges facing CW indicators and monitors.

In terms of tracking wellbeing over time, The South Australian City of Onkaparinga Community Wellbeing Monitor (2014), which focuses on four determinants of wellbeing – environment, economic development, social development and health – includes data for some indicators going back over a decade. A strength of this monitor is the longevity of data available, including data collected by the local council that is specific to the region. That said, the monitor lacks a consistent number of data points for every indicator, a common challenge facing many local level monitors, including our barometer.

Although accessing extant data is less labour-intensive than developing and administering fit-for-purpose surveys, there can be additional challenges when these data are relied upon. The City of Charles Sturt (2015) in SA developed a community wellbeing monitor to report on and track community strengths and vulnerabilities, using existing external data sources to track progress. However, a limitation exists due to reliance on third parties, and their timeframes for releasing data, as these are not tailored to the requirements of the monitor. This challenge to access available and relevant data was also faced in developing the Victorian City of Whittlesea's (2017) Community Wellbeing Indicators Framework. This framework was informed by council plans and, using trend data, aimed to assess whether CW was progressing, regressing, or offering no meaningful change, thus giving insights to guide future policy and planning. Their Community Wellbeing Indicators Report (City of Whittlesea, 2017) reveals that, in many cases, comparable historical data were not available to determine the trends such

tools were designed to capture. This inconsistency in data availability is one of the reasons we set criteria for a minimum number of data points.

Another of the challenges facing monitors is capturing community perspectives on appropriate measures of CW. Literature on the selection of indicators and development of monitoring tools emphasises the importance of community stakeholder and partner engagement in the design process (Davern et al., 2017; Burd-Shaps et al., 2017; Weeranakin & Promphakping, 2018; Calcagnini & Perugini, 2019; Pontifex, 2023). Despite efforts to engage with community in identification of indicators, measurement systems are often limited in terms of their ability to reflect diverse community perspectives (Kim, Kee & Lee, 2015). This limitation is evident in the tension between sourcing enough measures to capture diversity while ensuring a manageable number of measures (Pontifex, 2023). In developing our barometer, we consulted with community members and key stakeholders to ensure domains and measures were selected through a collaborative process and are locally meaningful (see appendices D and E). However, we recognise that not all voices were captured by this process.

Although no longer operational, Community Indicators Victoria (CIV) is an example of a collaborative effort – between stakeholders representing community, academia, government and non-government sectors – to measure and monitor CW at LGA level across Victoria (Davern et al., 2017). Davern et al. (2017) use CIV as a case study highlighting best practice principles to inform indicator systems, which include (but are not limited to): time series monitoring; valid, reliable, replicable and sensitive measures; and using a mix of objective and subjective measures. The framework for City of Sydney Community Wellbeing Indicators (Partridge et al., 2011) was informed by CIV, tracking health and safety, culture, democracy, community engagement and the local economy across time points. Indicators were drawn from objective and subjective data and benchmarked against state indicators. Likewise, we draw on state-wide data for comparison and context, as well as additional measures for validation.

According to Davern et al. (2017), best practice also calls for acknowledgement of differing perspectives and demographics and awareness that not all groups can or want to be represented in the data. This is an important point and not unique to our barometer. For example, we note that for some indicators to be included in the SA Wellbeing Index, data are not yet available and indicators for Aboriginal Cultural Wellbeing are still to be developed in partnership with Aboriginal and Torres Strait Islander stakeholders (Preventative Health SA, 2024.). This demonstrates that the process of identifying measures can be useful for highlighting data gaps and points to the need for ongoing work associated with capturing meaningful data on CW in consultation with stakeholders.

Like Davern et al. (2017), Movahed (2017) proposes best practice criteria for developing wellbeing monitors: comprehensiveness, availability of data, accessibility, sensitivity to changes over time, capacity to be used at different levels of aggregation, validity (external and internal), and reliability. Using existing, reputable data sources can assist in meeting such criteria, for instance, we have drawn on data from repositories like the ABS and other government sources (Davern et al., 2017). While we acknowledge there are ways and contexts in which different sub-groups, including marginalised groups, experience wellbeing (Atkinson et al., 2017) which are not captured by these datasets, where possible, we have included survey data relating to community members' perceptions to inform subjective measures. All the data we have used are publicly available which, in the spirit of ensuring accessibility, means any community member or group can access (and check) these data. We included composite scores for each domain, but also included data for each measure, meaning further detail can be accessed where required. This gives the end user the opportunity to identify, use and add context to data at a level of detail that is meaningful to them and specific to their purposes.

Drawing on insights gained from this literature, the process for development of the barometer is outlined next.

4. Method used to develop a Community Wellbeing Barometer for Latrobe City

In developing a barometer for Latrobe City, the research team followed an iterative, principles-based logical approach in selecting and combining existing and publicly available data sources. Broad steps encompassed:

1) identifying relevant CW domains, informed by previous research efforts;

2) identifying suitable measures meeting inclusion criteria;
3) collecting time series data against each measure to enable monitoring of trends over time;
4) presenting collected data in the form of a barometer depicting measures of wellbeing for each domain;
5) assessing the validity of the barometer through consultation with community stakeholders, against other composite measures, and through comparison with Victoria-wide data.

4.1 Identifying relevant community wellbeing domains

The barometer development began with a scoping literature review identifying relevant empirical studies (2007-2020) appearing in academic (peer reviewed) and grey literature, as the initial step. While acknowledging that many indicators of barometer may be intangible and difficult to measure, Atkinson et al. (2017) summarise previous empirical research subsumed under five overlapping and interconnected *domains*: health; economy; environment; services and infrastructure; and social associations and inclusion. These domains were considered and confirmed by the research team as a starting point for use in developing a barometer fit for the Latrobe LGA. We defined these domains as:

- Health – measures associated with physical and mental health and wellbeing;
- Economy – measures associated with money or financial transactions and the labour force;
- Environment – measures associated with climate and physical surroundings and their quality;
- Services and infrastructure – measures associated with support or facilitation that meets community needs; and,
- Social connections – measures associated with social connection, engagement and participation.

Research team meetings were held to brainstorm together (divergent thinking style) domain aspects and discuss suitability and applicability of available measures. For example, a community's *health* domain may be represented by several themes including physical health, life satisfaction, lifestyle factors and mental health. This resulted in four to five themes per domain. The resulting framework was reviewed by 29 community members interviewed as part of our larger project on community wellbeing (Yell et al., 2024). Their feedback enabled refinement and confirmation of the model. This process resulted in the model illustrated in Figure 2 below, depicting the five domains and their themes.

Figure 2. Barometer domains and corresponding themes

4.2 Identifying suitable measures meeting inclusion criteria

A combination of top-down and bottom-up approaches were applied to identify candidate measures for each theme. This identification process was informed by previous research (e.g., the 2014 Gippsland Monitor development undertaken by Federation University Australia - see Lawton, et al., 2014 - and the Regional Development Victoria Dashboard). Essentially, team members individually considered known, ongoing and publicly available measures relevant for each of the five domains (bottom-up) while also envisaging factors or aspects that may have possibly represented or informed each domain (top-down, for subsequent investigation of putative measures). Ostensibly, some measures may have easily fallen within more than one domain. For example, the availability of dentists, indicated by the number, may have fallen within the health or services and infrastructure domains. The research team, through discussion, made decisions on the measures' most appropriate location in relation to a domain.

Candidate measures (e.g., mean personal income under the economic domain) were included where they:

- were publicly available;
- provided data at LGA level (although we included some SA3 level measures);
- provided multiple observations over the target timeframe (2008-2023) with a minimum of three data points over time (i.e., regular collection and reporting);
- were based on a consistent data collection approach (i.e., in the case of surveys, the same questions were asked); and
- provided ongoing data (i.e., reporting of the measure was presumed ongoing).

Both subjective (i.e., intangible perceptions) and objective (i.e., relatively tangible elements including self-reported behaviour) measures were sought to broaden scope of measurement.

While most measures assessed a single construct (e.g., residential care places per 1,000 population aged 70 years and over), some composite measures were selected where single measures were unavailable (e.g., digital inclusion score).[1]

The research team scrutinised each measure on the validity criteria to reach a consensus that the measure was relevant and appropriate to the CW theme (i.e., face validity). Other validity criteria included the level of confidence (e.g., standard error provided *reasonable* reliability as a population measure) and being a direct measurement specific to Latrobe. In terms of regional specificity, measures typically used the Latrobe LGA boundary. However, in some cases the ABS statistical area level 3 (SA3) boundary was used, as the Latrobe City LGA and the Latrobe Valley SA3 (SA3 code 20504) was considered comparable. Figure 3 shows the Latrobe Valley (ABS Statistical Area 3 (SA3)) and Latrobe City (LGA) regions in red and blue respectively. For comparison, measures were also calculated for the State of Victoria.

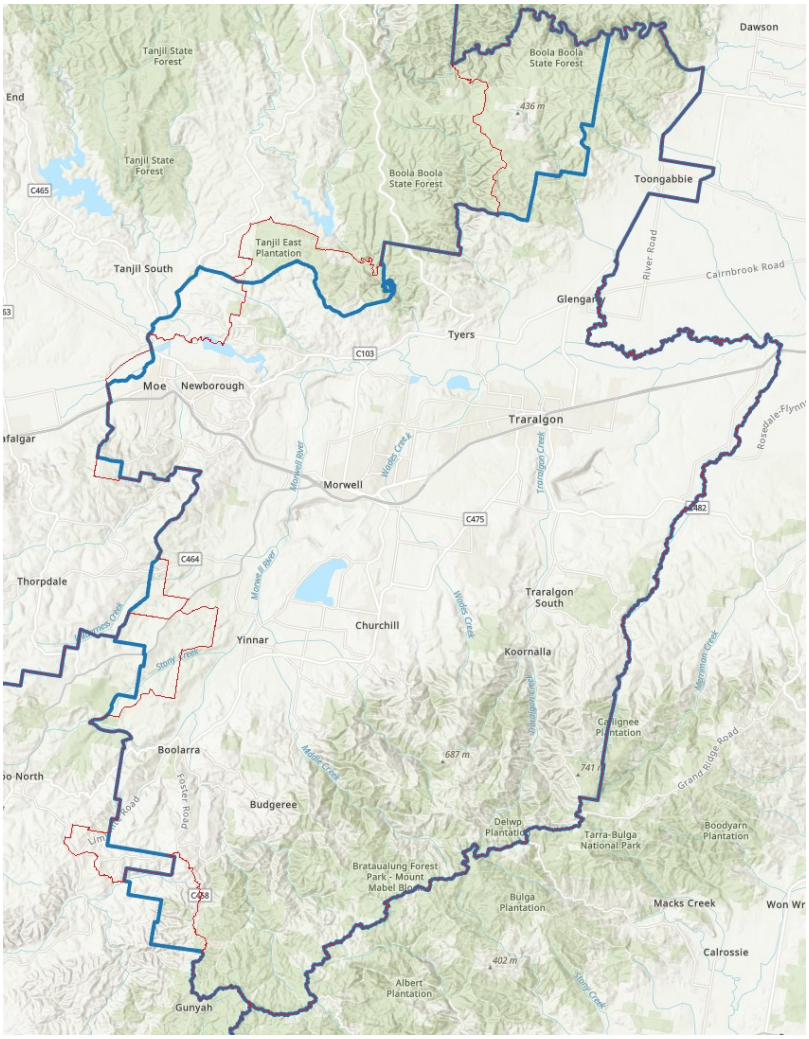

Figure 3. Latrobe Valley (SA3) and Latrobe City regions from ABS Maps (https://maps.abs.gov.au/)

4.3 Collecting time series data

The third step involved collection of time series data. First, relevant datasets were identified, then data meeting inclusion criteria were collected for each of the measures (for the Latrobe LGA and Victoria) and entered into MS Excel spreadsheets. Each domain was assessed by three to five independent datasets, resulting in 68 measures that were drawn from nineteen publicly available sources. Appendix A includes a full list of measures. All measures and associated data sources (along with links to further information, including methodologies and limitations) are listed in tables in Appendix B.

[1] A composite of ratings of three elements: access, affordability and digital ability.

4.4 Presenting collected data in the form of a Community Wellbeing Barometer

To provide a valid summary domain score, we aimed to have measures going in a single direction and corresponding meaningfully with other related measures. For some measures, depending on perspective, they could be seen as contributing either positively or negatively to CW. For example, data showing an increasing number of clients accessing homelessness services indicates economic stress (i.e., impacting negatively on CW). Alternatively, this could be viewed as improving CW in relation to services (i.e., through increased service support to people who are homeless or at risk of homelessness). The final measures as applied required subjective judgments by the research team on each measure's direction of effect with respect to CW, with decisions based upon consensus.

Data scores for some measures needed to be reversed. This is because for these measures, data trending higher indicates worsening CW (e.g., rising unemployment rates), in contrast to other measures, where it indicates improving CW (e.g., rising labour force participation). The opposite can also be true (i.e., falling trends for some measures can indicate either improving or declining CW). This means measures in the same domain may contribute to CW in opposing directions. For consistency, data scores for some measures were *reversed* so that all measures indicate a CW trend in the same direction.

4.5 Assessing the validity of the Community Wellbeing Barometer

The fifth and final step sought to verify the barometer domain findings. Interim barometer results were presented to a panel of community stakeholders and their feedback was used to refine and extend the choice of measures (see Appendix E for the presentation to stakeholders and focus group questions). We then benchmarked the results against state data and conducted external validation using other composite measures (e.g., environmental condition score). Composite and validation measures and associated data sources (along with links to methodologies and limitations) are listed in Appendix C.

4.6 Data analysis

Table 1 summarises measures employed for the compiled barometer. The majority (75%) were objective measures.

In line with the intention of keeping things simple and replicable, all calculations were made using the MS Excel program. To enable comparison between different units of measurement, all data points were converted to t-scores with measures reversed where required so that the direction of effect on CW was consistent (as described earlier). For most measures, data points were not available for every year of the selected time period (2008-2023). This is an identified limitation of many wellbeing monitors. Where data were missing between years for a measure, such as for surveys conducted bi- or tri-annually, imputation was undertaken using linear interpolation. T-scores were added to produce a mean score for each domain for each year.

T-scores provide a method to standardise available scores for small samples where the population standard deviation (a measure of response spread) is unknown (Runyon & Haber, 1967). A derived t-score represents the difference from the overall average of scores (below or above). The method assumes the population data are normally distributed (i.e., bell shaped curve, including for percentage data). Nonetheless, limitations of this method are recognised, particularly where the sample size is small (such as the minimum three data points used here). Increasing samples sizes gained over time will increase confidence in t-score approximations to a normal distribution.

Producing composite scores via this method provided a way to assess the overall change in each domain over time. This approach assumes implicitly that all measures provide an equal contribution to their barometer domain. This use of t-scores has been previously used in the academic literature (Turner et al., 2019). In addition to generating composite scores for each of the five CW domains over time, a broader representation of overall wellbeing, assuming equal contributions of domains, was provided by averaging summated scores across all domains.

Table 1. Number of measures included in the final Latrobe barometer by domain and type

Domain	Objective measures	Subjective measures	*Total measures*
Economic	16	1	*17*
Environmental	10	1	*11*
Health	10	4	*14*
Services and infrastructure	10	4	*14*
Social connections	7	5	*12*
Total	*51*	*17*	*68*

5. Results

5.1 Latrobe Community Wellbeing Barometer results

Results are presented visually, with line charts for each measure and a composite result for each domain, as well as an overall composite result for wellbeing across the five domains. Graphs (Figures 4-8) depict theorised upward or downward CW trends. As noted above, we assumed that each individual measure made an equal contribution to the composite domain result. A spreadsheet detailing measures and data analysis is available from the research team on request.

Linear trend lines for the composite score are included for each domain. The reported composite domain score for any year represents an *average* variation from the mean for all individual measure scores. This outcome effectively provides a proportional result for trending above or below a long-term average.[2]

Based on the linear trends in each domain, economy, environment, services and infrastructure, and social connections are trending upward while health is trending downward.

