REAL ASSETS
REAL ZERO

2022

What comes after net zero?

Net zero targets have become commonplace in the built environment.

But they are far from the best solution to the surmounting problems that a warming climate poses.

Net zero targets use an archaic carbon accounting practice to quantify the emissions from a building's energy use, which is approximately 90% of its operational carbon.

The annualised approach of these targets gives an inaccurate understanding of a building's carbon footprint.

They limit the opportunities to reduce operational carbon, and instead incentivise a questionable practice in which carbon offsets are abused to 'net' off emissions at zero.

WHAT'S NEXT?

EG is excited to adopt a sophisticated, data-driven approach to reaching carbon zero.

Our approach collects live carbon data and creates new, cost-effective opportunities to reduce emissions.

We take real assets to Real Zero by asking *when* they use energy, not just how much.

Initially, EG will be targeting Real Zero carbon across our Delta and ACE Funds.

As we refine and improve the process, we intend to expand the target across other mandates in the future.

So, what comes after net zero? **Real assets. Real Zero.**

Contents

Stop measuring carbon like it's 1999

The calculation for carbon emissions is old...

In Australia, most of a building's operational carbon footprint* comes from electricity used on site, controlled by the landlord (Scope 2 emissions) and tenants' (Scope 3, emissions).

In order to calculate the carbon content of this electricity, building owners use *annual* carbon emissions factors provided by the Federal Government.

The Department of Climate Change, Energy, the Environment and Water has been providing these emissions factors since 1990. The emissions factors are updated every year and have been gradually decreasing since 1989 as more carbon-free, renewable energy enters the grid.

For example, the most recent factors state one kWh of electricity consumed in NSW counts for 0.73kg of CO_2. If your building used 100,000kWh in 2021, it is calculated as 73 tons of carbon.

It's that simple. One sum.

Once you have the carbon footprint, you can purchase 73 carbon offsets and claim your asset is 'net zero'.

Different states have different emissions factors, with Tasmania's predominantly hydro-powered electricity significantly less carbon intensive than the brown coal that powers Victoria.

Emissions factors were not formally updated from 2019 to November 2022, with the Government only providing "latest estimates" placeholders while so many corporates were setting net zero goals.

The recent late-2022 update underscores the pace at which the grid is decarbonising. It also highlights the inaccuracies that this delayed, annualised approach to measuring carbon can create.

EMISSIONS FACTORS OF ELECTRICITY (kg CO_2/kWh)

	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2022
VIC	1.24	1.22	1.33	1.23	1.23	1.22	1.22	1.22	1.20	1.19	1.18	1.16	1.11	1.07	1.07	1.07	1.02	0.96	0.85
NSW	0.90	0.85	0.86	0.89	0.89	0.89	0.89	0.89	0.89	0.88	0.87	0.86	0.84	0.83	0.83	0.82	0.81	0.79	0.73
QLD	0.94	0.94	0.91	0.88	0.89	0.89	0.88	0.88	0.87	0.85	0.82	0.80	0.79	0.78	0.79	0.80	0.81	0.80	0.73
TAS	0.10	0.05	0.04	0.07	0.08	0.16	0.29	0.35	0.33	0.28	0.24	0.19	0.14	0.15	0.19	0.23	0.19	0.16	0.17
SA	0.81	0.87	0.91	0.86	0.86	0.83	0.77	0.72	0.67	0.65	0.62	0.58	0.55	0.53	0.53	0.51	0.44	0.35	0.25
WA	1.13	1.11	1.14	0.88	0.88	0.86	0.86	0.83	0.81	0.79	0.77	0.76	0.74	0.71	0.70	0.70	0.69	0.68	0.51

Source: Department of Climate Change, Energy, the Environment and Water 2022 National Greenhouse Gas Accounting Factors.

*Excludes embodied carbon

...and inaccurate

The current approach to measuring carbon is inaccurate because the carbon intensity of the electricity grid isn't consistent annually. The data to show this is free and publicly available .

The data changes every five minutes, as different forms of electricity – both renewable and non-renewable – enter and exit the grid.

In the middle of a sunny day, solar power is abundant (orange in the figure below, which documents 72 hours of energy market supply).

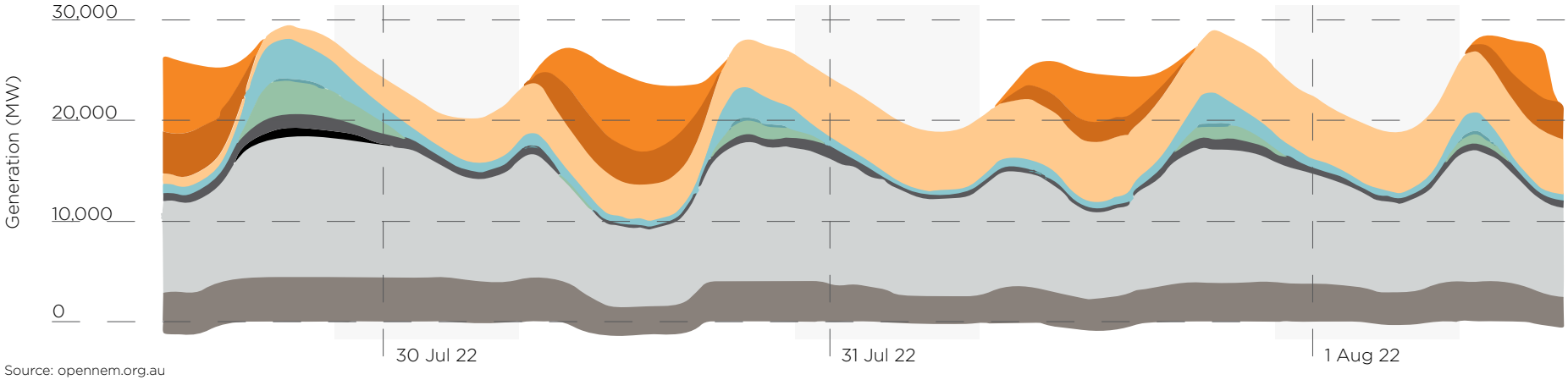
Therefore, electricity consumed in the middle of a sunny day is significantly less emissions intensive than energy consumed at midnight. The composition of energy types in the grid is changing constantly.

