

CARBON FOOTPRINT MEASUREMENT AND MANAGEMENT.

CASE STUDY – TE AO RANGAHAU

In 2021, Te Ao Rangahau Engineering New Zealand measured our carbon footprint for the first time since 2012.

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engineering
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te ao rangahau

ENGINEERING
CLIMATE ACTION

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Introduction.

In early 2021 the Engineering New Zealand Governing Board agreed that a programme of work should be scoped to support the profession's response to climate change (mitigation, transition, and adaptation). Within the programme are four workstreams including the Internal Response workstream.

The Internal Response workstream is intended to enable us to 'lead the way' for members and reinforce our words with actions, ensuring that we strengthen our advocacy and support of the profession by undertaking activities ourselves to mitigate and adapt to climate change. This means we needed the process to be transparent and shareable with members, and for the measurement of our footprint to result in reduction measures, as a minimum.

We had previously estimated our footprint using the Ministry for the Environment (Mfe) guidance, with the last estimate in 2013. The organisation has changed since then, including moving to a new office. Prior to undertaking this work, we did not know the size of our footprint, nor where we could best focus our efforts towards reducing it (other than anecdotally).

We identified 4 key stages in this process:

- Getting the 'green light'
- Finding a provider
- Measurement
- Management

This case study will take you through each stage, explaining the process we took and the lessons we learnt along the way.

We intend for this resource to provide organisations and members who haven't participated in this process before with guidance on where to begin and what to expect.

Getting the 'green light'.

DECIDING TO START YOUR CARBON JOURNEY

The catalyst or inspiration to start your carbon journey could come from several places, including:

1. Government or industry regulations or norms
2. Customer, member, or shareholder expectations
3. Internal values and aspirations

Process

Our process began following a mixture of all the above. Members had been asking about climate change, in part because of the increasing government and industry regulations and in part due to the clear scientific evidence and the need for change. A paper was put to the Governing Board to get permission to develop a climate change programme, to which the Board agreed. As part of this, it was recognized internally that we would need to 'walk the talk' for our programme to be credible. Many staff were also increasingly aware of the urgency and severity of climate change and wanted the organisation to be doing something about it.

Lessons learned

Genuine interest is important. Having people around that are knowledgeable about climate change and are interested in addressing the problem is critical, as it builds rapport and creates a greater sense of responsibility within the organisation.

LEADERSHIP / BOARD APPROVAL

Once it was confirmed that Engineering New Zealand would develop a climate change programme, the programme outline and key outputs needed to be developed. This is where we explicitly included the need for the carbon footprint project and began scoping out the options and costs involved.

Process

While undertaking the work mentioned below, we conducted initial information gathering and scoping to inform what approach we might want to take and how much budget we needed as the process for requesting and securing a budget was fast approaching.

The budget was subsequently approved and allocated.

We developed a programme management plan that included the case for change and outlined the approach we would take:

- The approach was developed after internal workshops with staff from across the organisation (who formed the working group), to pool knowledge on the functions of the organisation and where climate action could fit in.
- It largely mirrored existing functions as the intention is that this programme will be embedded in the organisation. It also makes use of existing structures.

Requested and collated further information from 8 service providers into an options paper (process outlined in further detail in 'finding a provider' section).

At the same meeting where the Leadership team reviewed and approved the programme management plan, they also reviewed the carbon footprint provider options paper and approved the preferred provider.

Lessons learned

Proper planning and scoping are essential when undertaking a carbon footprint project. It's important to gather relevant information and involve key stakeholders to ensure that the project aligns with the organisation's goals and can be integrated into existing structures. Additionally, it's critical to secure adequate budget and select a reputable service provider. By having a well-defined approach and involving stakeholders, the project can be effectively managed, and progress can be tracked towards achieving the organisation's climate action goals.

Finding a provider.

UNDERSTANDING WHAT YOU WANT

Before and during your search for a service provider to assist your organisation in carrying out a carbon footprint measurement, reduction, and offsetting – you will need to understand and be clear about what it is that you want.

What approach to carbon management and level of assistance do you want or require?

Some service providers take a carbon accounting approach where they review and verify your measurement – in this scenario, you would define the organisational boundaries, collect data and convert using emissions factors. This is essentially the process you may already undertake with your finances and your accounting agency may have carbon accounting expertise that you could utilise.

On the opposite end of the spectrum would be contracting someone or an organisation to undertake the entire process on your behalf, using their software and process. They will need your data, they may request you send it to them or they work from your office for a week to gather data and undertake the measurement.