Results for each domain are described as follows:

Economy: Consistent with a growing economy experiencing inflation and an increasing population, most economic measures were trending upward (increasing CW; Figure 4). This result is reflected overall in the summated result for the economic domain, with a clear spike following the COVID-19 pandemic. The factors underlying this will be considered further in the discussion.

Environment: While there is an upward trend in the environment domain (Figure 5), there was considerable annual variation from the average score in each of the indicators and, subsequently, in the composite score. This likely reflects both natural variations in the climate and infrequent though significant events such as wildfires.

Health: The health domain (Figure 6) shows a general downward trend, although the most recent data (2021) indicates a return to average.

Services and infrastructure: This domain (Figure 7) shows a general upward trend, with the most recent data consistent with the long-term average. The fall in 2022 may, arguably, be explained by COVID-19-related impacts on service provision that only became apparent in the 2022 data because of a reporting lag.

Social connections: There is a slight upward trend in this domain. Similar to the services and infrastructure domain, the social connections domain (Figure 8) illustrates downward movement both before and during the COVID-19 pandemic. The highest point, against the long-term average, is reached in 2022 in line with the ceasing of COVID-19 social distancing controls.

[2] Each individual measure included in the figures represents yearly variation against a long-term average (represented by the horizontal mean line at '0' on each figure). Hence, total variation from the mean over time adds to zero.