The Government emissions factors assumes every kWh of energy consumed has the same carbon intensity.

But the live data proves this is not true.

A 72-HOUR SNAPSHOT IN THE GRID

29 Jul 2022, 12:30PM AEST - 1 Aug 2022, 12:30PM AEST



Source: opennem.org.au

SOURCES

- Solar (Rooftop)
- Solar (Utility)
- Wind
- Hydro
- Battery (Discharging)
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- Gas (Reciprocating)
- Gas (OCGT)
- Gas (CCGT)
- Gas (Steam)
- Distillate
- Bioenergy (Biomass)
- Coal (Black)
- Coal (Brown)

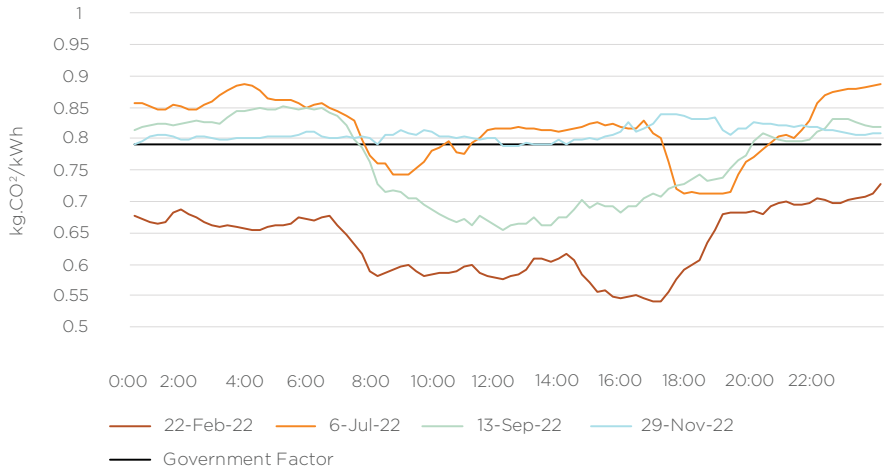
So, what would it look like if we started measuring carbon more accurately?

Firstly, every day is different. We've selected some sample days to give you an idea of the live carbon intensity of the NSW grid.

The key takeaway is that the emissions intensity is constantly changing, often by a factor of 30-40%.

It tends to be lowest during the middle of the day when the sun is shining, and solar energy is abundant.

EMISSIONS FACTORS OF ELECTRICITY

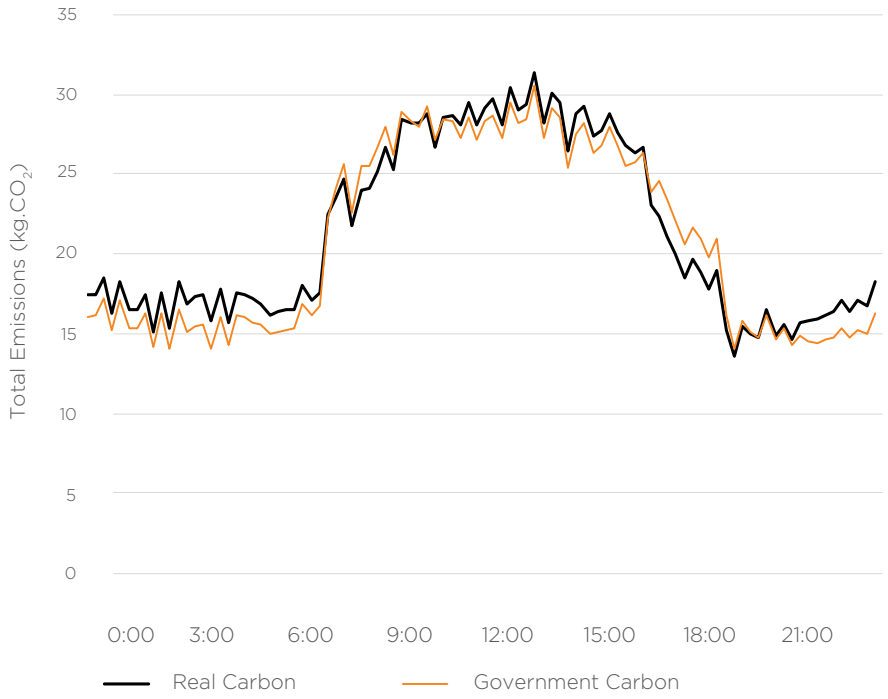


We recently applied this approach to EG's Delta and ACE Funds over the course of the 2022 financial year and found some interesting results.

There are days when we overestimate the carbon used by our buildings, and there are days when we underestimate it.

