carbon

Looking forward Thinking ahead

deta

Sustainable
action for a better
tomorrow

Our Mission

Remove 2 million tCO$_2$ emissions EVERY YEAR BY 2030

Who is deta

Our team of engineers and project managers are experts in decarbonisation, water, process improvement and sustainability.

Working with clients across Australasia we have helped businesses develop strategies, business cases, and implement capital projects to reduce emissions and operational costs, across all sectors.

It's not just the technical expertise that makes DETA different, it's our collaborative approach to projects that makes our team so successful in delivering real outcomes.

Through our work across New Zealand, Australia and the Pacific Islands we have found many organisations wanting to make changes but struggling to get a foothold amongst competing interests both internally and externally. In the interests of a collectively better future we have put together our guide to understanding Carbon Roadmaps and starting your own journey.

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Why Develop a **Carbon Roadmap**?

Responding to the challenge of climate change is moving to the forefront of business strategy, with political and social pressure to shift to a low carbon sustainable economy rapidly building.

At DETA we view carbon reduction as more than just a concept restricted to the environment because at its core it is much deeper than that - it is the capacity to endure. Therefore, developing a Carbon Roadmap is more than reducing the disastrous impacts of rising sea levels and increasingly destructive weather patterns.

It is about:

1. **Building** business resilience
2. **Reducing** business costs
3. **Developing** reputation and reinforcing credibility
4. **Driving** innovation and increasing competitiveness
5. **Fiduciary** responsibility of the board
6. **Creating** jobs

Overall, it is about understanding what strategies we can put in place now to ensure our businesses are still providing value to stakeholders in the future.

The purpose of this guide

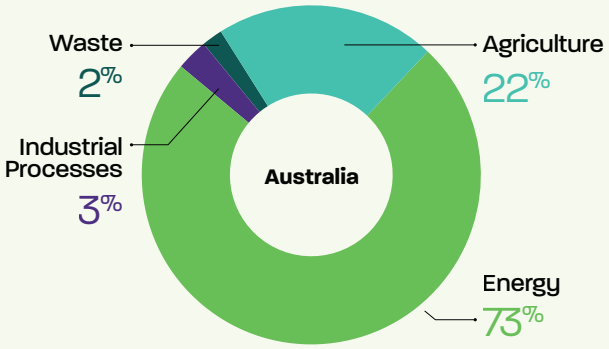
is to help organisations get momentum in this space with a clear methodology and strategy at its heart. We have broken down the key stages in developing a Carbon Roadmap, looking at:

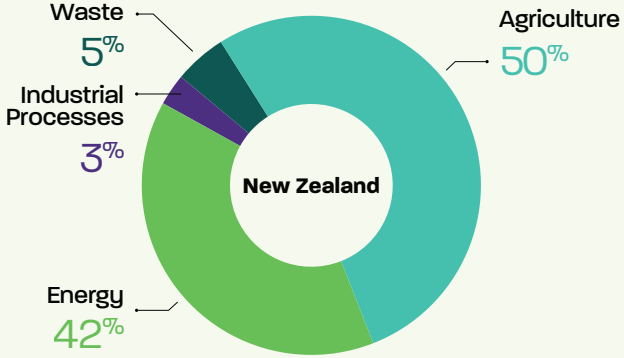
1. What is required for each step?
2. The potential roadblocks and some of the common questions that arise.
3. What support can DETA offer?

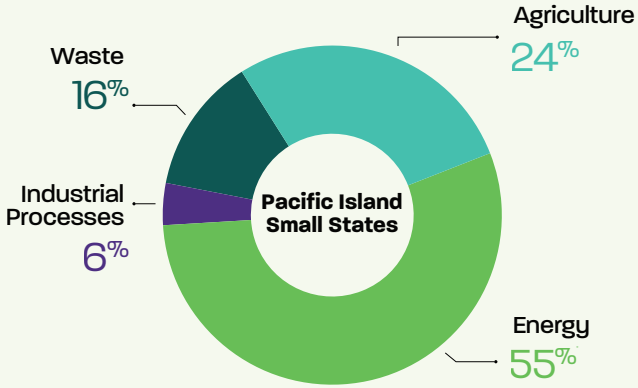
We want to share our DETA expertise & knowledge to help businesses navigate a starting point for their own carbon reduction journey.