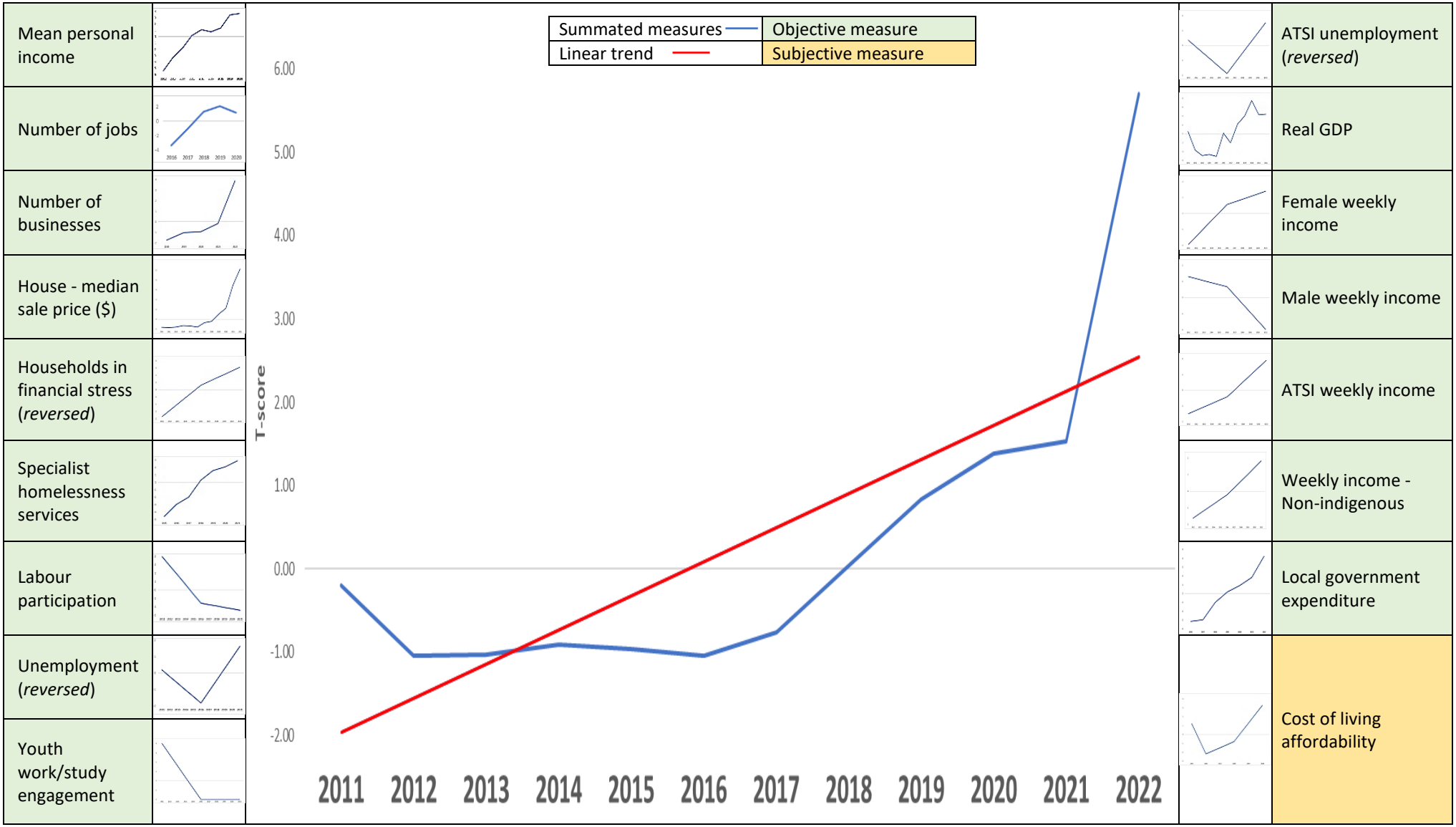

Figure 4. Economic composite domain and contributing measures

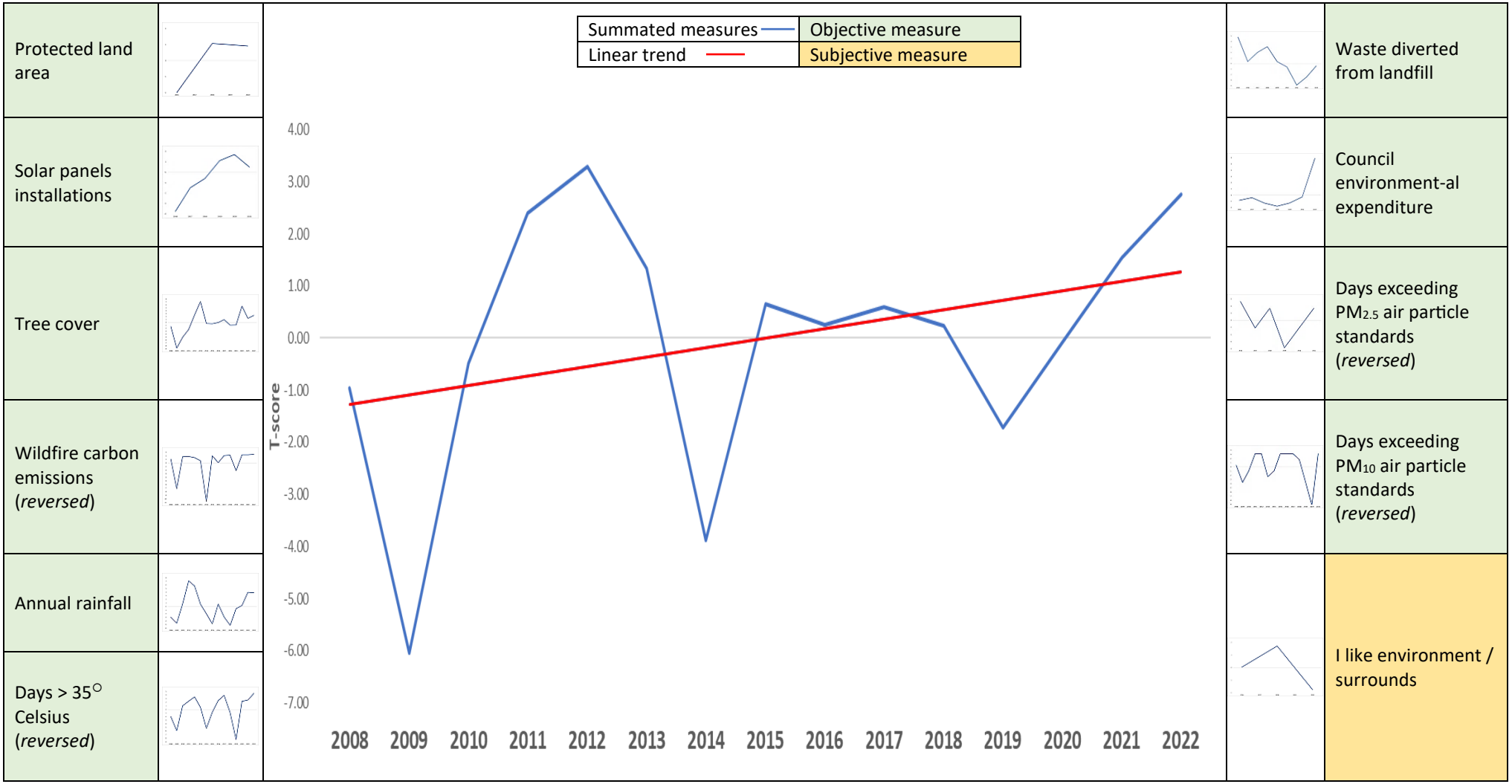

Figure 5. Environment composite domain and contributing measures

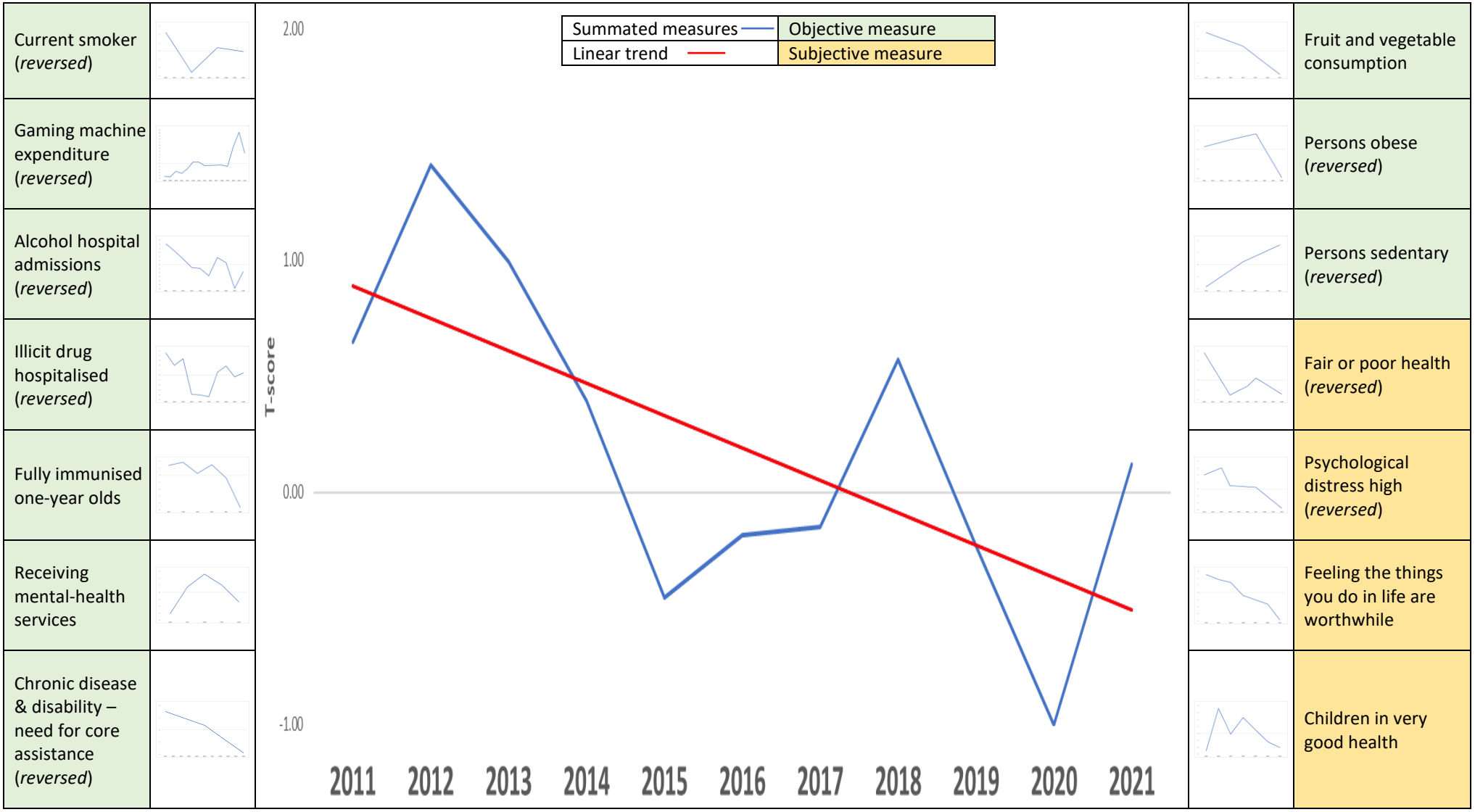

Figure 6. Health composite domain and contributing measures

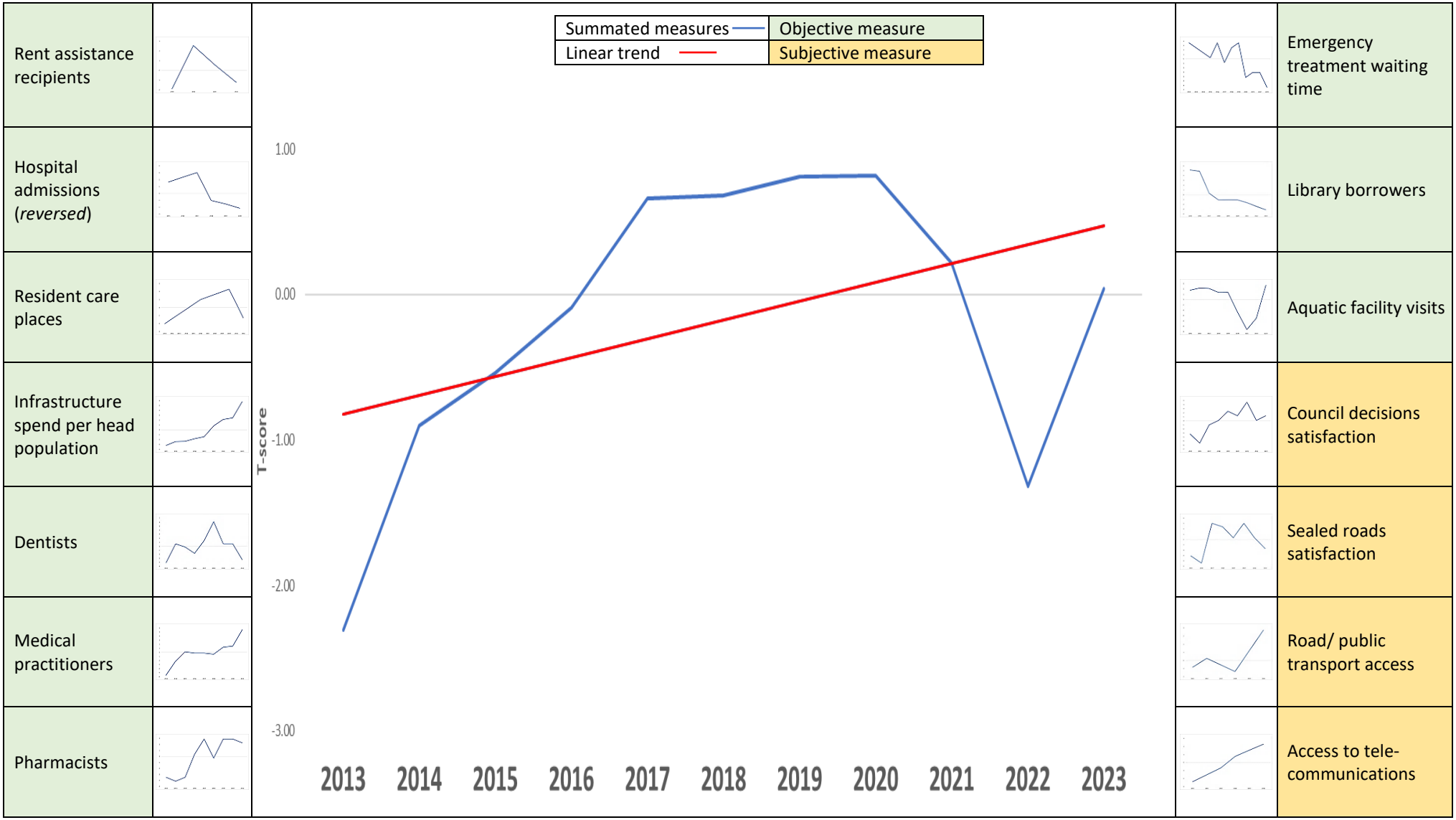

Figure 7. Services and infrastructure composite domain and contributing measures

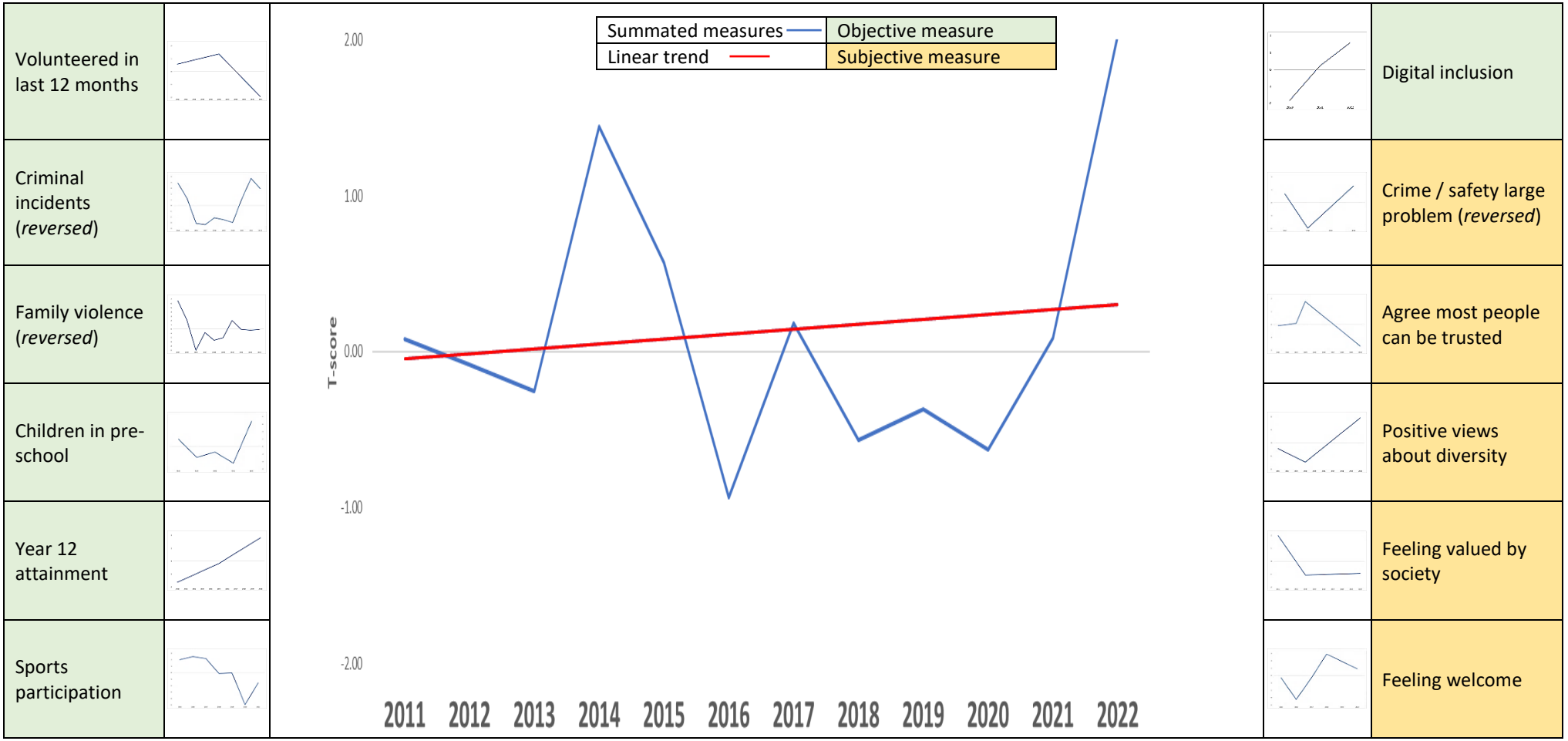

Figure 8. Social connections composite domain and contributing measures

A composite of the five domains is shown in Figure 9 below. This figure (and later Figure 11) shows two trend lines. The first is a linear trend line showing an upward CW trend. The second line used a polynomial trend more responsive to changes over time. That provides (arguably) a better representation of CW change over time. The polynomial trend line shown in Figure 9 follows a U-shaped pattern, falling from 2008 to a low point in 2015/2016 and then continuing to rise toward 2024.

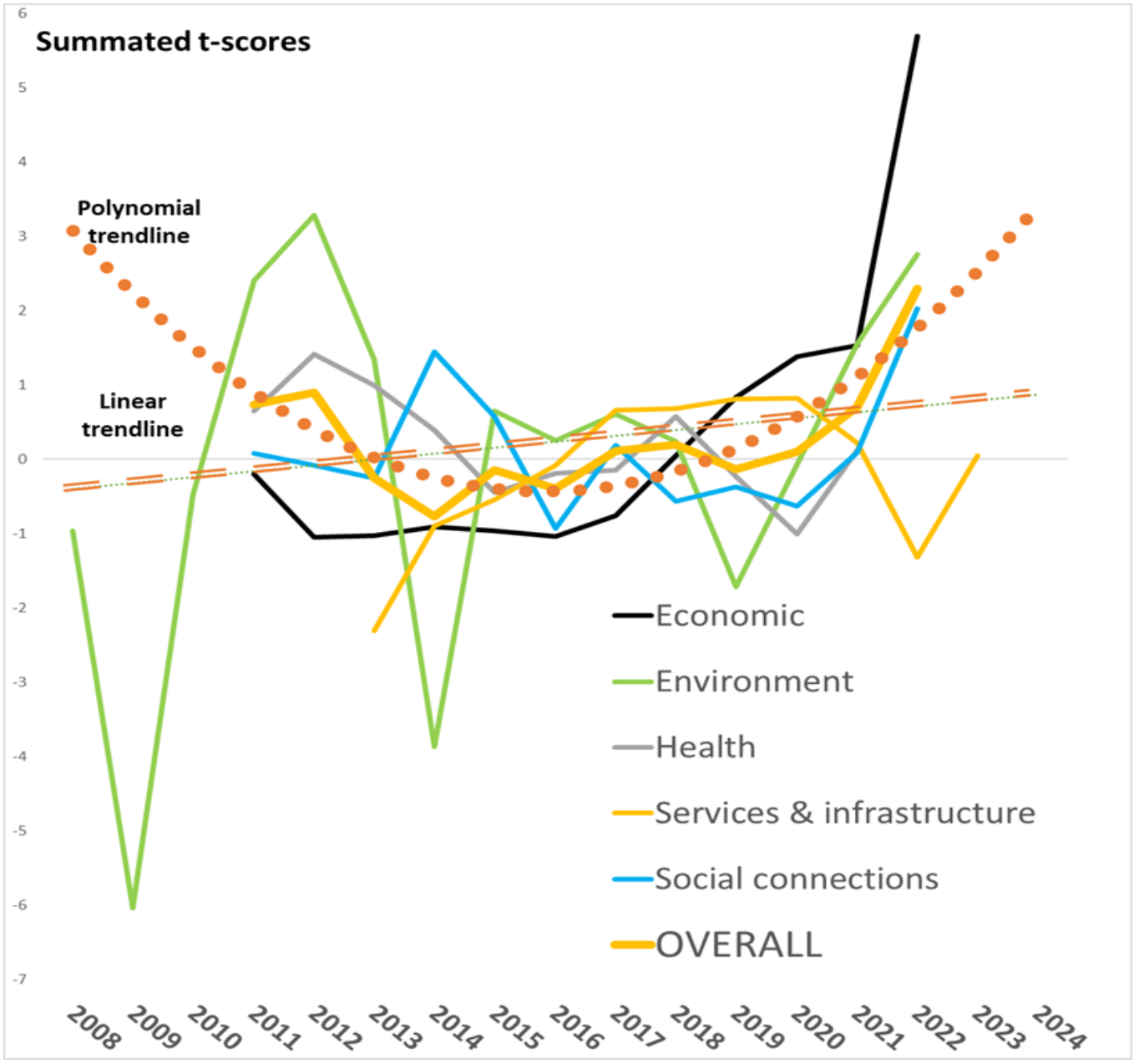

Figure 9. All domains with overall CW summation for Latrobe

The summated overall domain score (depicted in Figure 9) is shown again in Figure 10, along with approximate dates of key events theorised to have influenced CW in Latrobe. This figure depicts the mine fire (2014), Hazelwood power station closure (2017), Black Summer bushfires (2019-2020) and COVID-19 pandemic (2020-) coinciding with negative effects on CW in the short term, while initiatives including LHIZ, LHA and LVA (2016), and the appointment of the Health Advocate (2018) coinciding with a rising overall long-term trend in CW. While overall trends identified in Figure 10 support these proposed influences, the possibility of these associations being coincidental or the changes being the result of other factors cannot be excluded by the available evidence. These events may not have had uniform effects on wellbeing across the community and particular events may have had both positive and negative impacts (e.g., the COVID-19 pandemic had adverse impacts on health and social connection but was also associated with economic stimulus and health promotion initiatives). In addition, there may be a lag between an event or initiative and subsequent change in CW (as discussed below). For detailed discussion of community perceptions of the impact of these events see the companion report on *Community Wellbeing in the Latrobe Valley since the Hazelwood Mine Fire* (Yell, et al. 2024).

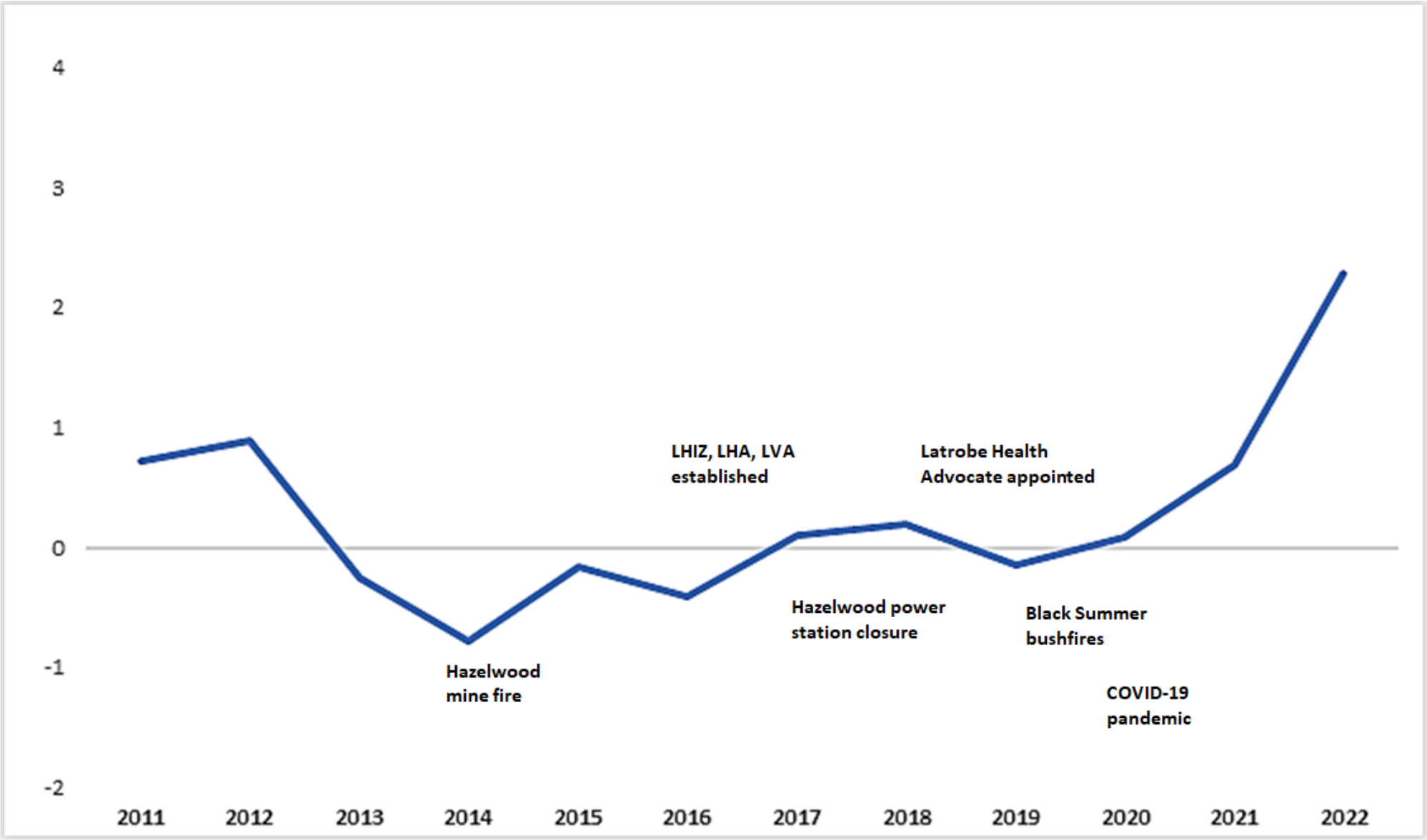

Figure 10. Summated Latrobe CW score and key events theorised to have influenced CW in Latrobe

5.2 External validation of barometer domains

To assess validity of the barometer, we undertook comparison with external composite measures. If the barometer domain results are valid, then they would be expected to correlate with comparable independent composite measures. This assumption was tested through identification of thirteen available composite measures falling within one of five of the barometer domains (more information about these measures is available in Appendix C). Correlations were assessed over common time periods. Where measures were not annual, an annual score was calculated using linear interpolation to provide equal sub-sample sizes. Some caution is warranted in the interpretation of these results due to small sample sizes being unreliable and violation of other standard assumptions in parametric correlation (e.g., linearity, equality of variance, effects from statistical outliers).

Results from correlations are reported in Table 2. Moderate to strong correlations between *some* external composite measures and Latrobe barometer summated domain scores were found for economic, environmental and health domains. Possible explanations for low or negative correlations are provided in the next section.

Table 2. Correlation between the Latrobe barometer summated domain scores and available external composite indicators specific to Latrobe

Latrobe Barometer Domain	External composite measure	Time period	*r*
Economic	Index of Economic Resources (IER) score (ABS)	*2011-2021*	0.27
	Community economic wellbeing (RWS)	***2015-2020***	**0.55**
	Household financial wellbeing (RWS)	*2015-2020*	-0.59
Environment	**Environmental condition score (AER)**	***2008-2022***	**0.65**
	Physical capital - landscape & aesthetics (RWS)	***2015-2020***	**0.35**
	Natural capital - perceived environmental health (RWS)	*2015-2018*	0.07
Health	Wellbeing of people - Personal Wellbeing Index (RWS)	*2015-2020*	-0.39
	Human capital - wellbeing - Emotional Affect Index (RWS)	*2017-2020*	-0.77
	Human capital - K6 psychological distress (RWS)	***2016-2020***	**0.75**
Services & Infrastructure	Social capital - health, education & childcare access (RWS)	*2015-2020*	-0.81
Social connections	Social capital - spending time with family and friends (RWS)	*2015-2018*	0.18
	Physical capital - crime & safety in the local community (RWS)	*2017-2020*	-0.53
	Index of Education and Occupation (ABS)	*2011-2021*	0.24

Note: Positive correlation results (based on *r*) bolded where considered *moderate* to *strong*.