1 QUEEN VICTORIA TCE, CANBERRA, ACT

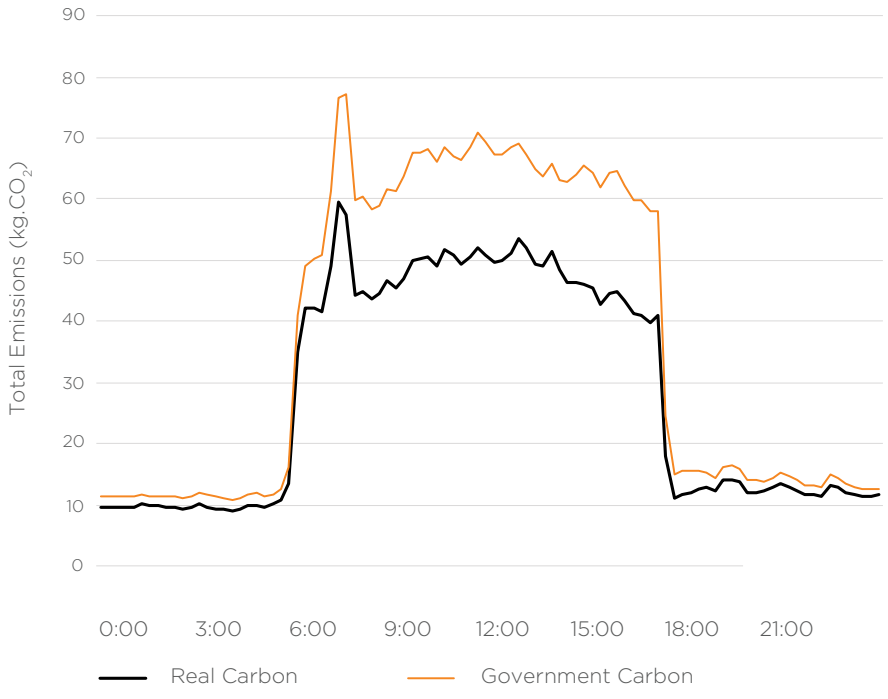
06-Jul-2021



The Government-calculated carbon underestimated the 'real carbon' of 1 Queen Victoria Tce by 47.02kg.CO_2 (2.4%) on 6 July 2022 - a day with limited renewable energy penetration in the ACT/NSW grid.

60 CARRINGTON ST, SYDNEY, NSW

22-Feb-2022



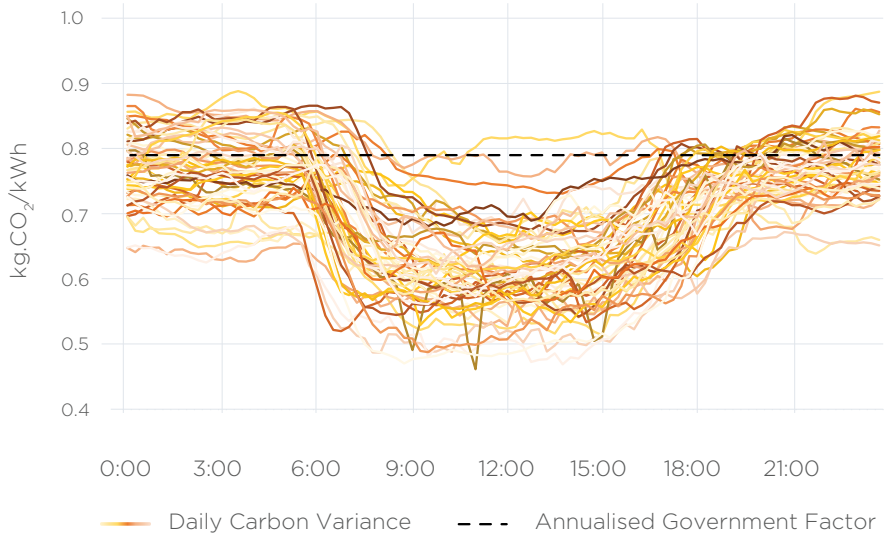
The Government-calculated carbon overestimated the 'real carbon' of 60 Carrington St by 828.33kg.CO_2 (23.6%) on 22 February 2022 - a day with high renewable energy penetration in the ACT/NSW grid.

Considering carbon on 24-hour cycles, rather than on an annual basis, showcases the variance of buildings' carbon footprints.

Because a building's carbon footprint is dependent on both how much energy is used – and when it is being used – it matters that the carbon content of that energy varies not only every day, but every 15 minutes.

See below the constant daily variance of the carbon in the energy our NSW buildings use.

CARBON EMISSIONS INTENSITY OF THE NSW GRID



Crucially, it also creates new opportunities to reduce carbon that occurs within those 24-hour cycles. The approach is more accurate than waiting to aggregate data at an annual level and take retrospective action, such as sourcing offsets to net off total emissions at zero.

EG will begin to report the carbon footprints of the assets, in our EG Delta and EG ACE Funds, with this level of granularity in 2023.

EG will also continue to report carbon in line with the Government Factors (after all, it is as easy as making one calculation) to ensure consistency with peers. This will have the added benefit of showcasing the differences between the two approaches.

Measure carbon using 2022 technology

Demand management and load shifting

So, what if we knew how much carbon our buildings are using every 15 minutes, instead of depending on one annual calculation?

Tracking the real time carbon of the energy used creates new opportunities for emissions reduction. These opportunities would be otherwise ignored if we assumed that every kWh of electricity consumed on site has the same carbon intensity.

Take this example from October 2022 in Queensland.

TIME	CARBON INTENSITY	
10.45AM	0.841kg.CO_2/kWh	↓ 25.7%
3.30PM	0.625kg.CO_2/kWh	

The carbon intenisty of the energy reduced by 25.7% over this five hour period.