GHG Emissions 2019 by Country/Region

(source: https://www.climatewatchdata.org/)







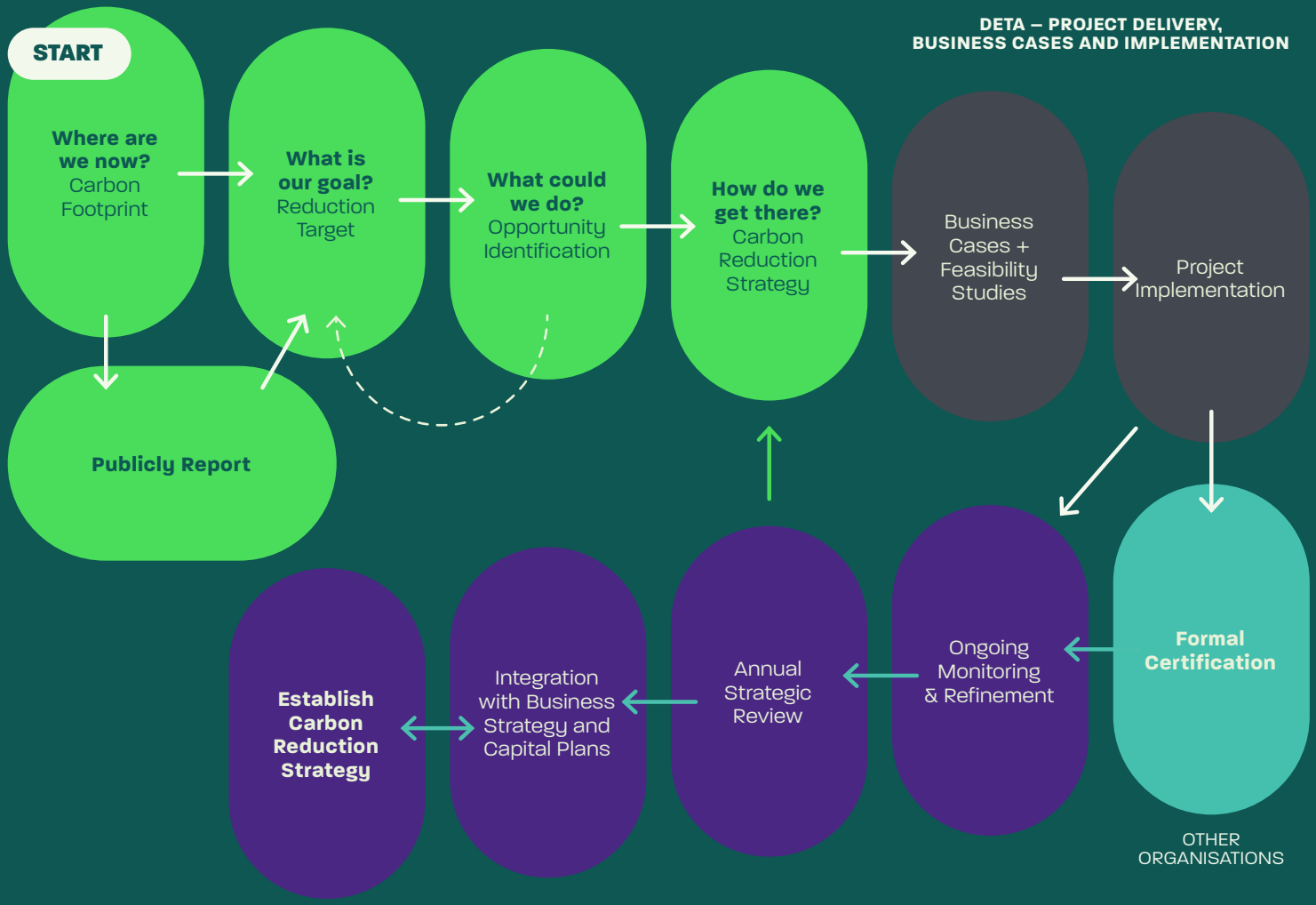
Overview

Carbon Roadmap

For the vast majority of companies the Carbon Roadmap will have very similar stages, each of which are examined in more detail in this document.