And of course, there are various options in the middle. To help you figure out what approach would suit your organisation think about how much internal resources you could allocate to this work, do you want to have this knowledge in-house, and what are your priorities when undertaking this work? Is it to just tick a box and declare your footprint, or do you want to access and apply opportunities for sustainability and mitigating climate risk across your organisation?

What do you want or need to prioritise in the procurement criteria?

Factors you might want to consider during procurement:

Cost (first year and ongoing – do you want the flexibility to adjust the services provided and cost incurred year to year?)

Preferences in the level of assistance and approach to carbon management

Credibility, brand recognition and experience of the provider

Certifications and Standards

How much internal resource will be required (first year and ongoing) – the balance between external support and building internal capacity

FINDING THE RIGHT PROVIDER

To find the right provider (for us) we undertook a broad scan online to find as many organisations as we could that are involved in carbon management or auditing. Using the information found online, through email enquires and in calls with providers we compiled an options paper that outlined the approach (service as well as estimated timeframes, internal resourcing required etc.) and cost of each provider. In a meeting with the leadership team, the paper and preferred provider were presented, providing opportunities for discussion and Q&A, at which they approved moving forward with confirming the preferred provider.

Process

1. Internet scan – various keyword searches were used, a list compiled on Sustainable Business Network's website.
2. Compile information on service and pricing from company websites.
3. Contact all providers for more information, and confirmation on pricing:
 - Explain who and what your organisation is: size, composition, functions, assets and activities.
 - Some may ask for information on your expenses and revenue if their pricing model is based on this.
 - Explain what you expect, want and/or need from a service provider – does this match what they can provide? Don't be afraid to ask questions more than once or restate your intentions, you want to make sure everyone is on the same page.
4. Develop an options paper: This document outlined our options for the carbon footprint project, the services each company offers and the estimated costs. It also indicated potential resourcing requirements and timeframes for the

first audit. From this paper, the Leadership Team agreed on a service provider and whether we will offset our emissions.

- Included a decision matrix with our key factors for procurement – service/s offered, internal resource required, timing (availability and expect timeframe), transparency, verification and certifications, and estimated costs.
- We also noted and considered our experience of communicating with key contacts from the service provider during the information-gathering stage. These people are often those who you will work with throughout the project, are they responsive and pleasant to work with?

5. There are also several other decisions that needed to be made, including selecting a baseline year, the scope of measurement and management, and internal resourcing. It was decided that this will be discussed with and agreed to by the programme sponsor on behalf of the Leadership Team.

6. The Leadership Team agreed to the preferred service provider.

7. The preferred service provider was contacted and asked for a formal quote. This was significantly higher than their initial quote. We queried this change, and while we disagreed with their assumptions of how large our footprint was likely to be which is part of how they price their services (another key factor was organisation size, which hadn't changed since the information we gave them during the initial quotes, and organisational complexity), we did not think it was worthwhile pushing back on this and decided to select a new provider.

8. When selecting the preferred provider the second time, we looked at the short-term (first year) and long-term (ongoing) costs in terms of the service price and internal resources, experience and credibility, and our experience of communicating with their key contact to date.

9. Our selected provider was:

- affordable, with the flexibility to reduce expenses and undertake more work internally in future years as our processes improved.
- is well-known and one of the longest organisations operating in this space.
- has offsetting options in-house – their services met the range of what we were looking for.
- was the first provider to respond to our calls for information.

- Additionally, the key contact had several calls with us to explain the process and re-confirmed their estimated costs. They were easy and pleasant to deal with and responded in reasonable time frames.

Additionally, we considered offsetting our emissions. It was our view that it is not sufficient for us to know what our footprint is, we also need to account for the impact it has on the climate. Offsetting is a way to do this whilst providing other social, cultural, economic, and environmental co-benefits, including biodiversity and local employment. Furthermore, research shows that offsetting organisational footprints can have a positive influence on reducing organisational footprints. It was decided that in the short-term, reducing our footprint would be the focus but offsetting will become part of the management of our carbon footprint in the future.

Lessons learned

Give as much information as you can to potential service providers upfront. This will impact the quotes they provide and could result in a significant difference in their initial quote to the one that they provide when you are ready to sign a contract. We experienced this firsthand, and it resulted in us returning to the drawing board and selecting a new preferred provider who we then contracted for the work, this delayed the project but not significantly.

Think long-term. While you may be eager to start your carbon journey as soon as possible you also need it to become a sustainable part of our business as usual.

Measurement.