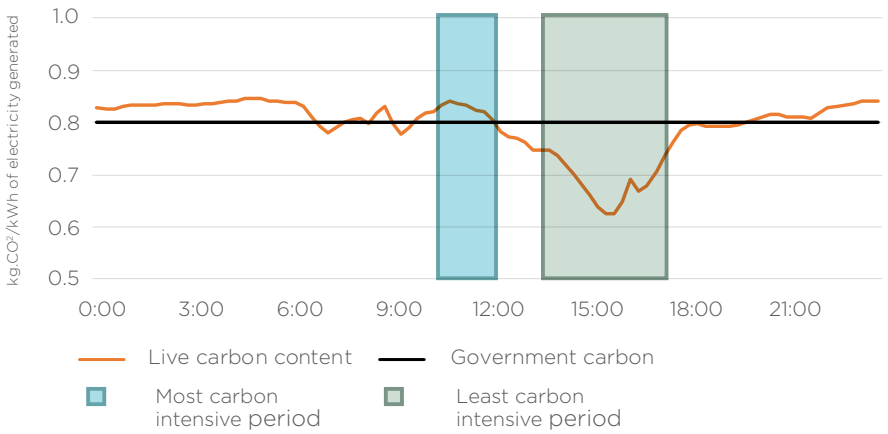
Training our asset managers to shift load from morning to afternoon on days like this can realise a significant decrease in carbon footprint.

Opportunities include small changes to HVAC set points (allowing you to use more energy when it's less carbon intensive, and less energy when it's highly carbon intensive), charging/discharging thermal load in chillers (or batteries) and integrating with on-site EV charging and amending start/stop times.

These periods of reduced carbon intensity tend to occur when solar is abundant in the grid, during daylight hours.

Conveniently, that's when buildings tend to be operational, when people are at work.

02-OCT-2022 QLD GRID CARBON INTENSITY



EXAMPLES OF DEMAND RESPONSE MECHANISMS

- **Optimum start and stop time**
- **Global VAV zone temperature SP offsets**
- **AHU supply fan speed limiting**
- **Outside air ventilation optimisation**
- **Chilled water temperature set point**

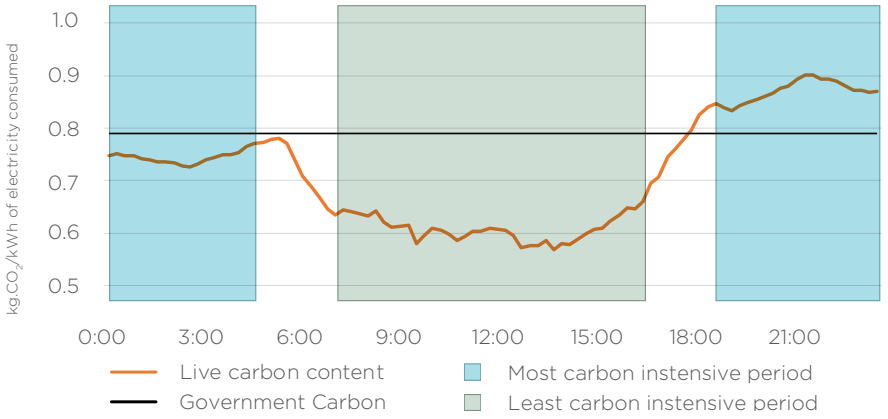
Take this example from November 2022 in NSW; on average, the electricity used between 7am-5pm was 27% less carbon intensive than the electricity used before 7am and after 5pm.

During these 10 hours of peak operation (42% of total time of operation), 32 Walker St, Sydney, NSW and 60 Carrington St, Sydney, NSW, consumed 76% and 69% of their daily electricity needs respectively.

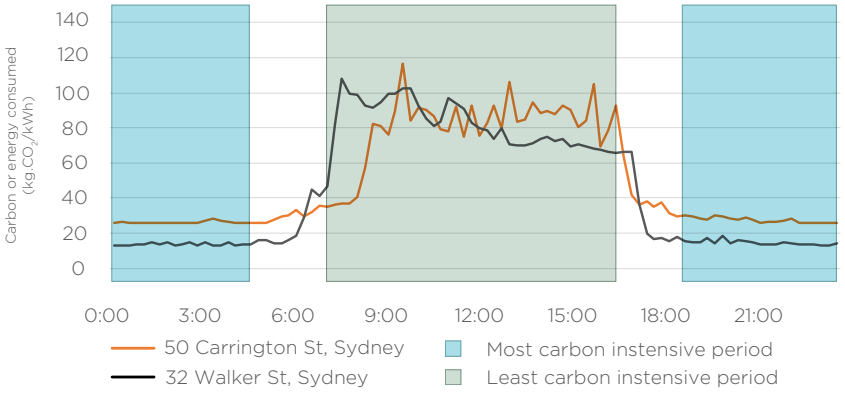
The key is retaining this fit, and ensuring our buildings are using the most energy when that energy is the least carbon intensive.

For example, turning buildings off earlier in the day (at 5pm instead of 6pm) – and even running them harder, using more energy during the day before an early stopping time – can limit high energy use during these shoulder periods of high carbon intensity, thereby reducing total emissions footprint.

15-NOV-2022 NSW GRID CARBON INTENSITY



15-NOV-2022 ENERGY CONSUMPTION OF OUR BUILDINGS



Case study

So, what does demand management and load shifting look like in practice?

EG is beginning to alter start and stop times to reduce buildings' energy use during these shoulder periods.