The two key things to note from this process are that it is **iterative** and **collaborative**. For the process to work it should be updated annually reflecting progress in carbon reduction, changes in the business, and developments in technology. There must also be full buy-in from all levels of the company. The strategy set by an organisation's leadership team has no traction without a strong implementation team, and a continuous improvement mindset from all members of the business. We recommend involving all key stakeholders, both internal and external, as early as possible in the process.

Our Roadmap to get you there



Developing a **Carbon Reduction** Strategy and Business Integration

The Carbon Roadmap starts at the governance and strategy level of the organisation.

In order for real change and progress to be made within your organisation there must be a clear mandate that sustainability and carbon reduction are prioritised and integrated within all business plans.

For a particular business this could mean a range of things, for example:

1. Establishing a carbon reduction policy
2. Adjusting the capital project criteria to account for carbon reduction benefits
3. Including carbon footprinting in Annual Reports

This aspect of the Carbon Roadmap continues throughout the entire process as the decisions made at this level significantly influence how each step is approached and the success of the entire process.

The consequences of climate change are one of the biggest long-term risks facing businesses and local bodies. Many organisations as well as state and regional governments are driving bold climate action by joining coalitions and networks and committing to set emissions reduction targets to keep global temperature rises to well below 2°C with efforts to reach 1.5°C.

Examples of these coalitions and networks are below.

How can DETA help?

For many organisations getting the ball rolling requires specialist knowledge. DETA offers **Governance Assistance and Strategic Planning** in a partnership model that will help you gain clarity and align the Carbon Roadmap with your organisation's mission and goals.

New Zealand

CLIMATE LEADERS COALITION
ON A MISSION TO REDUCE EMISSIONS IN NEW ZEALAND

Sustainable Business Council
wbcsd Global Network Partner

Sustainable Business Network

Australia

AUSTRALIAN ALLIANCE FOR ENERGY PRODUCTIVITY

CLIMATE ACTION NETWORK AUSTRALIA

Global - Local Bodies

UNDER 2°
SECRETARIAT THE CLIMATE GROUP

Establishing a Baseline – Development of a **Carbon Footprint**

As with all problems the first step in finding a solution is understanding and defining what exactly the problem is. What is the magnitude, where are our main concerns? Therefore, the first stage of the Carbon Roadmap is to compile a greenhouse gas inventory and develop a Carbon Footprint.

Carbon Emissions are broken down into three scopes:

Scope 1

- Direct GHG emissions from sources **owned or controlled by the company** (i.e. within the organisational boundary). For example, emissions from combustion of fuel in vehicles owned or controlled by the organisation.

Scope 2

- Indirect GHG emissions from the generation of **purchased energy** (in the form of electricity, heat or steam) that the organisation uses.

Scope 3

- Other indirect GHG emissions occurring because of **the activities of the organisation** but generated from sources that it does not own or control (e.g. air travel). This is broken down into four distinct categories.

Within these scopes are various sources and activities with each allocated an emission intensity. The exact process and boundaries are outlined in depth in various guides which also contain country specific factors (see adjacent box for details of guides for New Zealand and Australia).

By collating this data across the breadth of your company's business the largest sources of carbon emissions can be narrowed down. The purpose of this is to **align focus** for the next stages, prioritising time and energy to those emission sources which make up the majority of your footprint.

Country Specific Guides

New Zealand

Ministry for the Environments' **'Measuring Emissions: A Guide for Organisations'**

Australia

Department of the Environment and Energy's **'Technical Guidelines for the Estimation of Facilities in Australia'** which works in conjunction with an annual factors document.

How can we help?

The development of a Carbon Footprint can be undertaken by a company internally, but often expertise or resourcing is not available. In these cases, DETA can **Develop your Carbon Footprint**. An additional benefit of using DETA is the on-going access to our templates and calculation sheets which will allow you to update your footprint independently as your expertise increases. The development of a carbon footprint can be undertaken as a single piece of work or as part of the **DETA Carbon Kickstarter**.

see page 16 for more details

Carbon Footprint Reporting and Setting a Target

The reporting of your carbon footprint is an essential part of the Carbon Roadmap. Choosing the most appropriate reporting method helps with effective monitoring, informed decision-making, and an opportunity for organisations to leverage their environmental commitment and impact. Across Australasia there are several options for formally reporting your carbon emissions.