The majority of measures reported in Table 2 show a positive correlation with the domain scores in our barometer, providing a level of confidence in these scores. Nevertheless, five composite measures are negatively correlated, in some cases strongly, with our domain scores. These findings regarding correlations demonstrate the challenges in comparing measures or constructs that have limited available data, use different time periods or are based on different sampling techniques. Weak or negative correlations reported here may also be explained by the fact that the applied comparison indicators are designed to measure specific CW outcomes (e.g., crime and safety), whereas the barometer domains include a broad range of measures.

5.3 State comparison

To provide a comparison and benchmark for Latrobe CW, a barometer was calculated for the State of Victoria. This used the same measures included in the Latrobe barometer. As a limitation, some annual data points available for Latrobe were not available at the state level, and vice versa.

A U-shaped trend line for the State (Figure 11) is comparable to the trend for Latrobe (Figure 9). This suggests that overall, CW is rising across the Victoria. Figures 12-16 compare Latrobe and state CW results for each domain, showing similar trends. This is likely because the barometers use the same measures and local (Latrobe) level outcomes can be influenced by state-level policy settings. Changes in house prices or unemployment rate provide typical examples where direction of change at state level is typically reflected across Victoria, as would be the case for broad investment in the public health system. Nevertheless, local level events, such as the HMF and place-based health and transition initiatives, can result in differences between local and state CW trends.

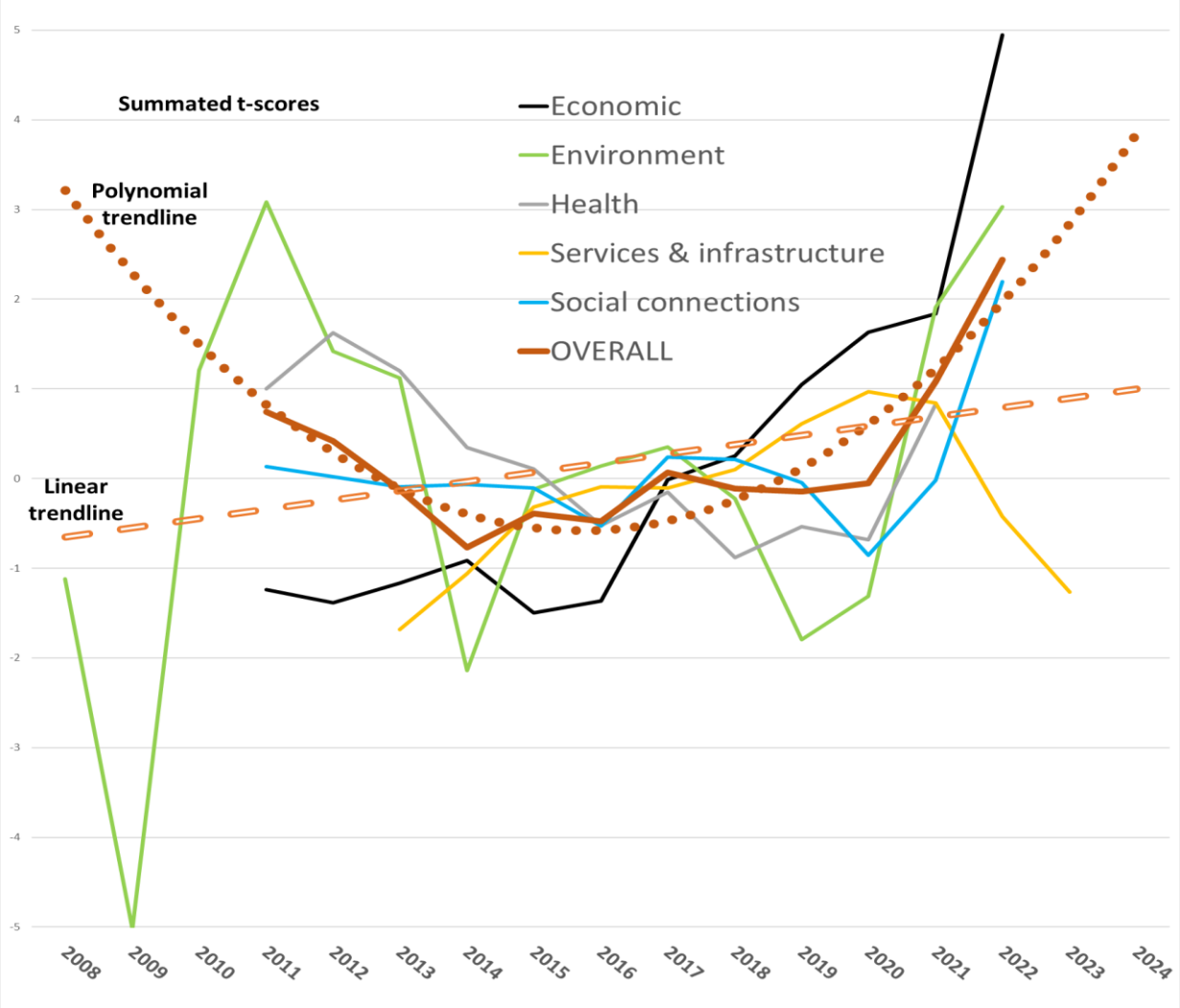

Figure 11. All domains with overall CW summation for Victoria

As noted previously, the following figures showing trends for CW domains for Victoria should be interpreted in terms of the trend directions and not the absolute values, as these simply reflect the deviation from the longer-term averages. This means that if the Latrobe and Victorian trend lines appear to overlap (which they generally do), it is not an indication that they have comparable levels of CW, just that they are following the same trajectory over time. For instance, Figure 13 for the environment shows a sharper decline for Latrobe in 2014 than it does for Victoria, likely because of the impact of the extreme 2013-2014 summer and the HMF. Hence, Latrobe City and Victorian averages differ in absolute terms. Interpretation therefore should not rely on relative data point values *per se*, but rather, consider differences in trends over time identified by the relative slopes of trend lines. Interpretation of these figures is provided in the next section.

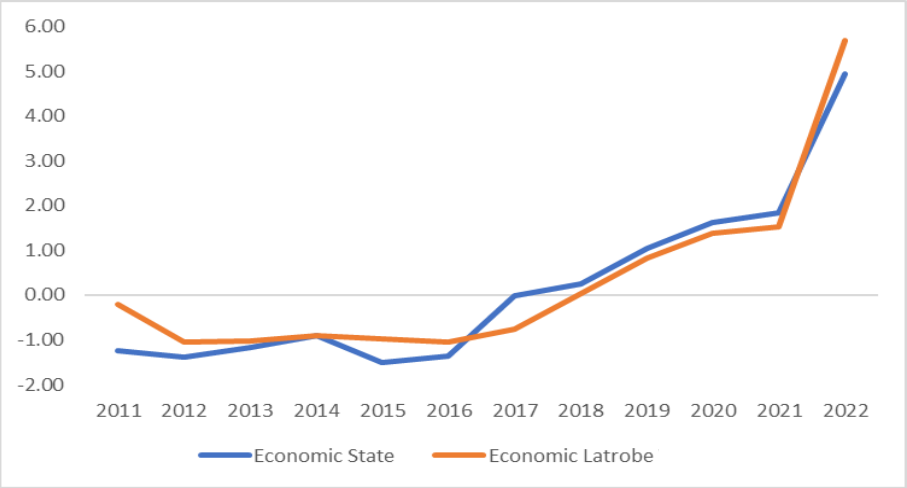

Figure 12. Summated economic domains for Victoria and Latrobe

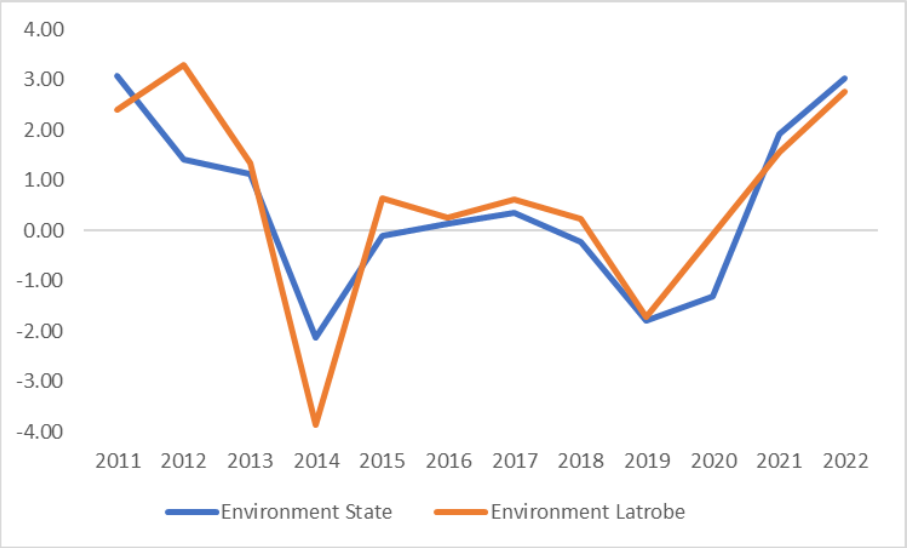

Figure 13. Summated environment domains for Victoria and Latrobe

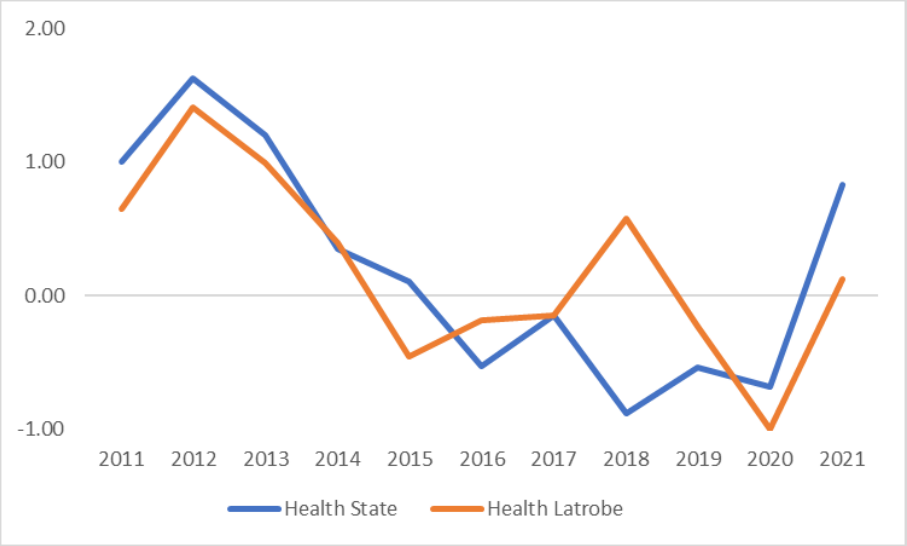

Figure 14. Summated health domains for Victoria and Latrobe

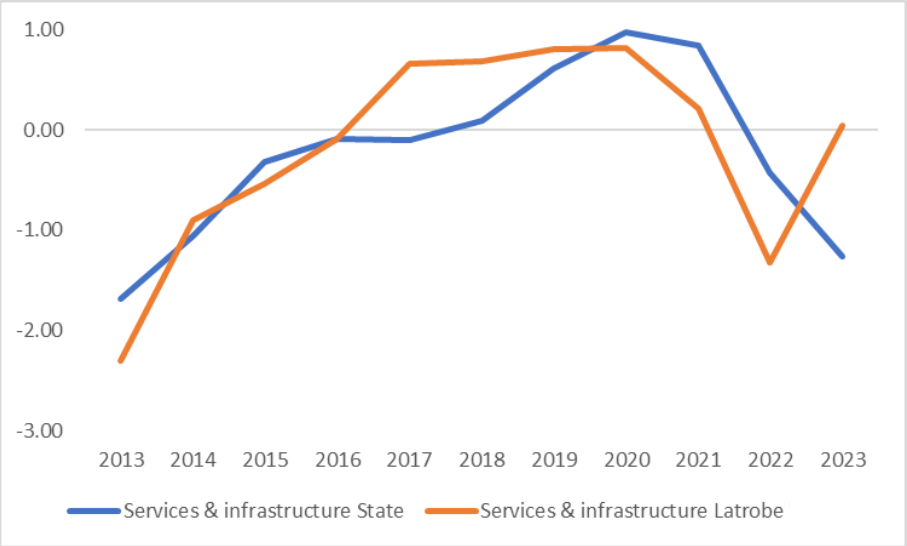

Figure 15. Summated services and infrastructure domains for Victoria and Latrobe

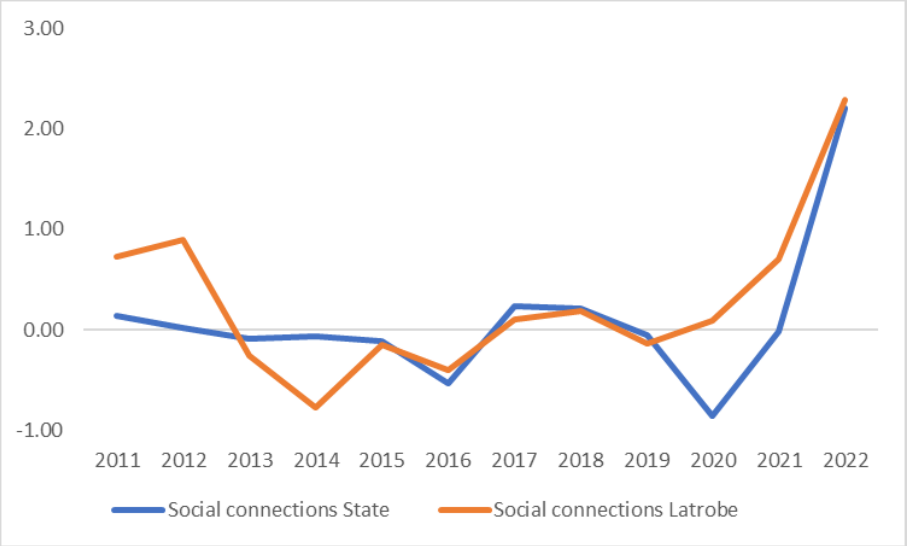

Figure 16. Summated social connections domains for Victoria and Latrobe

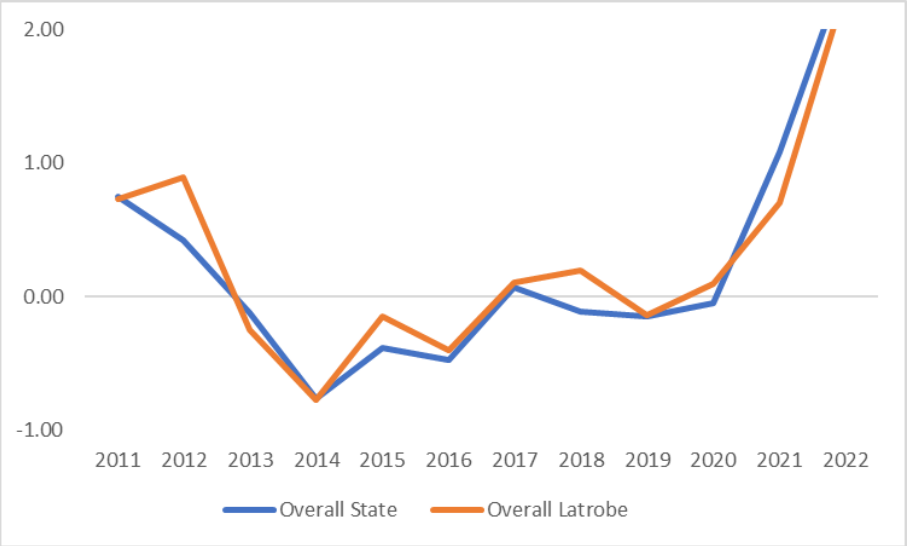

Figure 17. Summated domains overall for Victoria and Latrobe

6. Discussion

The study's aim was to use publicly available data to develop a tool, which we have called a Community Wellbeing Barometer, to represent changes in CW in Latrobe, and which could be readily used by other groups and in other areas. Trend lines were calculated for five representative domains—economy, environment, health, services and infrastructure, and social connections— for the period 2008-2023. There were some limitations relating to data availability, reliability, consistency and data analysis methods. However, strong correlations with comparable external composite measures of CW (where they were heading in the same direction) provided a level of confidence in reported domain scores (see Table 2 and associated discussion). Detailed analysis of the measures used for comparison, including methods of data analysis, may provide insight into why strong correlations were not found in some cases, but this is beyond the scope of the current report. Overall, the results provide, subject to limitations, evidence supporting proof of concept, rather than a definitive picture of Latrobe CW over time.