PROCESS

The exact process will vary based on your service provider and your internal processes and data management. Our experience of undertaking the measurement went as follows:

1. Set the organisational boundary and scope for measurement including selecting the base year for measuring; Identify emissions sources for data collection with the service provider.

1.1 The provider sent us a form which we filled out – this included describing our activities and expenses, as well as what sustainability initiatives we already have in place.

2. Gather data:

2.1 The provider sent us an excel based tool to input our data into. In a meeting with them they explained what would need to be included and in what units. They were available throughout the process to respond to queries (of which we had many) and provide advice on how to get the data.

2.2 Send supplier information requests (excel provided by the provider).

2.3 Gather, sort and convert (where needed) financial data so that it meets the required units.

2.4 Keep track of source and quality of data, assumptions behind estimates, and if excluding data the rationale behind this.

2.5 Input data into the excel tool.

2.6 Review – check internally.

2.7 Send to the provider. We sent them several items:

2.7.1 Completed excel tool/workbook

2.7.2 Word document: summary of what is in and out of scope, assumptions etc

2.7.3 Excel workbook summary results from our commuting survey

2.7.4 Contractor sheet – Bluestar (EG Magazine)

2.7.5 Contractor sheet – Finely Finished (Wonder Project – Rocket kit compilation)

2.8 The provider calculates the footprint using the data provided and emissions factors (mostly from MfE guidance, except where not provided).

2.9 The provider reviews the footprint internally (standard for all footprints) and then gets the footprint externally reviewed (for footprints over 100 tonnes) – we provided more information when/where requested.

2.10 Footprint confirmed, footprint report prepared by the provider and provided to us

2.10.1 Report reviewed by us

2.10.2 Report amended and finalized by the provider

TIMEFRAMES

Estimated timeframe are as follows:

1. Data collection – varies
2. Handover data – via email, less than a day
3. The provider's calculation and footprint report generation – 1-3 weeks depending on complexity and workload
4. External Review – 2-5 days
5. The provider revise calculation and report based on review – 1 day
6. The provider send Engineering New Zealand finalised Engineering New Zealand sign off calculation inventory – 1 day
7. Reduction workshop – ½ day
8. Target and reduction plan generation – 2 weeks depending on workload
9. Publish measurement results and targets/reduction plan – depends on your organisational process of signing out and publishing documents

WHO – INTERNAL RESOURCING

It is feasible for one individual to gather the data, however, you may want to involve other members of your organisation to share the workload and increase their understanding of the process at the same time – this helps for getting buy in on reduction activities. Key people to have involved:

Finance – a lot of data comes from their records, cost is also one of the key competitors of sustainability when it comes to decision making, so getting finance included and helping them understand the footprint process and importance, while also making use of their broad understanding of the activities of the organisation is key to long-term success.

Facilities – likewise, a lot of the data and knowledge of organisational activities will be housed in your key facilities staff such as your receptionist or office managers.

Anyone who manages key contracts for service/goods/products – they'll have a better understanding of the goods than you and will be able to get the information you need for the suppliers (e.g. for us this was Wonder Project and EG teams).

Someone who loves excel – they'll be able to make quick work of pulling the data you need from the existing finance files which are designed for a different purpose.

Those who have capacity – if you rely on those who do not have the capacity to help it will slow down the process.

SCOPE

The scope of the measurement is guided by the ISO Standard categories and the GHG protocol subcategories. Not all categories are mandatory:

Scope 1: Direct GHG emissions

- Stationary combustion
- Mobile combustion
- Chemical and industrial processes
- Fugitive emissions
- Land use and Land Use changes

Scope 2: Indirect GHG emissions from imported energy

- Purchased electricity

Scope 3: Indirect GHG emissions

- Transport
 - Freight: Upstream transport and distribution of goods
 - Freight: Downstream transport and distribution of goods
 - Business travel (flights, accommodation, etc.)
 - Employee Commuting (can include working from home)
- Products used by the organisation
 - Waste (solid and wastewater)
 - Fuel and energy-related activities (T&D losses for electricity and natural gas, WTT emission for fuel)
 - Scope 1 and 2 emissions proportional to purchased goods and services
 - Use of services (IT servers, consulting, cleaning, maintenance...)
 - Leased assets
 - Capital goods
- Products from the organisation that are used
 - Downstream leased assets
 - Processing of sold products
 - Use of sold products
 - End of life of products
 - Franchises
 - Investments

Relevant scope and categories depend on your organisational composition and activities, your service provider should be able to help explain each category and help you identify whether this is an activity that is relevant to your organisation. For example, the only source of scope 1 emissions that Engineering New Zealand has is mobile combustion from rental cars as we have no fleet and are not an industrial organisation.