Greenhouse Gas Protocol (GHG)

A globally recognised framework by WRI and WBCSD, offering guidelines for measuring and categorising direct and indirect emissions, facilitating international benchmarking.

Science-Based Targets (SBTs)

Aligning emissions reduction goals with climate science, SBTs establish targets that contribute to limiting global warming, demonstrating a commitment to climate action.

Carbon Disclosure Project (CDP)

Enhancing transparency and reputation, CDP allows companies to publicly disclose emissions data through a standardised questionnaire, aiding stakeholders' access to environmental impact information.

ISO 14064

An international standard enabling accurate emission inventories, target setting, and project assessment, promoting effective greenhouse gas management.

National Greenhouse and Energy Reporting (NGER)

A regulatory framework for large corporations, ensuring standardised and transparent reporting of greenhouse gas emissions, energy production, and consumption. (AUS only)

New Zealand Emissions Trading Scheme (NZ ETS)

This regulatory framework requires participants to measure and report their greenhouse gas emissions, aligning with New Zealand's emission reduction goals. The NZ ETS facilitates trading of emission units, encouraging emission reduction and offsetting. (NZ only)

Often we recommend using science-based targets - see the Frequently Asked Questions section (Page 27-28) for more information. However, if this process isn't right or appropriate for your organisation we can work with you to establish a target and timeline that does work and will allow you to start moving forward.

What is the Paris Agreement?

Paris Agreement 2050 signatories set a public aim to keep temperature rise across the globe to well below 2°C in 2050. This translates to a checkpoint of more than 30% emission reduction on 2005 levels by 2030. Currently global emissions are tracking 90% higher than this target. Identifying your footprint and announcing a reduction target is an important first step in developing a Carbon Roadmap and the subsequent reporting of this makes it known where your organisation stands and confirms that you are doing your part.

30%

emission reduction by 2030 to achieve the Paris Agreement 2050 target

How can we help?

As with the development of a Carbon Footprint, establishing a target can be undertaken by a company internally but often the expertise is not available. In these cases, DETA can **Develop a Target**.

The main benefit of using DETA is our experience with a range of organisations across multiple sectors with different timelines and opportunities for reduction, and a track record of producing tough but achievable targets.

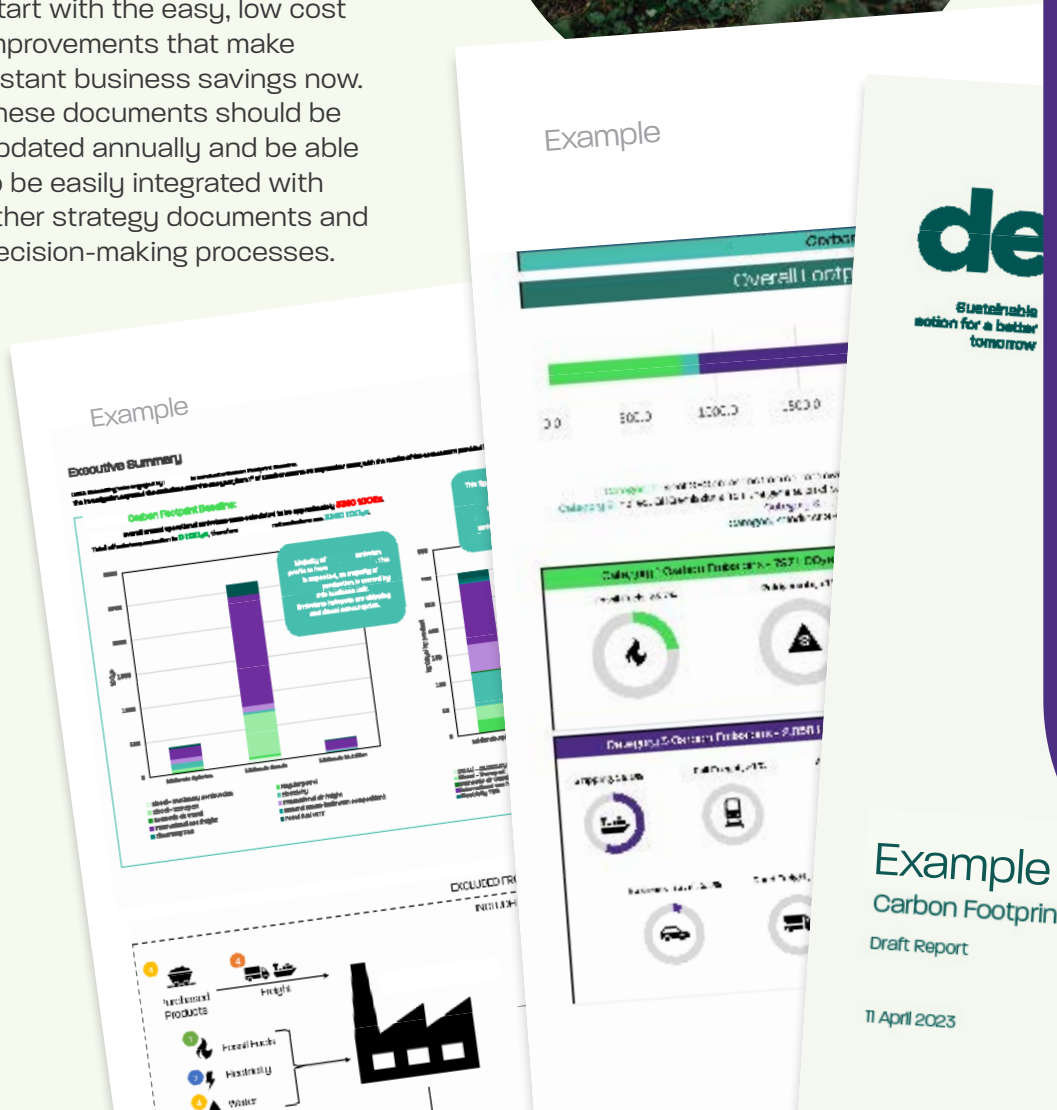
The development of a target can be undertaken as a single piece of work or as part of the **DETA Carbon Kickstarter.**