In addition, the barometer demonstrates the relative variability of domain outcomes over time (see Figure 8). Changes in the environment, services and infrastructure, and social connections domains are relatively stark, with a possible explanation for variation being events such as fires, the COVID-19 pandemic, or government interventions. These same measures, as well as the economic domain, are trending upwards over time, indicating CW overall is improving. The health domain is the exception, likely explained to some extent by the onset of COVID-19. The barometer provides the opportunity to examine potential drivers of CW change.

6.1 General picture of community wellbeing presented in the study

For most measures, data were available for an 11-year time-period (2011-2021). Data collection for earlier years was more challenging due to the lack of publicly available data. The overall CW pattern over this time, based on summated domain scores, shows CW falling to 2016 and then rising. Relative to long term averages, CW has risen to a recent high point. This appears to be largely due to upward trends in the economic, environment and social connection domains. While the services and infrastructure domain also had an upward trend line, levels were below or at the long-term average in 2022 and 2023, and therefore not contributing significantly to the recent increase in overall wellbeing. Of course, these conclusions are applicable at the community level, and may not reflect the experiences of individuals or sub-groups. It should be acknowledged that, according to our qualitative data on CW in Latrobe, there are pockets of disadvantage within the wider Latrobe community, with some groups experiencing severe disadvantage while others are doing relatively well (Yell et al., 2024).

As noted, comparisons on summated measures between Victoria (overall) and Latrobe show similar trajectories indicating the influence of state-level policy settings on local outcomes. The value of the local barometer model is that it illustrates points where local CW trends differ from the state. For the economic domain, 2016-2017 saw a sharper improvement for Victoria overall whereas Latrobe remained almost flat for this period, although more recently (i.e., from 2021) Latrobe has been trending upward. The environment domain follows similar patterns between Victoria and Latrobe. Of interest is the difference in 2018 where Latrobe showed a marked increase in health-related CW while there was a decline in Victoria, with both then returning to points just below the long-term average. This suggests that there were local factors in Latrobe, either in 2017 or 2018, that drove improved health in 2018. This trend is evident in the overall comparison (Figure 17). Reasons for this are open to speculation, and a review of individual measures in Figure 5 raises hypotheses.

For example, arising from the HMF and on the recommendations of the HMFI, initiatives such as the LHIZ, LHA and the Latrobe Health Advocate were implemented and began running projects and initiating community conversations around health in Latrobe. In addition, the state government provided a $266m "rescue package" for Latrobe and set up the LVA in recognition of the impact of the Hazelwood closure on the local economy. The purpose of this was to help mine employees transition to alternative employment, to create new employment opportunities and to stimulate the economy. Funding was also used to develop community sport infrastructure and events. The upward spike in Latrobe CW from 2017, which was not reflected at state level, appears to correlate with these policy interventions. The value for money of such interventions is a question beyond the scope of this report, but nevertheless, a positive effect from these is supported by available public data. Comparable explanations may be offered for differences in the infrastructure measure (Figure 15). Social connections appear to diverge also (Figure 16) corresponding to the timing of the HMF.

6.2 Implications

The Latrobe Community Wellbeing Barometer, with its ability to present trends in CW at the local and state levels, can potentially inform policy. With ongoing and consistent reporting of data, it may be possible to identify correlations between specific events and changes in CW, as well as detect time lags that can occur between events and impacts on CW. This opens up the potential to implement intervention strategies and then assess resultant impacts on CW.

Other regions may also be interested in using the barometer to track wellbeing and guide policy development, particularly regions undergoing significant economic and social transformation due to phasing out of non-renewable power generation. A benefit of using publicly available data at the LGA and SA3 levels, is that, while the domains and associated measures have been selected for Latrobe, these may be applied to other regions allowing trend comparisons.

When considering the factors impacting community wellbeing, it is important to be aware of potential lags in the effects of both significant events and policy initiatives on specific domains. The environment domain, for example, will likely provide timely impact information (e.g., measures of smoke particulate matter from fires, flooding from heavy rainfall, heatwaves from increasing number of hot days, etc.). In other domains such as health or social connections, there can be a considerable lag between an event or initiative, and its impacts (public health campaigns on smoking, diet, exercise, etc., or community education campaigns aimed at social connectivity may take time to influence attitudes and behaviours). Effects from external shocks (e.g., natural disasters) on CW will presumably show up some time after the event, whether due to delays in data collection or delayed onset of health or psychosocial impacts, as evidenced by research conducted by the HHS (e.g., Carroll et al., 2024). While the barometer cannot provide nuanced analysis of the impact of specific events/initiatives, it can help pinpoint areas for further investigation.

The barometer reflects the current scope of available data and is also, therefore, useful in identifying data gaps. These may be data that are currently not collected, collected infrequently, no longer collected, or not publicly available. It highlights where more work is needed to collect data that can guide effective policy and decision making informed by local needs.

6.3 Limitations

Some key limitations have been acknowledged above; these and others are stated or restated here. From a practical standpoint, important aspects of CW will likely not be represented, simply because relevant data were not available or did not meet our criteria. Measures used in the barometer development reflect the current scope of available data while also indicating data gaps. As part of this process, it became clear that there were a number of measures where data existed but were not in the public domain and/or easily accessible, or available at the local level. For example, in terms of green space and walkability measures, we were able to locate publicly available data for metropolitan LGAs (Victorian Planning Authority, 2021), but not regional areas. Accessing other satellite-based measures of green space required technical expertise. If suitable data become available in the future, it may be beneficial to include this in the barometer to capture additional aspects of CW that have not been represented at this point.

The method of measure selection may also have introduced bias through subjectivity inherent to the process. While the research team followed as far as possible a transparent, logical and replicable process in selecting measures, other possible conceptualisations of CW may offer alternative insights.

Individual measures are not currently weighted. While it may be possible to include weighting to adjust for differences in the level of contribution made by each measure to their respective domain, this would have added complexity, and so contradict our aim of producing a tool that can be easily utilised by local government, other agencies and community groups.

Another key limitation concerns data availability. We have less confidence in the assessment of CW prior to 2012, as several of the indicators utilised in the barometer had not been established by this time, meaning earlier assessments are based on fewer data points.

The method of data analysis, and particularly the t-score technique used to standardise and combine data, may be questioned on strict statistical grounds. For example, and as noted earlier, t-scores assume normal distributions and so are more reliable with larger sample sizes than were available here. Further, numerical data imputation that was undertaken to compensate for missing years may not accurately represent actual changes in the measure over time. These concerns will ameliorate over time once future data are included. While t-score summation does not provide an absolute score, it does provide a score that is relative to the long-term average. This is useful for comparing trends among domains or with state scores. While a relatively minor limitation, the application of t-scores for percentage-based data may be considered statistically flawed (in terms of assuming independence between scores and standard deviations).

A final and relatively significant limitation inherent to baseline data measures occurs where viewpoints from sub-groups of the population are unrepresented or underrepresented. This relates to gaps in existing data (e.g., there was a lack of suitable data pertaining to young people), as well as the nature of the barometer which presents a general picture of CW by collating population level data.[3] Also, in order to meet our time-series criteria (at least 3 time points to mitigate limitations of too-infrequent data), some quantitative data and one-off surveys of some groups, including young people and Aboriginal and Torres Strait Islanders could not be included.

6.4 Recommendations and next steps

Based on the development of the barometer to date and its potential utility, we make the following recommendations for next steps:

- disseminate the findings of this report to the community and key stakeholders;
- build on current interest in the barometer to establish a community advisory group to oversee future development of the barometer, including maintenance and ongoing data collection;
- design an interactive online tool (based on the barometer) that is publicly accessible and supports expansion to other LGAs;
- support advocacy aimed at addressing data gaps to more effectively and comprehensively monitor CW, emphasising the value of government and other agencies providing ongoing and consistent publicly available data; and
- disseminate more widely this model of combining different indicators to come up with a meaningful composite measure, as it has relevance to other LGAs and other topic areas, as well as sub-groups within communities.

7. Conclusion

The key outcome of this study is a tool for monitoring CW that:

- uses readily available data that is sensitive to local changes;
- has the potential to assess the impact of events;
- can inform interventions;
- then assess the impact of those interventions; and
- is potentially applicable to other localities, topic areas and sub-groups.

Policies and programs supporting improved health and social connections may translate to improvements in CW, but such interventions should be informed by evidence beyond the exclusive use of data and results reported here. Where the barometer is considered a potentially useful tool, this should be considered as one source of information among others to support good decisions that promote CW for Latrobe.

[3] Qualitative data on CW may be better suited to a more nuanced understanding of diversity and difference in CW - see our companion report on Community Wellbeing in the Latrobe Valley since the Hazelwood Mine Fire (Yell et al., 2024).

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9. Appendices

Appendix A. List of barometer measures

Economy

1. Mean personal income ($) (ABS)
2. Number of jobs (ABS)
3. Number of businesses (ABS)
4. Median house sale price ($) (VGV)
5. Low-income households under financial stress from mortgage or rent (%) (SHA)
6. Specialist homelessness services client count (no.) (SHA)
7. Labour force participation rate - persons aged 15 years and over (%) (ABS)
8. Unemployment rate - persons aged 15 years and over (%) (ABS)
9. Youth engagement in work/study (15-19) - total fully engaged (%) (ABS)
10. ATSI unemployment (%) (ABS)
11. Real GRP (June 2021 Prices) $B (REMPLAN)
12. Female individual weekly income - % above minimum weekly wage (VWHA)
13. Male individual weekly income - % above minimum weekly wage (VWHA)
14. ATSI persons 15 years and over median total personal income ($/weekly) - (ABS)
15. Median total personal income ($/weekly) - Non-Indigenous persons 15 years and over (ABS)
16. Local government total expenditure (council functions) ($) (VLGGC)
17. Agree 'living costs are affordable here' (%) (RWS)

Environment

1. Protected land areas (hectares) (ABS)
2. Small-scale solar panel system installations (no.) (ABS)
3. Agree with the statement 'I like the environment and surrounds I live in' (%) (RWS)
4. Tree cover (annual average woody vegetation cover fraction %) (AER)
5. Carbon emissions from wildfire (gC/m^2) (AER)
6. Annual rainfall (mm) (AER)
7. Number of hot days (screen level temperature above 35 degrees Celsius) (AER)
8. Kerbside collection waste diverted from landfill (%) (LCC)
9. Annual council expenditure environment ($) (VLGGC)
10. Particles ($PM_{2.5}$) - Numbers of exceedances (days) (Traralgon) (EPA)
11. Particles (PM_{10}) - Numbers of exceedances (days) (Traralgon) (EPA)

Health

1. Obese (%) (VPHS)
2. Fair or poor self-reported health (%) (VPHS)
3. Sedentary (%) (VPHS)
4. High/very high psychological distress (%) (VPHS)
5. Current smoker (%) (VPHS)
6. Electronic gaming machine expenditure per adult ($) (VGCCC)
7. Rate of alcohol hospital admissions per 100,000 population (AODStats)
8. Rate of illicit drug hospital admissions per 100,000 population (AODStats)
9. Fully immunised 1 year olds (%) (DHAC)
10. People receiving Medicare-subsided mental health-specific services - no. of patients (all providers) (AIHW)
11. 'To what extent do you feel the things you do in your life are worthwhile'? (Mean score 0-100) (RWS)
12. Chronic disease, disability - need for core assistance (%) (ABS)
13. Meeting both fruit & vegetable consumption guidelines (%) (VHPS)
14. Children reported to be in excellent or very good health (%) (SEHQ)

Services and infrastructure

1. Commonwealth Rent Assistance recipients (AIHW)
2. Admissions for all potentially preventable conditions - public hospitals (age standardised rate per 100,000) (SHA)
3. Residential care places per 1,000 population aged 70 years and over (SHA)
4. Community satisfaction rating with Council decisions in the interest of the community (LCC)
5. Infrastructure per head of population ($) (LCC)
6. Community satisfaction rating with sealed roads (out of 100) (LCC)
7. Mean score access to roads and public transport (scale 1-7) (RWS)
8. Mean score access to telecommunications (scale 1-7) (RWS)
9. No. of dental practitioners (NHWDS)
10. No. of medical practitioners (NHWDS)
11. No. pharmacists (NHWDS)
12. LRH emergency department waiting times - % patients who commenced treatment within recommended time (category 'Triage 2. Emergency (treatment required within 10 minutes)' (AIHW MyHospitals)
13. Active library borrowers in municipality (%) (LCC)
14. Number of visits to aquatic facilities per head of municipal population (%) (LCC)

Social connections

1. Did voluntary work through an organisation or group (last 12 months) (%) (ABS)
2. Crime and safety - rate crime as a problem in the local community (%) (RWS)
3. Feelings of trust - agree 'yes, definitely' that most people can be trusted (%) (VPHS)
4. Positive views of multiculturalism/tolerance of diversity (%) (VPHS)
5. Feeling valued by society (%) (VPHS)
6. Total criminal incidents rate per 100,000 (year ending June) (CSA)
7. Family violence - incidents rate per 100,000 (year ending June) (CSA)
8. Children enrolled in a preschool or preschool program (4 and 5 year olds) (no.) (ABS)
9. Highest year of school completed - Persons aged 15 years and over who are no longer attending primary or secondary school - completed ear 12 or equivalent (%) (ABS)
10. Sports participation rates - player registrations per 100 residents (no.) (VicHealth)
11. Agree 'I feel welcome here' (%) (RWS)
12. Digital inclusion score (DII)

Appendix B. Detailed listing of measures and data sources

Table B1. Economy domain measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in the barometer
Mean personal income (end financial year) ($) (Objective measure)	Mean personal income of people who interacted with the taxation system and had personal income identified.	2012-2020 9 data points	Australian Bureau of Statistics (ABS) https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/personal-income-australia/latest-release	https://www.abs.gov.au/methodologies/personal-income-australia-methodology/2020-21-financial-year	Personal income is an indicator of material living conditions, impacting access to resources and, therefore, wellbeing.
Number of jobs (end of financial year) (no.) (Objective measure)	Number of jobs where "job" is a relationship between employee and employer.	2016-2020 5 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/jobs-australia-methodology/2020-21-financial-year	Growth in number of jobs is considered positive for economic prosperity.
Total number of businesses (end of financial year) (no.) (Objective measure)	Count of actively trading businesses contributing to economy.	2018-2022 5 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/statistics/economy/business-indicators/counts-australian-businesses-including-entries-and-exits/latest-release	Indicative of levels of confidence in performance of local economy.
Houses – median price ($) (Objective measure)	Median sale price of properties.	2008-2022 15 data points	Valuer-General Victoria https://www.land.vic.gov.au/valuations/resources-and-reports/property-sales-statistics	https://www.land.vic.gov.au/valuations/resources-and-reports/property-sales-statistics	Measures sales activity in the property market and indicates housing affordability.
Low-income households under financial stress from mortgage or rent (%) (Objective measure)	A family or individual in a low-income bracket paying 30% of that income to mortgage payments or rent.	2011, 2016, 2021 3 data points	PHIDU Torrens University Australia Social Health Atlas https://phidu.torrens.edu.au/social-health-atlases/data	https://phidu.torrens.edu.au/notes-on-the-data/demographic-social/housing-stress	Measures housing stress on low-income households, which is a risk factor for homelessness.
Specialist Homelessness Services Client Count (no.) (Objective measure)	Number of clients (any age) of Specialist Homelessness Services are provided to prevent or respond to homelessness.	2015-2022 8 data points	Australian Institute of Health & Welfare https://www.aihw.gov.au/reports-data/health-welfare-services/homelessness-services/data?&page=2	https://www.aihw.gov.au/reports-data/health-welfare-services/homelessness-services/overview	This measure acknowledges association between economic factors – housing stress, cost of living pressures, unemployment and underemployment – and homelessness.[4]

[4] While increasing numbers of client indicates more people who are homeless or at risk of homelessness, this could also be interpreted in a somewhat positive light as it indicates greater numbers of people are accessing support.