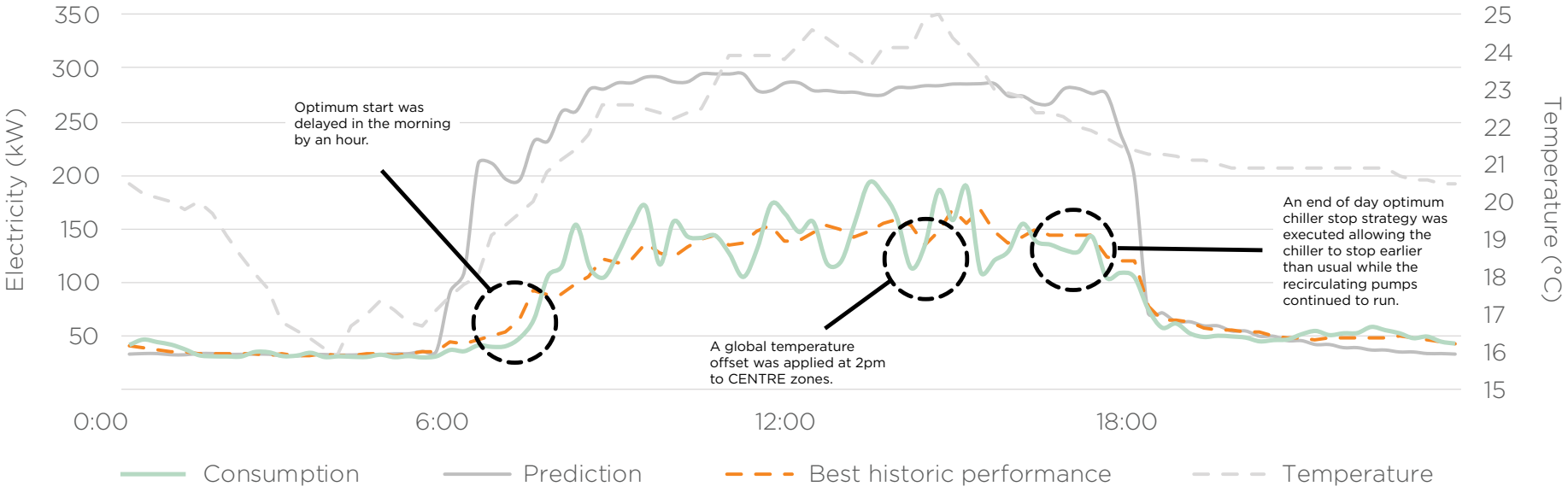
Initial attempts are reaping rewards, with 95 North Quay, Brisbane saving 70kg of CO_2. 4.6% of the building's average daily carbon footprint, on the day illustrated in the graph below.

These savings are achieved in part by delaying the start time by an hour and reducing energy use before 7am, when there is little solar in the grid.

Tenant comfort is maintained by ramping up energy use once carbon intensity has dropped. Even in increasing energy use above the best historic performance (the dotted orange line) results in a carbon reduction.

Similarly, shutting down the water chiller earlier (before sunset at 6pm) but recirculating pumps filled with previously cooled water further reduces carbon.

Saving 70kg of CO_2 daily amounts to 25 tons of CO_2 each year. This would cost ~$1,250 to offset – and this is all from an initial trial.



24/7 renewable energy

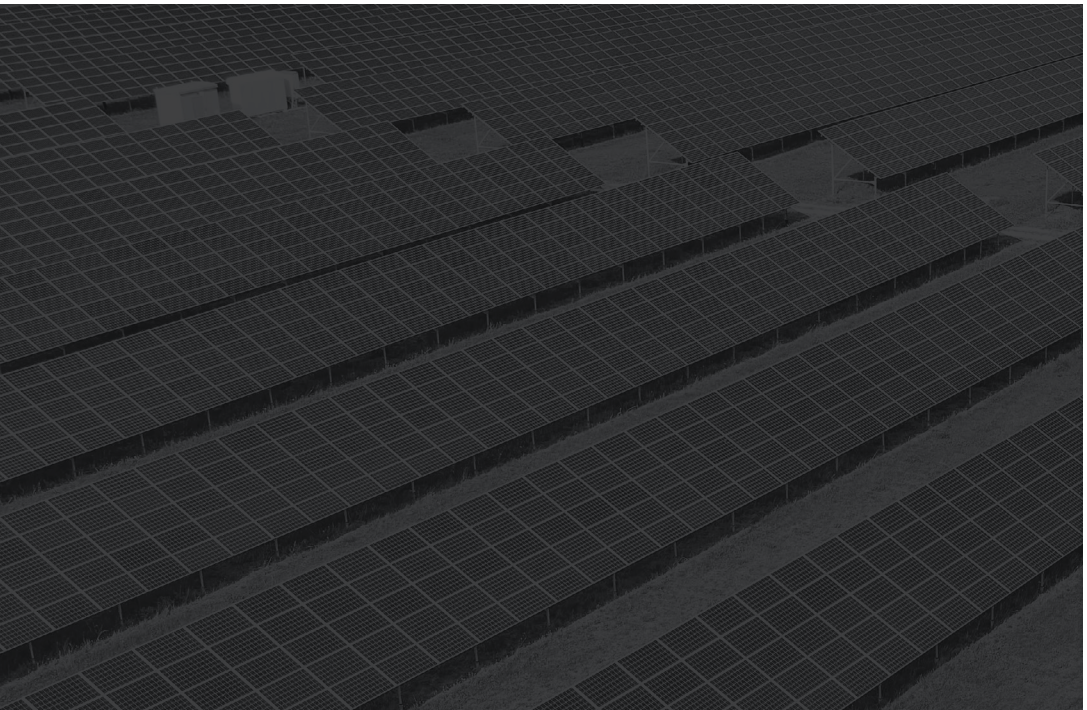
In addition to demand management and load shifting, a dynamic approach to carbon accounting creates more sophisticated renewable energy procurement opportunities.

Commonplace methods of procuring '100% renewable energy' are often retrospective in nature.

Businesses can claim 100% renewable energy by buying a certain amount of Renewable Energy Certificates (RECs) or offsets equal to the amount of energy consumed. "Oh, we used 150MWh of electricity, let's write a cheque for 150 RECs and call it a day."