Developing a **Carbon Reduction** Plan

In the previous stages of the Carbon Roadmap your company has established a carbon reduction policy, started to understand the risks and opportunities of a low carbon economy, a carbon footprint has been developed and publicised, and a target has been decided upon. This next step is pulling this all together in a Carbon Reduction Plan.

The purpose of a Carbon Reduction Plan is to give a high-level overview of what the path may look like between your company's current position and the target established in the previous step. It involves using industry experience to look at a range of carbon reduction opportunities, providing a high-level indication of potential savings and costs while also considering previously planned expansions or strategy changes and accounting for changes in the market and technological improvements.

Generally, the result of this is a suite of documents that outline the steps in implementation. Start with the easy, low cost improvements that make instant business savings now. These documents should be updated annually and be able to be easily integrated with other strategy documents and decision-making processes.



How can we help?

Of all the stages previously examined this is perhaps the most important in which to engage DETA. Our expertise across a range of industries in developing these plans means we have the processes in place to easily identify potential opportunities for your company and have a solid understanding of the potential costs and benefits associated with these.

An additional benefit of using DETA for developing a **Carbon Reduction Plan** is you get access to our collection of templates and graphs that will allow the plan to be presented in a way that is understandable through all levels of the organisation and does not require technical knowledge to refer to and discuss.

Opportunity Refinement and Business Case Development

The Carbon Reduction Plan established in the previous step provides high level descriptions of opportunities and indicative savings and costs, but lacks the details required for the project to be immediately implemented.

In order to implement these opportunities, the projects need to be refined and for those opportunities where there are multiple options these need to be evaluated. This is often achieved through the development of feasibility studies and/or business cases. The evaluation of these is likely to follow your established business practices, but with carbon reduction projects, consideration should also be given to the project's sensitivity to the escalation of the carbon price as well as full life cycle costs and cost of abatement.

These aspects should have been integrated into your business processes in the first stage (Developing a Carbon Reduction Strategy and Business Integration) but when this has not occurred the criteria should be adjusted in this step to ensure that the best projects/options are progressed with.

How can we help?

For a single option feasibility study or multiple option comparison DETA can provide concise and accurate **Feasibility Studies/Business Cases** in either a company specific or in our standard format. These will outline the benefits of the project – looking at traditional economic metrics as well as Marginal Abatement Cost (MAC), full life cycle costs with carbon price inflation considered and Capital Costs specified to the Capital Cost Estimate accuracy required to meet your company Capex Stage Gate requirements.