Table 1: In scope for our baseline measurement:

In Scope		Data source
Electricity	KWH annual	Quarterly invoices contain data and in KWH. Fairly straightforward.
Freight and distribution	TKM (weight and distance) annual for road, sea, air, rail and couriers	<p>Courier is our main form of freight and distribution:</p> <ul style="list-style-type: none"> • Everyday and misc. – 2kg and above only – NZ Courier invoices. • Helps to use the same company for all.
Business travel	<ul style="list-style-type: none"> • Domestic air travel - PKM (people per km) • Rental car – KM • Accommodation – Person nights • Staff mileage – KM • Taxi/Uber – KM 	<ul style="list-style-type: none"> • Financial records and invoices • Make sure all invoices/records include the number of people, number of nights, and origins and destinations – clearly recorded.
Staff commute	KM	Survey – run your draft survey past your service provider to make sure it asks the right questions / gathers the right information.
Waste and wastewater	<ul style="list-style-type: none"> • Landfill • Composting • End-of-life disposal of products – see EG 	<ul style="list-style-type: none"> • Cleaners weighing for a week – long-term think about getting a week’s worth of data per quarter. • Depending on who you use they may already gather this data. • Kaicycle provided estimate
EG Magazine	<ul style="list-style-type: none"> • Electricity • End of life • Transport 	<ul style="list-style-type: none"> • Supplier information sheet (the provider template) – printers • We weighted the magazine (190-200gram approx.), we know the circulation and number of editions a year and used this to work out estimates with the provider • Bulk orders included in courier financial records – over 2kg • Individual orders: Estimated based on weight, circulation, and furthest distance (Invercargill).

Table 1: In scope for our baseline measurement (cont):

Wonder Project	<ul style="list-style-type: none"> • Transport • Electricity (for compiling kits) 	<ul style="list-style-type: none"> • NZ Courier used for kits, however, financial records did not contain enough information. Estimated based on the known weight of each kit (3 types), the number of kits and the distance it gets sent (using stakeholder information recorded by the Wonder Project team). • Supplier information sheet
Water Supply	M3	Can work out quantity based on invoice and the Council rate.

What is out of scope is guided by the ISO Standards, which recognize that sometimes activities are: too difficult/expensive to obtain data, where the organisation is limited in level of influence, or are insignificant.

Table 2: Out of scope for our baseline measurement:

In Scope	Rationale
Wonder Project – Electricity and fuels related to production	Each kit (of which there are 3 types) consists of many individual parts sourced from separate places, quantity, and size not high enough to be worthwhile or easy to get.
Wonder Project – End of life	Too difficult to break down into the different parts and weight/quantity because each kit is a mix of paper, plastic, and metal. Way too much estimation in the end of life already so easier to stick with simple items.
Wastewater	Building management does not collect this data, no way to determine a reasonable estimate, likely marginal.
Datacenters	The provider advised us to exclude it as marginal. No need to include it, the emissions tend to be so small it's not worth the effort to collect the data unless your business is only about data. The servers upstairs are included in our electricity.
Couriers Below 2kg	ISO Standard compliant. Effort v. impact. The provider rule is that any mail or letters less than 2 kgs just aren't worth our while including as the emissions are inaccurate and (as your financial friends say) de-minimis. The key things we need for freight are weight and distance, for items couriered that are too small courier companies can't provide reports for you on this as it's not worth their while recording either.

Lessons learned

Suppliers may not have ever filled out similar forms before and may need an explanation and/or run-through.	When estimating make conservative assumptions that err on the side of over-estimating your footprint. However, if the accuracy is too low – either put more effort into data collection or exclude it.
The first year is likely the most difficult, make note of where information is lacking or requires effort to collect.	
Update data management/coding systems to match the categories required (e.g., we added new codes into the finance system)	

Management.

TARGET SETTING AND REDUCTION PLANNING

Introduction

You know your footprint, great! Now, what are you going to do about it? Reducing your footprint is not just about mitigating climate change, it is also an opportunity to transition your organisation away from emissions-intensive assets, activities and practices that are becoming outdated. It can also reduce costs in the long term.

Your process for developing targets and reduction plans will depend on your provider's approach, as well as the appetite for change in your organisation.