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in the barometer
Labour force participation rate - persons aged 15 years and over (%) (Objective measure)	Percentage of people 15 years and over who participate in the labour force.	2011, 2016, 2021 3 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/data-region-methodology/2011-23	Measures rate of people who are employed, unemployed and actively looking for work, or waiting to start a new job.
Unemployment rate - persons aged 15 years and over (%) (Objective measure)	The unemployment rate is the number of unemployed persons expressed as a percentage of the labour force.		ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/data-region-methodology/2011-23	High unemployment indicates limited opportunities to find work.
Youth engagement in work/study (15-19) - total fully engaged (%) (Objective measure)	The percentage of young people working or attending school/an educational institution.		ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/data-region-methodology/2011-23	Young people who are engaged in education and training have better employment options and are socially connected, which benefits communities.[5]
ATSI unemployment % (Objective measure)	The percentage of ATSI people who reported being in the labour force who are unemployed.		ABS ATSI Census data 2011; 2016; and 2021 https://www.abs.gov.au/census/find-census-data/quickstats/2021/IQSLGA23810 https://www.abs.gov.au/census/find-census-data/community-profiles/2021/LGA23810	Note for LGA and Vic comparison: state level data was not available for 2021. https://www.abs.gov.au/census/guide-census-data/census-dictionary/2021/variables-topic/income-and-work/labour-force-status-lfsp	Employment relates specifically to targets from the National Agreement on Closing the Gap to support youth engagement and strong economic participation of ATSI people.
Real GRP (June 2021 Prices) $B (Objective measure)	Gross Regional Product (GRP) is a measurement of the total of everything produced in the region.	2008-2022 15 data points	REMPLAN https://app.remplan.com.au/latrobe/community/trends/gross-regional-product?state=Pj5lib!KeJNiaMEvTvN4wbH92LdlHET7Fa8vHbFkFQ8IkFLsltyYP	https://www.remplan.com.au/economy/	Measures the local economy's net wealth.
Female individual weekly income - % above minimum weekly wage (Objective measure)	Percentage of women 15 years and over earning above minimum weekly wage.	2011, 2016, 2021 (frequency: released every 5 years) 3 data points	Victorian Women's Health Atlas https://victorianwomenshealthatlas.net.au/#!/	https://victorianwomenshealthatlas.net.au/reports%2Ffactsheets%2FSocioeconomics%2FLatrobe%2FVWHAtlas%20Fact%20S	This measure is an indicator of the gender pay gap.

[5] Further information on youth engagement in education employment, including risk factors, can be found here: https://www.aihw.gov.au/reports/children-youth/engagement-in-education-or-employment

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in the barometer
Male individual weekly income - % above minimum weekly wage (Objective measure)	Percentage of men 15 years and over earning above minimum weekly wage.	2011, 2016, 2021 (frequency: released every 5 years) 3 data points		heet%20Socioeconomics%20Latrobe.pdf	Included as context for the gender pay gap.
ATSI med. total personal income ($/weekly) (Objective measure)	Median weekly income ATSI people 15 years and over.		ABS https://www.abs.gov.au/census/find-census-data/community-profiles/2021/LGA23810	https://www.abs.gov.au/census/guide-census-data/about-census-tools/community-profiles	This measure is an indicator of the income gap between ATSI and non-indigenous people.
Med. total personal income ($/weekly) - non-Indigenous 15 years and over (Objective measure)	Median weekly income of non-Indigenous people (including those who did not state their Indigenous status) 15 years and over.				Included as context for gap referred to above.
Local government total expenditure (Objective measure)	Council expenditure including: governance; community services; aged and disability; recreation and culture; waste management; traffic and street management; environment[6]; business and economic services; local roads and bridges.	2016-2022 7 data points	Victorian Local Government Grants Commission data (expenditure tables) https://www.localgovernment.vic.gov.au/funding-programs/victoria-grants-commission/consultation-and-operations	https://www.localgovernment.vic.gov.au/funding-programs/victoria-grants-commission/consultation-and-operations	Included as a measure of public investment.
Agree "living costs are affordable here" (%) (Subjective measure)	Measured on a 7-point scale from strongly disagree to strongly agree. Respondents who scored 5-7 were reported as agreeing.	2015-2020* 5 data points *No data for 2019; data for metro LGAs was not included 2015 & 2016, so State figures for these years are not available.	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables: https://www.regionalwellbeing.org.au/the-questionnaires/ Explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/We note that a limitation of these data is small sample sizes. [7]	An indicator of perceptions of cost of living affordability.

[6] Expenditure on environment is also included (as a standalone measure) in the barometer's environment domain.

[7] We acknowledge the RWS small sample sizes are a limitation of this data source. Due to a lack of publicly available data at LGA level relating to subjective assessments, we believe there is benefit in including this measure in the barometer.

Table B2. Environment domain measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in the barometer
Protected land areas (ha) (end of financial year) (Objective measure)	Refers to areas of land [hectares] dedicated to the protection and maintenance of biodiversity.[8]	2016, 2018, 2020 3 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/data-region-methodology/2011-23	Conservation of biodiversity is essential to environmental health.
Small-scale solar panel installations (no.) (year ended 31 December) (Objective measure)	Installations incl. residential and commercial systems with panel array capacity of no more than 100 kilowatts.[9]	2016-2022 6 data points			An indicator of adoption of renewable energy in the community.
Agree with the statement "I like the environment and surrounds I live in" (%) (Subjective measure)	Measured on a 7-point scale from strongly disagree to strongly agree. Respondents who scored 5-7 were reported as agreeing.	2016, 2018, 2020* 3 data points *Metro LGAs were excluded in 2016, so State figure was available for that year.	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables: https://www.regionalwellbeing.org.au/the-data-tables/ Explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	An indicator of community perceptions of the appeal and attractiveness of the natural and build environment.
Tree cover % (Objective measure)	Annual average woody vegetation cover fraction.[10]	2008-2022 15 data points for each measure	Australia's Environment (TERN and the Australian National University) https://www.wenfo.org/aer/	Score cards for LGAs available at: https://www.wenfo.org/aer/#scorecards Data explorer available at: https://wenfo.org/ausenv/#/2021/Environmental_Condition%20Score/Region/Actual/Local_Government%20Areas/bar,options	Tree cover provides shade, helps reduce heat, improves air quality and protects biodiversity.
Annual emission of carbon from wildfire (gC/m^2) (Objective measure)	Measures carbon emission from wildfires[11].				Carbon emissions from wildfires pollute the air and impact the climate.
Annual rainfall (mm) (Objective measure)	Total annual precipitation.[12]				We note increased rainfall could be indicative of flooding, which Latrobe City experienced during the reference period.

[8] Sourced from the Collaborative Australian Protected Areas Database (CAPAD), Commonwealth of Australia, maintained and updated by the Department of Climate Change, Energy, the Environment and Water (DCCEEW).

[9] Data includes the annual number of new installations, updates and replacements that have passed auditing, met standards and been granted Small-Scale Technology Certificates. Installation data comes from the Clean Energy Regulator (CER).

[10] Derived from Landsat imager by ANU.

[11] "Annual emissions of carbon from wildfire, derived from ECMWFs Global Fire Assimilation System v1.2' – 'The Global Fire Assimilation System (GFAS) assimilates fire radiative power (FRP) observations from satellite-based sensors to produce daily estimates of emissions from wildfires and biomass burning. FRP is a measure of the energy released by the fire and is therefore a measure of how much vegetation is burned" (https://www.ecmwf.int/en/forecasts/dataset/global-fire-assimilation-system)

[12] Derived from BoM data and GPM satellite data by the OzWALD model-data fusion system.

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in the barometer
Number of hot days (Objective measure)	Number of days screen level temperature above 35 degrees Celsius[13]	2008-2022 15 data points		/-28.96/135.00/4/none/Roadmap/Opaque	Increasing temperatures could indicate impact of climate change, put stress on the environment and critical infrastructure, and also have health impacts.
Kerbside collection waste diverted from landfill (%) (Objective measure)	Percentage of garbage, recyclables and green organics collected from kerbside bins that is diverted from landfill.	2015-2023* 9 data points * Note for LGA and Vic comparison: "all councils" state level data is only available from 2020.	Latrobe City Council (council performance data annual reports) https://www.latrobe.vic.gov.au/Council/Media_and_Publications/Major_Council_Publications	Information on the Local Government Reporting Framework, including reporting and indicator guides can be found here: https://www.localgovernment.vic.gov.au/council-innovation-and-performance/performance-reporting	Higher percentages are indicative of more effective waste collection to lessen environmental pollution from landfill.
Annual council expenditure on environment ($) (Objective measure)	Council expenditure on protection of biodiversity and habitat; fire protection; drainage; agricultural services; sewerage; soil decontamination; waste water management; administration.	2016-2022 7 data points	Victorian Local Government Grants Commission data (expenditure tables) https://www.localgovernment.vic.gov.au/funding-programs/victoria-grants-commission/consultation-and-operations	https://www.localgovernment.vic.gov.au/funding-programs/victoria-grants-commission/consultation-and-operations	Investment in the environment by council helps ensure the community has access to a healthy environment.
Particles ($PM_{2.5}$) - Numbers of exceedances (days) (Traralgon) (Objective measure)	Measures air pollution by number of days of exceedances per year with the goal of zero exceedances.	2016-2022 7 data points[14]	EPA Victoria Air monitoring report 2021: Compliance with the National air quality standards https://www.epa.vic.gov.au/about-epa/publications/2052-nepm-compliance-air-monitoring-report	Information on EPA air quality monitoring of $PM_{2.5}$ and PM_{10} can be found here: https://www.epa.vic.gov.au/for-community/monitoring-your-environment/monitoring-victorias-air-quality .	Indicates air pollution due to smoke (from fires and wood heaters and industry).
Particles (PM_{10}) - Numbers of exceedances (days) (Traralgon) (Objective measure)	See description above.	2008-2022 14 data points			Indicates air pollution from dust (from unsealed roads, smoke, sea salt, traffic exhausts and industry).

[13] Derived from downscaled ECMWF [European Centre for Medium-Range Weather Forecasts] reanalysis data.

[14] Data for the Traralgon monitoring site, located in Latrobe City, has been used. The average number of exceedances across sites (list available in Air Monitoring Report document included in the data source column of this table) has been used for a state comparison. Some state level data was not included for comparison over some time points during the LGA reference period due to differences in number of total monitoring sites available.

Table B3. Health domain measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Obese (%) (Objective measure)	Obese (>=30.0 kg/m^2): self-reported weight and height for BMI calculation.	2011, 2014, 2017, 2020 4 data points (frequency: LGA data released every 3 years)	Victorian Health Population Survey (VHPS) https://www.health.vic.gov.au/population-health-systems/victorian-population-health-survey	The VPHS collects data on the health and wellbeing of Victorians 18 years and over. An LGA breakdown is provided with a sample size of approximately 34,000 participants across Vic (approximately 430 respondents per LGA). Responses are self-reported via telephone survey (https://www.health.vic.gov.au/population-health-systems/victorian-population-health-survey)	Obesity is a health risk factor.
Fair or poor self-reported health (%) (Subjective measure)	Proportion of adults with self-reported health status as "Fair/poor".				Subjective assessment of health. Increases in "fair/poor" ratings considered negative.
Sedentary (%) (Objective measure)	This measure is based on self-reported physical activity status.				Physical activity is protective against disease and supports good physical and mental health.
High/very high psychological distress (%) (Subjective measure)	Proportion of adults with high/very high (22+) on Kessler Distress Scale (K10).				Indicates levels of high/very high levels of distress in the community.
Current smoker (%) (Objective measure)	The proportion of adults who reported smoking daily, or occasionally.				Smoking is associated with a number of health conditions and is one of the leading preventable causes of death and disease (ABS).
Meeting both fruit & vegetable consumption guidelines (%) (Objective measure)	The proportion of adults who reported they met both fruit and vegetable consumption guidelines.				Diets that meet this recommendation help protect against disease and support physical and mental health.
Electronic gaming machine (EGM) expenditure per adult ($) (end of financial year) (Objective measure)	Money spent per adult, defined as player loss on electronic gaming machines.	2008-2022* 15 data points *2020 data reflects the impact of COVID[15]. Note for LGA and Vic comparison: state totals were not provided for 2008-2011	Victorian Gambling and Casino Control Commission (VGCCC) https://www.vgccc.vic.gov.au/resources/information-and-data/expenditure-data	Further information, including disclaimer and key definitions, is available via data downloads available at: https://www.vgccc.vic.gov.au/resources/information-and-data/expenditure-data A limitation of these data is that they only cover gaming in venues, not online gambling.[16]	The economic and social impacts of gambling can harm health and wellbeing.

[15] As VGCCC note, gaming venues were closed between March and November 2020 due to COVID restrictions.
[16] During lockdown periods, spending on EGMs decreased, but this does not mean online gambling was not a problem for many during this period.

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Rate of alcohol hospital admissions per 100,000 population (Objective measure)	Hospital admissions with a primary diagnosis wholly (or partially) attributable to alcohol or other drugs.[17] Any case where any illicit drug was primarily involved in the event.[18]	2012-2021 10 data points	AODstats (Turning Point, Eastern Health) https://aodstats.org.au/explore-data/hospital-admissions/	Information on scope, methods and data analysis can be found here: https://aodstats.org.au/explore-data/hospital-admissions/	Measures harm caused by alcohol.
Rate of illicit drug hospital admissions per 100,000 population (Objective measure)					Measures harm caused by illicit drugs.
Fully immunised 1 year olds (%)SA3* (Objective measure)	Percentage of 1 year olds who have been fully immunised (the majority of childhood immunisations happen during this first year of life).	2017-2022 6 data points	The Department of Health and Aged Care (Aust. Government) https://www.health.gov.au/resources/publications/vic-childhood-immunisation-coverage-data-by-sa3?	Further information can be found here: https://www.health.gov.au/resources/publications/vic-childhood-immunisation-coverage-data-by-sa3?	We consider vaccination indicative of protective health behaviour to support the developing immune systems of infants and to help protect the wider community from disease.
People receiving Medicare-subsided mental health-specific services - no. of patients (all providers) - SA3 (Objective measure)	This measure could indicate an increasing demand for service and, therefore, an increase in mental health conditions requiring treatment.	2016-2020 5 data points	Australian Institute of Health and Welfare https://www.aihw.gov.au/mental-health/resources/archived-content	Further information is available here: https://www.aihw.gov.au/mentalhealth/resources/classifications-and-technical-notes	We see this as an objective measure of prevalence of mental illness in the community. That said, an increase could be a positive in a sense that more funding is being invested in supporting mental health.
"To what extent do you feel the things you do in your life are worthwhile"? (Subjective measure)	A means score (0-100) based on response to the extent respondents feel the things they do in life are worthwhile.	2015-2021* 5 data points *No data for 2020	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#/	Data tables: https://www.regionalwellbeing.org.au/the-data-tables/ Explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Note for LGA & Vic comparison: state level data was not available for 2015 & 2016 (Vic figures excluded metro). Limitation: see footnote 4.	A person's sense of purpose, or meaning, feeling that life is worthwhile can indicate their overall sense of wellbeing.