The problem is that the servicing of these RECs or offsets can have nothing to do with the business' energy use.

They may be created at a different time, in a different jurisdiction or by an unknown generator.



This approach doesn't encourage users to align demand with supply of renewable energy; it doesn't stop the use of fossil fuels, and it doesn't accelerate the deployment of advanced technologies for a transitioned grid in a zero-carbon economy.

24/7 renewable energy does.

Using smart, live technology creates opportunities to track the source of energy in real time.

Renewable electricity is tagged with the time and source of production, enabling us to match our consumption with clean energy in 15-minute intervals, rather than on a retrospective annual basis.

"

24/7 Renewable Energy Compacts are designed to be ambitious, action-oriented and measurable commitments to the 7th Sustainable Development Goal: "affordable, reliable, sustainable and modern energy for all" and the Paris Agreement.

ENERGY COMPACTS
SUPPORTED BY: UN ENERGY

The UN Energy Compact

Matching renewable energy purchases to market via ‘smart tagging’ platforms also creates new methods of procurement, which includes opportunities to purchase from the wholesale energy market.

Following supply/demand market logic, wholesale prices are most depressed when supply is greatest and solar is abundant.

The Australian grid is increasingly priced negatively, particularly during daylight hours, as solar energy becomes more present.

When enough energy generators are pricing their energy as negative (to guarantee discharge into the grid) so that supply out-strips demand, prices are negative for these trading intervals.

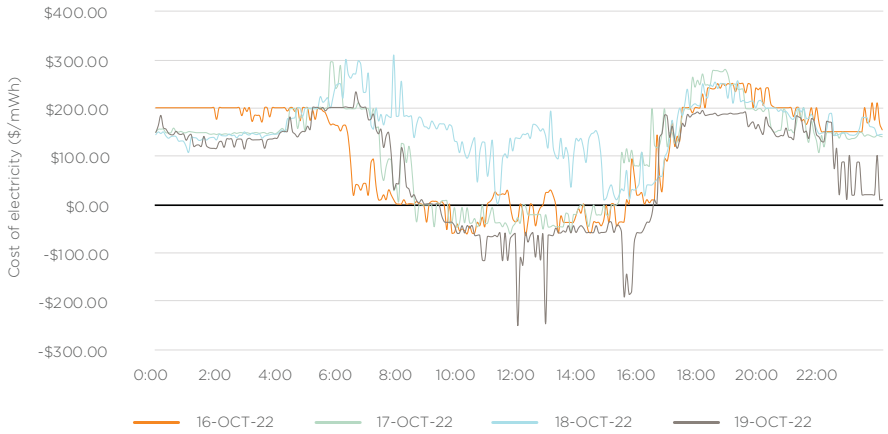
This creates an opportunity to be paid to purchase renewable energy from the wholesale market.

It also busts the myth that ‘it costs to go green’, a negative consequence of the practice of buying RECs or carbon offsets as an additional cost when claiming 100% renewable energy status.

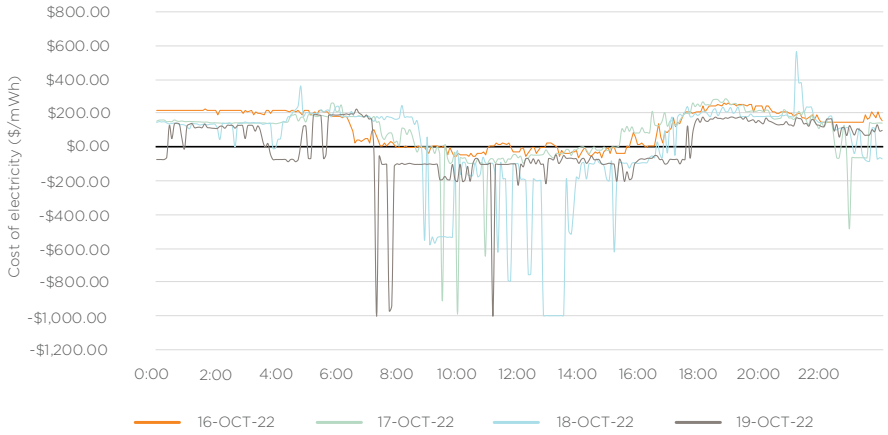
It is a tangible, achievable way to align economic and environmental outcomes.

The trend of negative pricing isn’t just happening in South Australia (the country’s greenest grid) but also in Victoria, the dirtiest. Check out that y-axis.

VICTORIAN WHOLESALE MARKET



SOUTH AUSTRALIAN WHOLESALE MARKET



This approach also addresses the supply/demand issues in the National Energy Market (NEM).

Whenever we talk about the NEM transitioning, the conversation always focuses on the supply side of this market equation.

"How fast are renewables entering the grid?"

"When is coal being withdrawn?"

Beyond noting that industries are electrifying – and so demand will increase – the conversation always focuses on how much energy we use.

Never *when* we use it.

The built environment accounts for ~40% of total energy usage. If this carbon accounting approach were to achieve widespread adoption and successfully shift demand to times when renewable energy was being generated, it would make a notable difference assisting the NEM's transition to renewables.

Research conducted by the UN Energy Compact shows that 24/7 Carbon Free Energy strategies "increase electricity buyers' impact on the decarbonisation of broader electricity systems, helping electricity systems shift away from fossil fuels".