Process

Review your footprint report

Pull together a team from across the organisation to undertake a workshop to discuss your footprint, highlight hotspots and brainstorm activities to reduce your emissions or change the way you do things

- We did this online, using Teams and Miro as a virtual whiteboard
- On Miro, we had pre-set working spaces that included
 - Agenda
 - Overview and stats on our footprint
 - Working spaces/blank sheets and post-its for each key emissions category: travel, electricity, commuting and misc (everything else)
 - A matrix to help you prioritise the ideas:
 - Quick Wins – high impact, low cost/effort
 - Major Projects – high impact, high cost/effort
 - Fill-ins – low impact, low cost/effort
 - Thankless Task – low impact, high cost/effort

Collate the ideas from the workshop and prioritise those that have a high impact and low cost/effort first, followed by high impact and high cost/effort. When thinking of impact,

consider both the % of your footprint that the activity relates to (e.g. Electricity is only 7% of our footprint) as well as the estimated impact the activity will have.

Discuss and set targets for the short, medium and long term. To do this a mini working group was formed that included a representative of the leadership team, finance manager and IT specialist.

Once targets are set, prioritise and map out your reduction activities for the short (that year) and medium term. Identify costs, resourcing and timeframes.

Compile information into a paper and get input and approval from the necessary people. For us, this was the LT Operations group who included key people managers from across the organisation whose teams would be involved in the reduction activities.

Lessons learned

Targets are a tricky one, you can set "soft" targets as part of the workshop, but setting hard targets can be difficult as you don't know what you can achieve until you've done more analysis of the actions you pick. A soft target along the lines of "we aim to reduce our emissions each year for the next 5 years after which we will set hard targets" or "we will reduce our emissions each year and will become carbon neutral by 2050". Then you aren't tying yourself down and can adjust them as you get more information.

Consider if you want targets based on absolute emissions or intensity (like per FTE) as this allows for growth.

PUTTING IT INTO ACTION

Get people from across the organisation involved in the brainstorming, development, and implementation of key reduction activities.

Engaging our social club in reduction activities to reduce staff commuting emissions

For example, we approached our social club to help us develop activities to encourage staff to shift transport modes during their commute to work, to more emissions-efficient modes. They have experience and creativity in developing and running fun events, and we wanted this to be fun and engaging. Building staff

engagement in the reduction of emissions is important for long-term success. During the meeting they identified a path forward:

1. Send an email to staff – educational, introduce concepts and footprint, why the commute matters, signal to activity coming up
2. Competition – run a competition that encourages positive actions but doesn't punish 'negative' actions
3. Event – announce results and celebrate change with food

Conclusion.

This case study aimed to help you understand the process involved with measuring your organisational carbon footprint and we hope this case study did just that. It's important to note that the process isn't simple or easy (especially in your first year), but with the right provider and people involved to support, it becomes a straightforward process.

It's important to remember that measuring your organisational carbon footprint is just the beginning of a broader carbon reduction strategy. Once you have an accurate understanding of your carbon footprint, you can begin identifying areas where you can reduce your emissions and implement strategies to achieve those reductions. This ongoing effort to reduce your carbon footprint requires ongoing commitment and dedication from everyone in the organisation. However, the benefits of reducing your carbon footprint go beyond environmental responsibility and can also lead to cost savings, improved reputation, and competitive advantage. So, it's essential to keep measuring your carbon footprint annually and continually look for ways to reduce it.

KEY TAKEAWAYS

Here are the key takeaways from our carbon measurement journey.

Proper planning, stakeholder involvement, securing adequate budget, and selecting a reputable service provider are essential for a successful carbon footprint project.

Genuine interest and knowledge of climate change are critical for building rapport and a sense of responsibility within the organisation.

Provide as much information upfront to service providers to impact their initial quote and avoid delays in selecting a provider.

Sustainability should be a long-term consideration in implementing carbon reduction initiatives.

Suppliers may need explanations or run-throughs for unfamiliar forms.

The first year is the most challenging and requires notetaking for data gaps.

Update data management/coding systems to match required categories.

Conservative assumptions should be made when estimating carbon footprints to err on the side of over-estimating.

Set soft targets initially and adjust them as more information becomes available.

Consider absolute emissions versus intensity-based targets for growth.

Useful Resources.

Links to useful resources to help you get started on your carbon measurement journey.

[Measure and manage your carbon footprint – support for businesses to lower their emissions](#)
(Engineering New Zealand)

[Measuring Emissions: A guide for Organisations](#)
(MfE)

[Sustainable Business Council](#)

[Sustainable Business Network](#)

[Climate Action Toolbox](#)