[17] Alcohol is defined as "alcohol involvement, with or without other drugs/substances".
[18] Includes "heroin, opioids, amphetamines, cannabis, stimulants, hallucinogens, inhalants, or other illicit drugs not explicitly mentioned".

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Chronic disease, disability - need for core assistance (%) (Objective measure)	The number of people with profound or severe core activity limitation requiring day-to-day living assistance with self-care and/or mobility and/or communication due to a long-term health condition or disability (>6 months).	2011, 2016, 2021 (frequency: released every 5 years) 3 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/census/guide-census-data/about-census-tools/community-profiles https://www.abs.gov.au/census/guide-census-data/census-dictionary/2021/variables-topic/disability-and-carers/core-activity-need-assistance-assnp	Included in recognition of impact on quality of life and health system.
Children reported to be in excellent or very good health (%) (Subjective measure)	Health status of children entering school reported by parents.	2015-2022* 6 data points *No data for 2020	Government of Victoria - Outcomes for Victorian Children at School Entry - School Entrant Health Questionnaire https://www.vic.gov.au/school-entrant-health-questionnaire	https://www.vic.gov.au/school-entrant-health-questionnaire	Records parent perceptions of their child's health as they begin primary school. There are limited measures meeting our criteria that refer to children/young people – we have included this measure in recognition of the importance of child health in the community.

Table B4. Services & infrastructure domain measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Recipients of Commonwealth Rent assistance (Objective measure)	Households receiving Commonwealth Rent Assistance.	2019-2022 4 data points	Australian Institute of Health and Welfare https://www.aihw.gov.au/reports-data/health-welfare-services/housing-assistance/data	https://www.aihw.gov.au/reports-data/health-welfare-services/housing-assistance/overview	This is an indicator of support to people to access housing (in the absence of suitable data regarding social housing).
Admissions preventable conditions - public hospitals (age standardised rate per 100,000) (Objective measure	Preventable hospitalisations are admissions from a specified range of conditions where hospitalisation could have been prevented through provision of appropriate care	2016-2020* 5 data points *No data for 2016	PHIDU Torrens University Australia Social Health Atlas https://phidu.torrens.edu.au/social-health-atlases/data	https://phidu.torrens.edu.au/notes-on-the-data/health-services/hospital-admissions	Indicator of adequacy of primary and community-based care (incl. by GPs, medical specialists, dentists, nurses and allied health professionals).
Residential care places per 1,000 population aged 70 years and over (Objective measure)	This refers to residential aged care places that are subsidised by the Commonwealth.	2011, 2016, 2020, 2022 4 data points	PHIDU Torrens University Australia Social Health Atlas https://phidu.torrens.edu.au/social-health-atlases/data	https://phidu.torrens.edu.au/notes-on-the-data/health-services/residential-aged-care-total	Indicates support for older people – the number of places available at care facilities/ nursing homes for older people who require support with daily activities.
Community satisfaction- Council decisions in community interest (rating out of 100) (Subjective measure)	Assessed via an annual Community Satisfaction Survey.	2015-2023 9 data points	Latrobe City Council (council performance data annual reports) https://www.latrobe.vic.gov.au/Council/Media_and_Publications/Major_Council_Publications	Local Government Reporting Framework, including reporting and indicator guides can be found here: https://www.localgovernment.vic.gov.au/council-innovation-and-performance/performance-reporting Performance Reporting Indicator Guide 2023-2024: https://www.localgovernment.vic.gov.au/__data/assets/pdf_file/0019/194050/LG-BPG-Performance-Reporting-Indicator-Guide-2023-24-.pdf Note for LGA and Vic comparison, 'all councils' state level data available from 2020.	Indicative the confidence the community has in the council decision making – that council is working in the interests of the community.
Infrastructure per head of population ($) (Objective measure)	The value of infrastructure (assets excluding land) per head of the Latrobe City population is an indicator included in the framework all councils are evaluated on annually.				"Higher proportion of infrastructure value relative to population level suggests greater commitment to improving infrastructure" (source: Performance Reporting Indicator Guide 2023-2024)
Community satisfaction rating with sealed roads (out of 100) (Subjective measure)	Assessed via an annual Community Satisfaction Survey.	2015-2022 8 data points			Measures satisfaction with essential infrastructure.

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Mean score access to roads and public transport (scale 1-7) (Subjective measure)	Measured on a 7-point scale from very poor to very good. An average score was calculated based on ratings given to roads and public transport.	2014-2020* 5 data points *No data for 2019	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables: https://www.regionalwellbeing.org.au/the-data-tables/ Explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Note for LGA and Vic comparison: state level data was not available for 2015 & 2016 (Vic figures excluded metro). Limitation: see footnote 4.	Subjective assessment of quality of roads and public transport.
Mean score access to telecommunication (scale 1-7) (Subjective measure)	Measured on a 7-point scale from very poor (low quality access) to very good (high quality access). An average score was calculated based on ratings given to mobile phone reception and internet.	2014-2020* 4 data points *No data for 2016 & 2019 We did not include 2016 data due to an inconsistency with other years in how the question was phrased			An indicator of perceptions of access to telecommunications.
No. of dental practitioners (Objective measure)	Measures the number of dental practitioners working in Latrobe.	2013-2022 9 data points	The Department of Health and Aged Care (Australian Government) Health Workforce Data https://hwd.health.gov.au/	Information available here: https://hwd.health.gov.au/resources/index.html?resourcetype=dashboards	While a limitation of these measures is that data is not provided per head of population, an increase in the number is considered positive, while a decrease is assumed to be negative.
No. of medical practitioners (Objective measure)	Measures the number of medical practitioners working in Latrobe.				
No. of pharmacists (Objective measure)	Measures the number of pharmacists working in Latrobe.				
LRH (Latrobe Regional Hospital) ED % patients who commenced treatment within recommended time (Objective measure)	LRH emergency department waiting times - % patients commenced treatment within recommended time (category Triage 2. Emergency (treatment within 10 min).	2012-2023 12 data points	AIHW MyHospitals performance data Latrobe Regional Hospital https://www.aihw.gov.au/reports-data/myhospitals	https://www.aihw.gov.au/reports-data/myhospitals/sectors/emergency-department-care	Indicative of the performance of LRH in terms of emergency department waiting times.
Active library borrowers in municipality (%) (financial year) (Objective measure)	The percentage of the population who borrowed a book/print material or other resource from the library.	2015-2023 9 data points	Latrobe City Council (council performance data annual reports) https://www.latrobe.vic.gov.au/Council/Media_and_Publications/Major_Council_Publications	Local Government Reporting Framework, incl. reporting and indicator guides can be found here: https://www.localgovernment.vic.gov.au/council-innovation-and-performance/performance-reporting	Measures use of public services/facilities/resources.
Number of visits to aquatic facilities per head of municipal population (%) (financial year) (Objective measure)	The percentage of the population who visited a council operated aquatic facility.				

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
				Performance Reporting Indicator Guide 2023-2024: https://www.localgovernment.vic.gov.au/__data/assets/pdf_file/0019/194050/LG-BPG-Performance-Reporting-Indicator-Guide-2023-24-.pdf Note for LGA and Vic comparison, 'all councils' state level data available from 2020. Source requests the impact of COVID restrictions for 2020 and 2021 be noted.	

Table B5. Social connections domain measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Did voluntary work through an organisation or group (last 12 months) (%) (Objective measure)	People engaged in unpaid voluntary work for an organisation/group in 12 mths prior to the Census e.g., assisting at organised events, sports or school activities, churches, hospitals, nursing homes, charities, emergency services, committees.	2011, 2016, 2021 (frequency: released every 5 years) 3 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810		Volunteer work was included as a measure of social connections as it supports people to expand their networks and provides opportunities for social interaction and skill development.
Crime and safety - rate crime as a large problem in the local community (scale 1-7) (%) (Subjective measure)	Measured on a 7-point scale from crime being not a problem to a very big problem.[19]	2017-2020* 3 data points *no data for 2019	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables: https://www.regionalwellbeing.org.au/the-data-tables/ Explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Indicates perceptions of crime and safety in the community.
Feelings of trust - agree 'yes, definitely' that most people can be trusted (%) (Subjective measure)	Percentage of people who agree most people can be trusted.	2011, 2014,2020* 3 data points *There was no 2017 public release of this measure	Victorian Health Population Survey https://www.health.vic.gov.au/population-health-systems/victorian-population-health-survey	The VPHS collects data on the health and wellbeing of Victorians 18 years and over. An LGA breakdown is provided every 3 years – these data are available for 2011, 2014, 2017 and 2020 – with a sample size of approximately 34,000 participants across Vic (aiming for approximately 430 respondents per LGA). Responses are self-reported via telephone survey (https://www.health.vic.gov.au/population-health-systems/victorian-population-health-survey)	In terms of social connections, trust is related to social and community cohesion and capital.
Positive views of multiculturalism/tolerance of diversity (% (Subjective measure)	Percentage of people with positive views of multiculturalism/tolerance of diversity.				Positive views and tolerance indicate a more socially cohesive community.
Feeling valued by society (%) (Subjective measure)	Measures the percentage of people who feel valued by society.	2011, 2014,2020 3 data points (frequency: typically released every 3 years although there was no 2017 public release of this measure)			Feeling valued is an indicator of social inclusivity, a social determinant of health.

[19] Respondents who scored 6-7 were recorded as rating crime as a large problem.

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Total criminal incidents rate per 100,000 (year ending June) (Objective measure)	Crime rates indicate the prevalence of crime in the community.	2014-2023 10 data points	Crime Statistics Agency https://www.crimestatistics.vic.gov.au/	https://www.crimestatistics.vic.gov.au/about-the-data/explanatory-notes https://www.crimestatistics.vic.gov.au/about-the-data/glossary-and-data-dictionary Note for LGA and Vic comparison of FV rates: Vic data for years ending September available from 2018.[20]	The impacts of crime, including the fear of crime, can impact and be impacted by levels of community connectedness.
Family violence - incidents rate per 100,000 (year ending June) (Objective measure)	Rates of family violence indicate its prevalence in the community.	2014-2023 10 data points* *Data tables for years 2018 & 2023 ended June (inconsistent with other years)			Family violence is a health risk factor. Higher rates of family violence indicate the need for community education aimed at changing attitudes, as well as increased social support. Family violence impacts physical and mental health, participation in work & education, & access to social supports & connections.
Children enrolled in a preschool or preschool program (4 and 5 year olds) (no.) (Objective measure)	Measures the number of children enrolled in preschool.	2017-2022 5 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/data-region-methodology/2011-23 https://www.abs.gov.au/methodologies/preschool-education-methodology/2023	Enrolment in preschool supports early childhood development and learning, preparing children for school, as well as providing opportunities for parents to work and study.
Highest year of school completed - completed year 12 or equivalent (%) (Objective measure)	Measures the percentage of people over 15 who have completed year 12 or equivalent.	2011, 2016, 2021 3 data points	ABS https://dbr.abs.gov.au/region.html?lyr=lga&rgn=23810	https://www.abs.gov.au/methodologies/data-region-methodology/2011-23 https://www.abs.gov.au/census/guide-census-data/census-dictionary/2021/variables-topic/national-reporting-indicators/attainment-year-12-or-certificate-iii-or-higher-yr12c3p	Year 12 completion is associated with better outcomes in terms of likelihood of further education/training and transition to work.

[20] We acknowledge that the source notes year-to-year comparisons are not recommended across time series data, as outputs are constantly reviewed and changes made to crime and FV data. However, limitations are relatively minor in this context and the benefits for our purposes outweigh the limitations. The barometer can also be updated as new data is made available.

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Sports participation rates - player registrations per 100 residents (Objective measure)	Measures rates of participation in organised sport.[21]	2014-2021 7 data points	https://www.vichealth.vic.gov.au/media-and-resources/publications/victorian-participation-in-organised-sport	https://www.vichealth.vic.gov.au/news-publications/research-publications/victorian-participation-organised-sport 2019-2021 figures from 2021 report; 2018; 2017; 2016, 2015 from individual year reports.	Participation in sport supports wellbeing through opportunities for physical activity and social interaction. It encourages social cohesion, trust and inclusivity.
Agree 'I feel welcome here' (%) (Subjective measure)	Perceptions of how welcoming the community is. Measured on a 7-point scale from strongly disagree to strongly agree. Respondents who scored 5-7 were reported as agreeing.	2014-2021* 5 data points *No data for 2019	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables: https://www.regionalwellbeing.org.au/the-data-tables/ Explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Feeling welcome indicates feeling connected.
Digital inclusion score (0-100) (Objective measure)	Rates of digital inclusion – based on access, affordability and digital ability – from 0-100. A higher school indicates higher digital inclusion[22].	2020-2023 3 data points	Digital Inclusion Index https://www.digitalinclusionindex.org.au/	https://www.digitalinclusionindex.org.au/dashboard/National.aspx https://www.digitalinclusionindex.org.au/collecting-the-data/ https://www.digitalinclusionindex.org.au/reading-the-data/	Access, affordability and digital ability are important in enabling participating in education and employment, social connections and access to services and support.

[21] We note that not all sports were included consistently across each year.

[22] Score categories: highly excluded (<45); excluded (>45 and <61); included (>61 and <80); highly included (<80 and >).

Appendix C. Composite & validation measures

Table C1. Economy domain composite & validation measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Index of Economic Resources (IER) score	Indicator of relative socioeconomic advantage and disadvantage by summarising income and housing variables.	2011, 2016, 2021	Australian Bureau of Statistics (ABS) https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/latest-release#index-of-economic-resources-ier-	Technical paper: https://www.abs.gov.au/statistics/detailed-methodology-information/concepts-sources-methods/socio-economic-indexes-areas-seifa-technical-paper/2021 Methodology: https://www.abs.gov.au/methodologies/socio-economic-indexes-areas-seifa-australia-methodology/2021	Used as a broad measure of socioeconomic advantage/disadvantage in the community. A low score suggests lack of access to economic resources; a high score suggests greater access.
Community economic wellbeing	Scores for 4 areas rated on a scale 1-7 – living cost affordability; whether the community is "well-off" economically; job availability; and whether local businesses are doing well – averaged to produce a community economic wellbeing score (1 – low to 7 – high).	2015-2020* *No data for 2019	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables and explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Subjective assessment of material conditions relating to the economic prosperity of the community.
Household financial wellbeing	Self-reported household income bracket (based on ABS income categories) and then self-rated their financial wellbeing (prosperous; very comfortable; reasonably comfortable; just getting along; poor; very poor). A single average measure was then calculated.				Subjective assessment of conditions relating to the economic prosperity of households in the community.

Table C2. Environment domain composite & validation measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Environmental condition score	"A score between 0 and 10 expressing condition relative to previous years. It is calculated as the average rankings of component scores …: inundation*, streamflow (blue), vegetation growth, leaf area, soil protection, tree cover* (green) and the number of hot days* (orange)" (source: https://ausenv.online/aer/wp-content/uploads/2023/03/2022-Aus-Env-report-FINAL.pdf) *Included as individual measures in the barometer	2008-2022	Australia's Environment (TERN and the Australian National University) https://www.wenfo.org/aer/data/	Score cards for LGAs available at: https://www.wenfo.org/aer/#scorecards Data explorer and downloads available at: https://ausenv.tern.org.au/aex/#/2023/Environmental_Condition%20Score/Region/Actual/Local_Government%20Areas/bar,options/-28.96/135.00/4/none/Roadmap/Opaque Disclaimer and data origin: https://www.wenfo.org/aer/data/ More information on data source methodology: https://doi.org/10.36334/modsim.2019.J5.vandijk	Provides a composite measure of the overall condition of the environment.
Physical capital - landscape & aesthetics	Scores for 3 areas rated on a scale 1-7 –extent to which respondents like their environment and surrounds; attractiveness of buildings and homes; attractiveness of natural places (e.g., parks and bushland) – averaged to create score.	2015-2020**Excluded 2017 on basis that the question varied significantly to other years. No data for 2019	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables and explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Indicates perceptions of attractiveness of built environment and green spaces.
Natural capital - perceived environmental health	Scores for 11 areas of environmental health rated on a scale 1-7 were averaged to create score, which was then reversed so a score of 1 represents poor health and a score of 7 good.				Indicates perceptions of how healthy the environment is.