For more information please refer to the Frequently Asked Questions in Part 2

An additional benefit of using DETA for **Opportunity Refinement** and **Business Case Development** is that our project delivery team works in very close collaboration with the carbon reduction side of our business. This allows for a continuation of the partnership previously established and we've found this has had great outcomes for our clients.

Implementation

Refining and evaluating the opportunities introduced in the Carbon Reduction Plan allows for the execution of these reduction projects with the full understanding of the benefits they will provide.

Companies have a range of internal strategies that dictate how to proceed with implementation. However, we often find a dedicated resource can be incredibly beneficial for carbon reduction work as it is often in addition to the business as usual work which consumes the vast majority of operations and project time.

How can we help?

If your organisation requires support to implement the reduction projects, DETA can continue to partner with you on the **Carbon Roadmap** with a range of contracting models tailored to best suit your organisation.

Working with DETA through **Project Implementation** also ensures the seamless continuation of strategy and refinement and maintains the connection between the project delivery and technical teams, strengthening our partnership.

"Having [DETA] on site is just excellent," says WML Head of Projects Dave Hodder. "[They have] the inclination, the time and the ability to go through all this stuff and unravel it. If you don't have that dedicated resource, it can just get lost in 'business as usual'."

link to article in NZ Herald

Continuous Improvement – Ongoing Monitoring of Your **Carbon Footprint** and Refinement of the Roadmap

A key trait of the Carbon Reduction Plan is iteration, creating continuous improvement. It is a living and breathing document that will need to be amended to reflect changes in your business, to technology, or to the operational environment.

Undertaking an annual strategic review may show that some opportunities produced more savings than expected and others less so, there may be a change in the way you decide to run your business or a change in your target markets. Additionally, with large investments in renewable technology across many industries, the expansion of available technology may change what best practice looks like on a rapidly changing basis. All these factors should be considered and accounted for in the Carbon Reduction Plan in order to produce the best results from a carbon perspective and just as importantly, economically.

It is also important to be updating your carbon footprint annually and reporting this - making the most of the improved data collection methods that have been put in place.

How can we help?

This aspect of the process integrates back to the first step of the **Carbon Roadmap - Governance Assistance and Strategic Planning.**

A long-term partnership with DETA will provide your organisation with our ongoing experience and support on how to adapt to the established strategy and plan for movements in the markets, both in terms of available technology as well as in governmental policy and previous project outcomes.

In addition, the Carbon Footprint established earlier in the **Carbon Roadmap** is designed to be owned long-term by your organisation and can therefore be regularly updated and reported upon in line with your sustainability policy.

Formal Recognition of **Carbon Reduction**

For some companies, the end goal of this process is obtaining formal certification.

For New Zealand there are two key programmes which are both run by Toitū Envirocare (previously known as Enviro-Mark Solutions):

- **carbonreduce (Previously CEMARS)** - Certification in accordance with ISO 14064-1 or PAS 2050 which is to allow the company to make carbon reduction claims with confidence in any market.
- **carbonzero** – As with **carbonreduce** but with the additional step of offsetting remaining emissions through verified carbon credits to achieve net zero balance.

In Australia similar programmes in the low carbon and zero carbon space are available from companies such as Carbon Neutral, Climate Friendly, Green Fleet and South Pole Group.

Most of these programmes are focused on formal measurement and verification, and the development of a framework. It is then up to you to internally identify and implement solutions. This can be challenging for companies who do not have dedicated resources with expertise in identification and implementation.

Pursuing a Carbon Roadmap and obtaining certification are entirely independent processes, and there is no reason why they cannot be run in parallel. Many businesses are now choosing to do both.

Why do we not recommend Carbon Credits?

In all likelihood Australia and New Zealand will still have emissions in 2050 associated with agriculture in the form of biogenic methane. We believe that this is the only emission type that should be offset. Instead of offsetting non-agricultural emissions the focus should be on technology and behavioural change. In our experience offsetting is a distraction to emissions reduction as it tends to redirect valuable resources away from reducing or removing the initial source of the emissions.

How can we help?

DETA does not provide formal certification. However, we have strong ties with a range of Australasian organisations who can provide both certification of your Carbon Footprint and verification of the footprint development.