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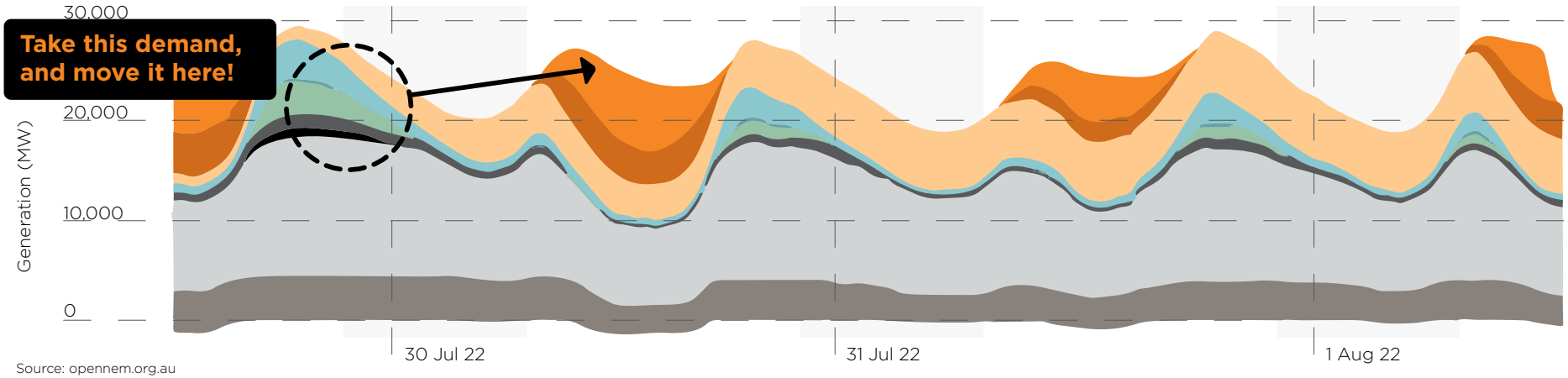

Source: opennem.org.au

SOURCES

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Planning for the future

Real Assets. Real Zero.

For EG, this means we are targeting **Real Zero** for real assets by 2030.

We are tracking carbon in real time, buying renewable energy in real time, and not buying RECs or offsets to reach carbon zero.

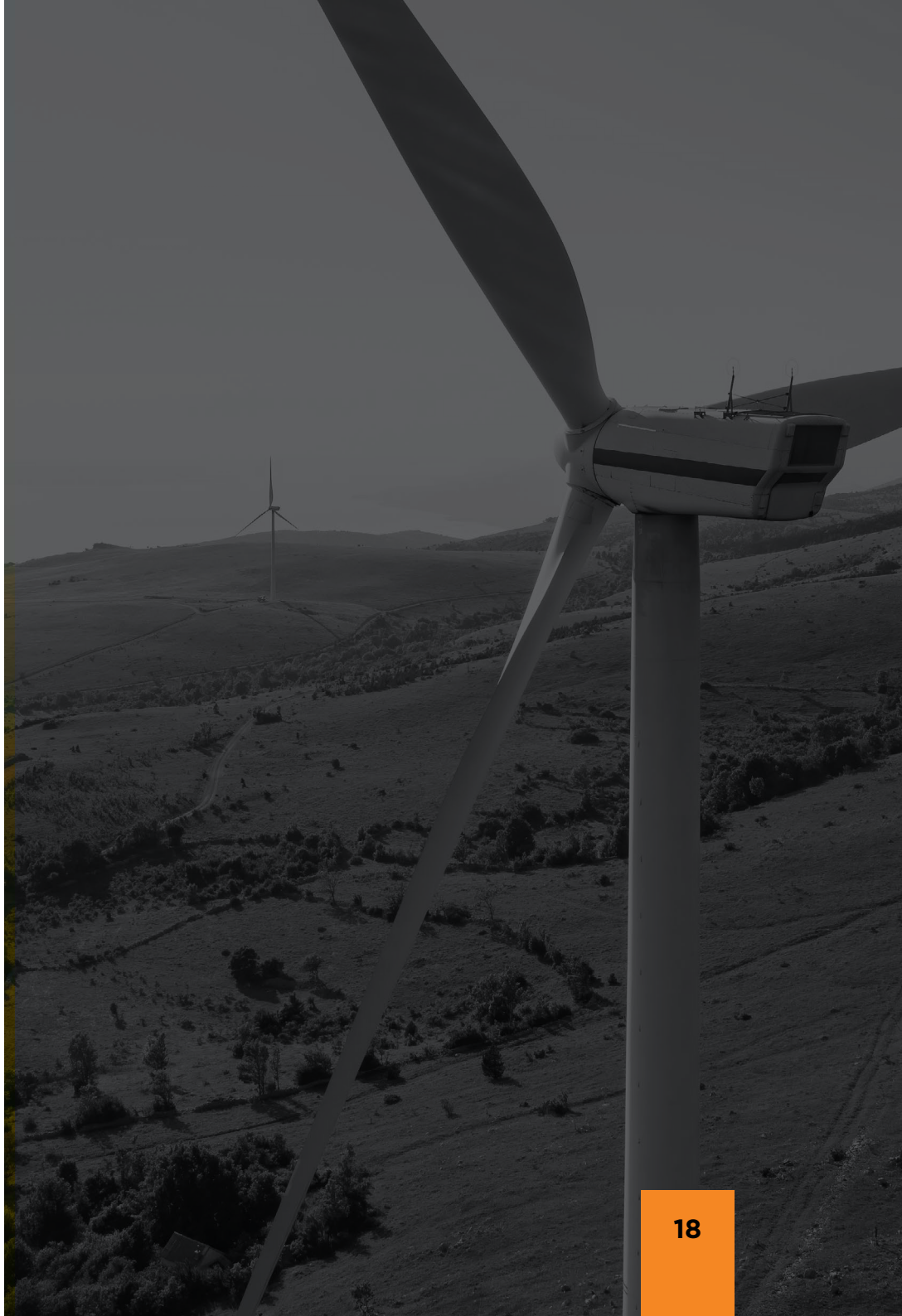
Our Real Zero target will apply to our EG Delta and ACE Funds, and we'll explore expanding it to other mandates as we develop and execute the strategy.