Table C3. Health domain composite & validation measures

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Wellbeing of people - Personal Wellbeing Index	Scored 0-100 based on average of satisfaction ratings for 7 areas – living standard; health; achievement; personal relationships; perception of safety; perception of community connection; future security.	2015-2020* * No data for 2019	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables and explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Indicates perceptions of areas of life relating to sense of wellbeing.
Human capital - wellbeing - Emotional Affect Index	Based on responses to 3 questions relating to levels of feelings of happiness, worry and depression. Responses to questions of worry and depression were reversed. The index score is an average of the 3 ratings.				Indicates perceptions of areas relating to emotional health and happiness.
Human capital - K6 psychological distress	General Psychological Distress (the K6) relating to distress experienced over the previous month. Higher scores mean higher distress.				Indicates levels of distress (mental health).

Table C4. Services & infrastructure domain composite & validation measure

Measure	Description	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Social capital - health, education & childcare access	Calculated based on average score of ratings (1-7) of access to GP services; mental health services; specialist health services; quality of local schools; access to child care.	2015-2020* * No composite score available for 2017. Slight variations in descriptions of questions across years i.e., aged care was included in 2015 and 2016; childcare was not included in 2020	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables and explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Provides ratings for some services relating to health care and education, which relate to individual measures included in the barometer.

Table C5. Social connections domain composite & validation measure

Measure	Description/	Time series information	Data source	Further info (methodologies, limitations)	Reason for inclusion in barometer
Social capital - spending time with family and friends	Calculated as an average of ratings (1-7) relating to how often respondents spent time keeping in touch with friends; chatting to neighbours; spending time with family members who live elsewhere.	2015-2018* *Slight variations across years: 2015, 2016 and 2018 include keeping in touch with friends, chatting to neighbours and spending time with family who live elsewhere; neighbours were not included in 2017. 2020 results were excluded on the basis that the question varied significantly.	Regional Wellbeing Survey (University of Canberra) https://www.regionalwellbeing.org.au/#	Data tables and explanatory notes: https://www.regionalwellbeing.org.au/the-data-tables/ Limitation: see footnote 4.	Composite measure relating to relationships and social connections.
Physical capital - crime & safety in the local community	Calculated using average ratings (some reversed) to get an overall score (1-7) indicating low-high levels of safety.	2017-2020* *Did not include 2015 and 2016 as questions were significantly different			Composite measure relating to crime and safety. Ratings were given for perceptions of safety in the local area; crime; drug abuse; alcohol abuse; domestic violence, which relate to individual measures used in the barometer.
Index of Education and Occupation	Classifies the workforce according to groups of occupations, skill levels and employment levels	2011-2021	https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/latest-release#index-of-education-and-occupation-ieo-	Technical paper: https://www.abs.gov.au/statistics/detailed-methodology-information/concepts-sources-methods/socio-economic-indexes-areas-seifa-technical-paper/2021 Methodology: https://www.abs.gov.au/methodologies/socio-economic-indexes-areas-seifa-australia-methodology/2021	Used as a broad measure of advantage/disadvantage relating to educational attainment and employment. A low score suggests relatively lower education and occupation levels; a high score suggests relatively higher levels.

Appendix D. List of presentations and stakeholder consultations

November 2020-April 2021	Interviews with 29 stakeholders and community members for validation of domains and themes
11 November 2021	Hazelwood Health Study Community Engagement presentation (online)
18 October 2022	Hazelwood Health Study Community Engagement presentation (online)
15 November 2022	Stakeholder Consultation on the barometer design, Federation University, Churchill
6 December 2022	Stakeholder Consultation on the barometer design (online)
28 September 2023	Hazelwood Health Study Community Engagement presentation (online)
16 February 2024	Federation University Innovation Breakfast, Morwell Innovation Centre
17 February 2024	Hazelwood Mine Fire: Ten Years On community day, Kernot Hall, Morwell

Appendix E. Interim presentation to stakeholders and focus group questions

Latrobe Valley Community Wellbeing Barometer

Stakeholder Consultation/Focus Group
15 November 2022

Community Wellbeing Stream

Federation University Australia · Monash University · JCU College of Business, Law and Governance · The University of Newcastle Australia · Hazelwood Health Study

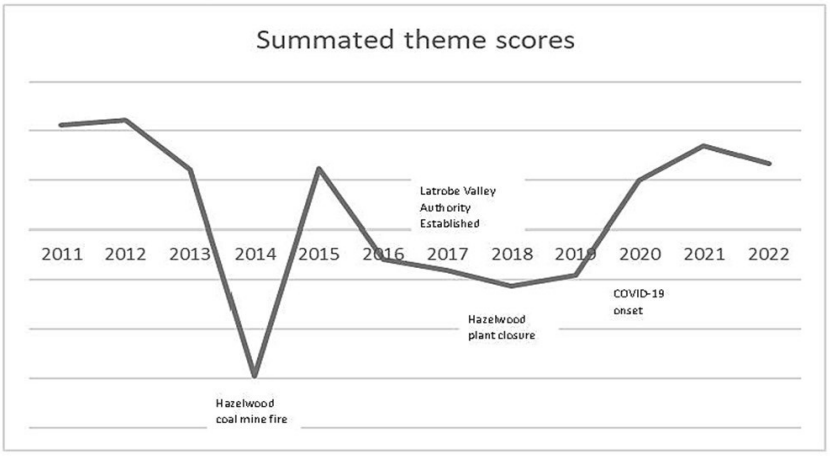
Aims and method

- **Aim**: to compile and analyse publicly available data that reflects and informs on community wellbeing for a selected region
- **Method**:
  - Literature review of academic and grey literature between 2007-2020
  - Atkinson *et al.* (2017): 5 overlapping and interconnected domains (presented in diagram)
  - Determined publicly available measures relevant for each of the 5 domains
  - Iterative process with stakeholder engagement and feedback

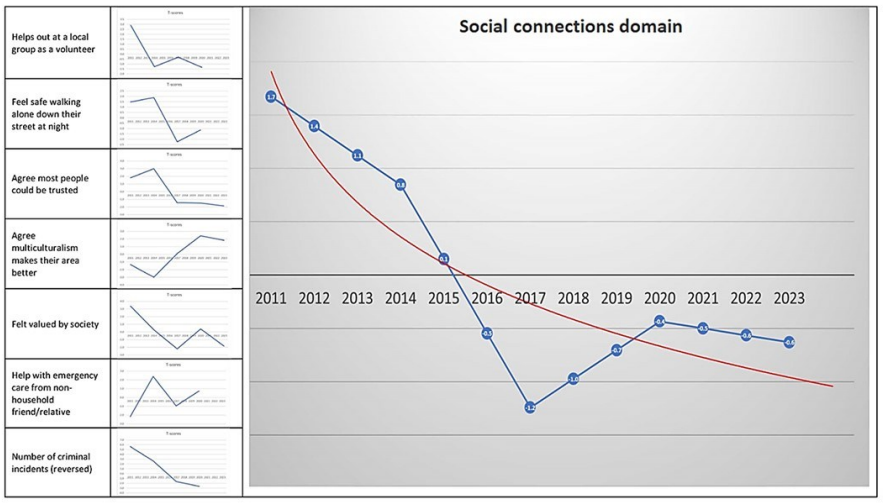
Is anything missing?

- Are there other areas of community wellbeing that you think are important, that are not captured here?
- If so, can data be found for what's missing? (E.g. data sources that you know of that reflect certain demographics, age groups?)

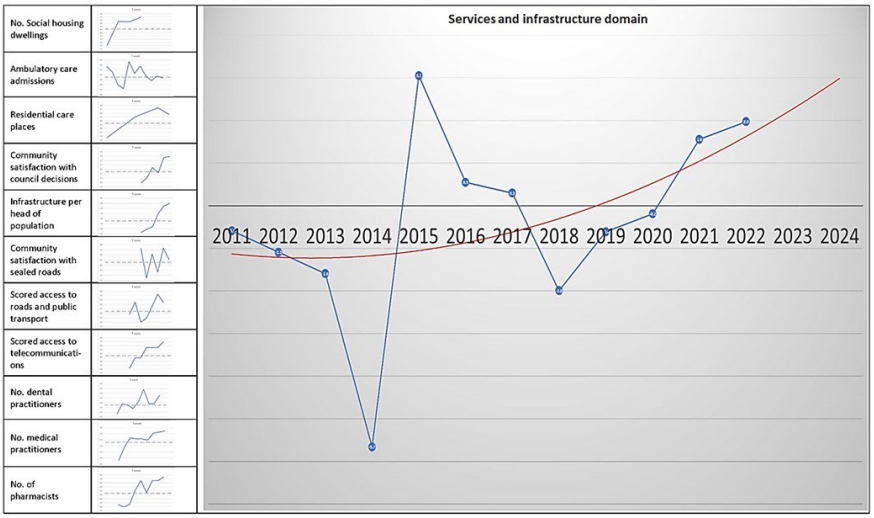
Summated domains score and significant community events theorised to impact CWB



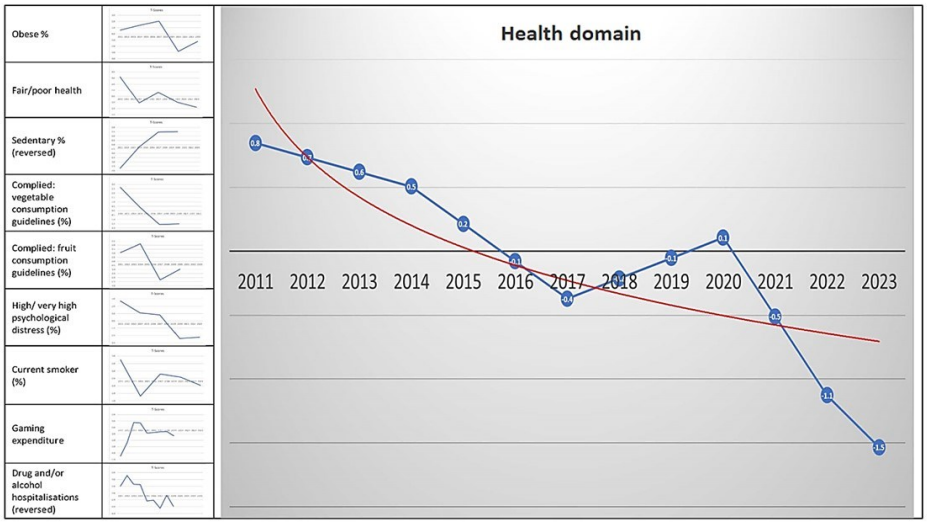
Social connections domain (note: upward data trend improves CWB, and *vice versa*, for each measure and overall



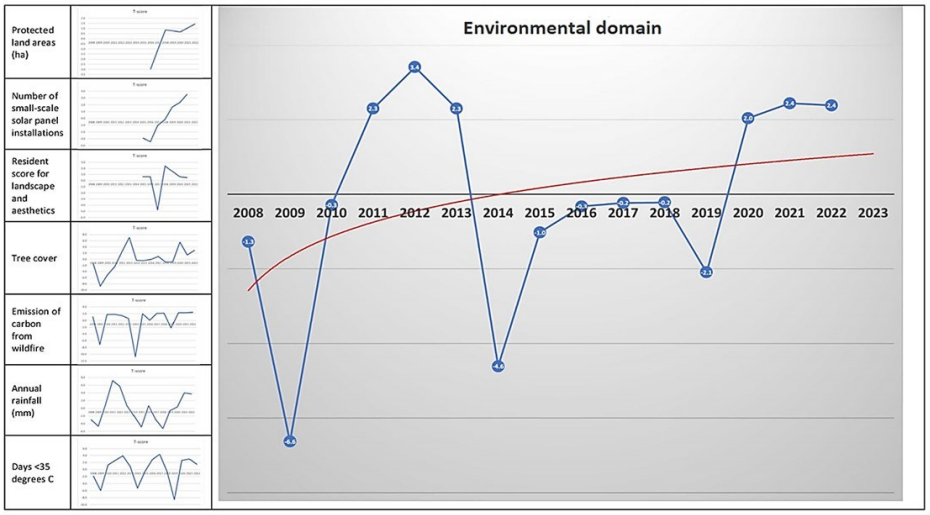
Services and infrastructure domain (notes: upward data trend improves CWB, and *vice versa*, for each measure and overall



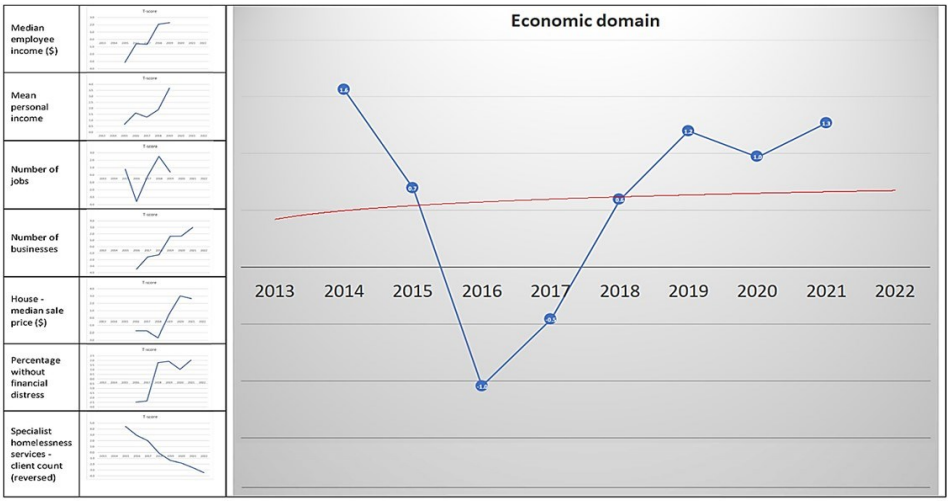
Health domain (note: upward data trend assumed to improve CWB, and *vice versa*, for each measure and overall



Environmental domain (note: upward trend improves CWB, and *vice versa*, for each measure and overall)



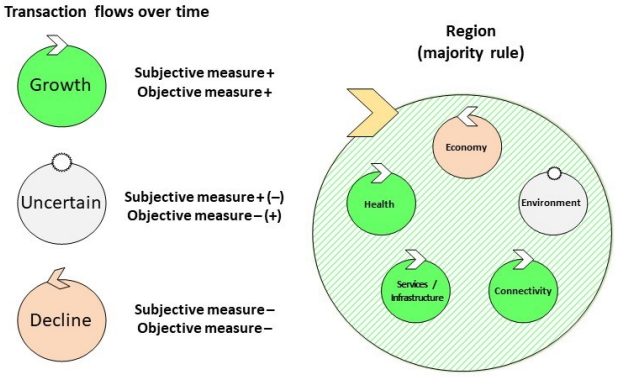
Economic domain (note: upward data trend assumed to improve CWB, and *vice versa*, for each measure and overall)



Questions for consideration

- Do the chosen measures (shown in the following graphics) capture the factors that affect this community's wellbeing?
- Looking at the results for each of the domains, do you think these measures match your sense of the impact of this factor on the community over this period?
- Looking at the forecast for each domain, does that match your expectation for the Latrobe community?

How the barometer captures community wellbeing changes over time



- Community wellbeing conceptualised as *transactions over time*
- Positive transactions promote community wellbeing growth whereas negative transactions reduce this growth