Each asset will have a bespoke decarbonisation pathway, focused on;

- Energy efficiency
- Electrification
- Demand management and load shifting
- On-site renewable energy and storage
- Off-site renewable energy procurement

> This sophisticated approach to tracking carbon in buildings unlocks new emissions reduction opportunities at the intersection of property, data and carbon. This is a crucial step along the road to zero carbon cities, and we hope to see wider take up of this approach in the future.

JORGE CHAPA
Head of Market Transformation, Green Buildings Council of Australia



Over time, each asset will reduce energy use, eliminating shoulder periods (where carbon is highest) and reducing emissions to Real Zero, every day.

This will look different on summer days and winter days, as buildings' energy demands change (from cooling to heating) and the timing and amount of solar in the grid varies.

But condsidering carbon on a 24-hour period, rather than monthly or annually, enables us to better understand how our buildings consume it, and reduce carbon accordingly.

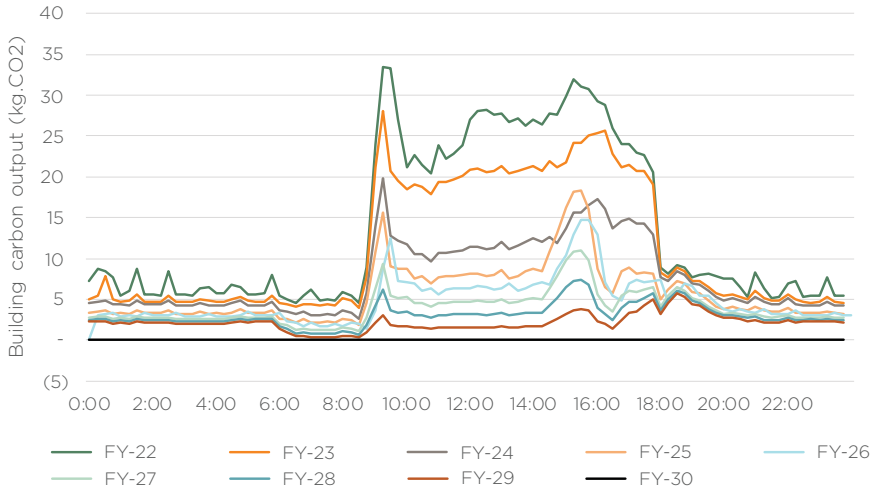
It's not an easy path, and given the challenges posed by electrification and 24/7 renewable energy use, there's every chance we might not get there.

But at EG we would rather be ambitious and aim for Real Zero carbon by 2030 than write a cheque for offsets and be 'net zero' today.

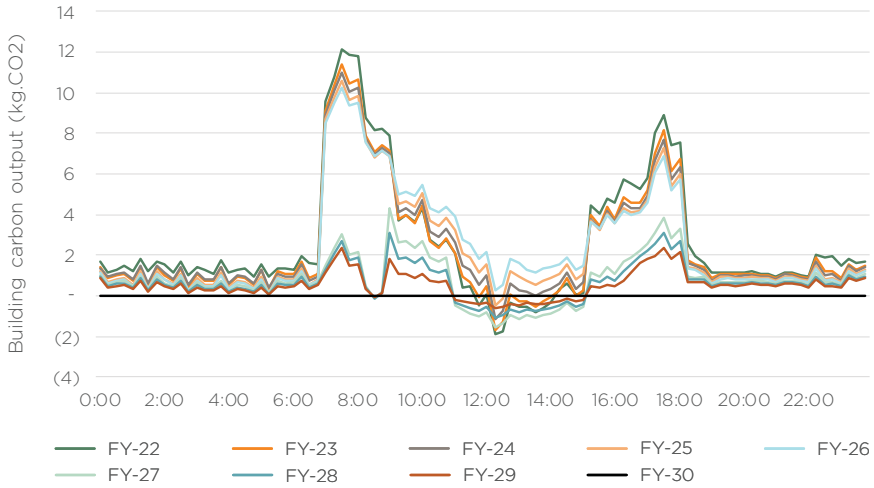
> A data-driven approach can lead to real life, practical improvements that lower emissions and reach zero carbon. This is important to us and our members and is a key criteria for us when selecting an investment manager.

RONALD BAUSCH
Senior Director, PGGM
Investors in EG's ACE Fund

24-HOUR CARBON PROFILE - SUMMER DAY



24-HOUR CARBON PROFILE - WINTER DAY



Conclusion

EG is proud to be targeting Real Zero carbon.

We are excited about this sophisticated approach that reflects present day technological advancements.

Real Zero carbon uses live carbon tracking to enable demand management, load shifting and 24/7 renewable energy procurement opportunities.

These carbon emission mitigation pathways are otherwise ignored within the build environment.

No bulk Renewable Energy Certificate purchases. No offsets.

Only Real Zero, for real assets.

About EG

EG is a leading Australian commercial real estate fund manager and developer with bold ambitions for a more equitable future, seeking a better path to better returns. We are proud to be tackling Real Zero carbon as one of our key business endeavors.

Real Zero is a sophisticated approach for a sophisticated company with a 20-year track record, operating at the intersection of property and technology.

EG is proud to be partnering with Buildings Alive and CBRE on the pathway to Real Zero Carbon.

Our success is underpinned by B.I.G. Thinking®. We uncover what's truly best for both communities and investors.

We build in good, so you can build in growth.

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