If you choose to work with DETA to develop your footprint, as part of the **DETA Carbon Kickstarter** we guarantee that the resulting inventory and methodology will be suitable for certification.

Heavy Transport Fleet **Decarbonisation** for NZ Post

deta Identified

34,000

tCO_2e per year potential emission reduction

"It's a matter of urgency that we act now to reduce emissions. NZ Post understands the need to partner with organisations, such as DETA, who understand we're at a critical point in shifting to low carbon delivery. By sharing what we're learning as we adopt new, clean technologies and innovations in heavy transport - such as hydrogen and electric trucks - we hope to empower others in the sector.

Sustainability is embedded in our culture at NZ Post, and this is just another way we're showing we are committed to our people, our communities and delivering for our planet. Ultimately, we're all in this together."

Dawn Baggaley,
Group Sustainability Manager - NZ Post

NZPost

NZ Post contacted DETA as they were seeking to take ownership of decarbonising their heavy transport emissions, identify ways to reduce emissions and create a pathway in order to meet reduction targets.

DETA Delivered

- Review of NZ Post's emissions profile & asset base
- Developed a list of potential projects to reduce carbon impact by 2040
- Created a pathway of recommended actions & their associated emissions
- Developed a timeline of projects & actions

Results

- Identified potential carbon emission reductions of 34,000 tCO_2e per year for NZ Post
- A realistic summary of the contribution from Heavy Transport to NZ Post's total emission landscape
- A net-zero plan including a clear set of actions and when to implement them to hit net-zero targets

Summary

There are clear strategic and financial advantages in developing your company's Carbon Roadmap. It is about future proofing your organisation, innovating, building reputation and mitigating against the risk of a high carbon cost and consumers who demand improvements and will vote with their wallets. Being proactive rather than reactive will allow your business to not only survive but thrive in the new economic landscape.

What's Next? read on to see how to put a decarbonisation journey together, step-by-step.

Part 2

deta CARBON KICKSTARTER

For the purpose of kick starting a company's carbon journey we have rolled the four key steps of the Carbon Roadmap into a single offering called the DETA Carbon Kickstarter.

If your organisation needs support to start your decarbonisation journey, we can help. Step one is creating a Carbon Footprint, giving you an idea of what your emissions profile looks like. The next phase is what we call the Energy Audit - combining the steps setting the **reduction targets** and identifying **reduction opportunities** into one comprehensive report full of tangible options for the way forward.

The Carbon Reduction Plan is the strategy and action piece - its the pathway to get results. DETA can help you with all of these - some of our clients choose to start with a Carbon Footprint first, others take it to the Energy Audit stage then their in-house expertise takes over, and some clients get us on board for the whole DETA Carbon Kickstarter package.

Carbon Footprint

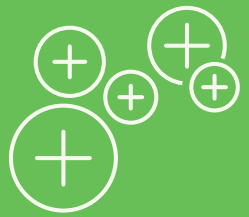
- **What is the magnitude of your carbon emissions profile?**
- **Where do your emissions come from?**

You Get – a report in a format that can be updated internally in the future to measure progress year on year.

Reduction Target

- **What direct or indirect GHG emissions can we reduce?**
- **What is the magnitude of the reduction required?**

You Get – a summary of clear & practical reduction goals for your organisation based on consideration of all relevant factors.



Opportunity Identification

- **Where can we make changes in our processes to achieve our reduction targets?**

You Get - depending on the type of organisation a Process or Business Flow Schematic will be prepared in a workshop with key stakeholders so as to brainstorm the identification of carbon reduction opportunities.

Carbon Reduction Plan

- **How do we pull all this together?**
- **How do we start? What do we do first?**
- **How much will it cost?**

You Get – a report setting out the recommended implementation order of opportunities with a visual representation of the impact each will have, and the carbon levy threshold that will tip the economics in its favour.

deta CARBON KICKSTARTER

Who is the DETA Carbon Kickstarter for?

The **DETA Carbon Kickstarter** is for any business in any sector who has a drive to make positive change. Whether you're just starting on your carbon reduction journey, or you're well on your way, the DETA Carbon Kickstarter can help you understand the next steps towards your zero carbon operation.

What will be the key deliverables?

The key deliverable is a report which will describe the journey from where your company is now to where you want to go.

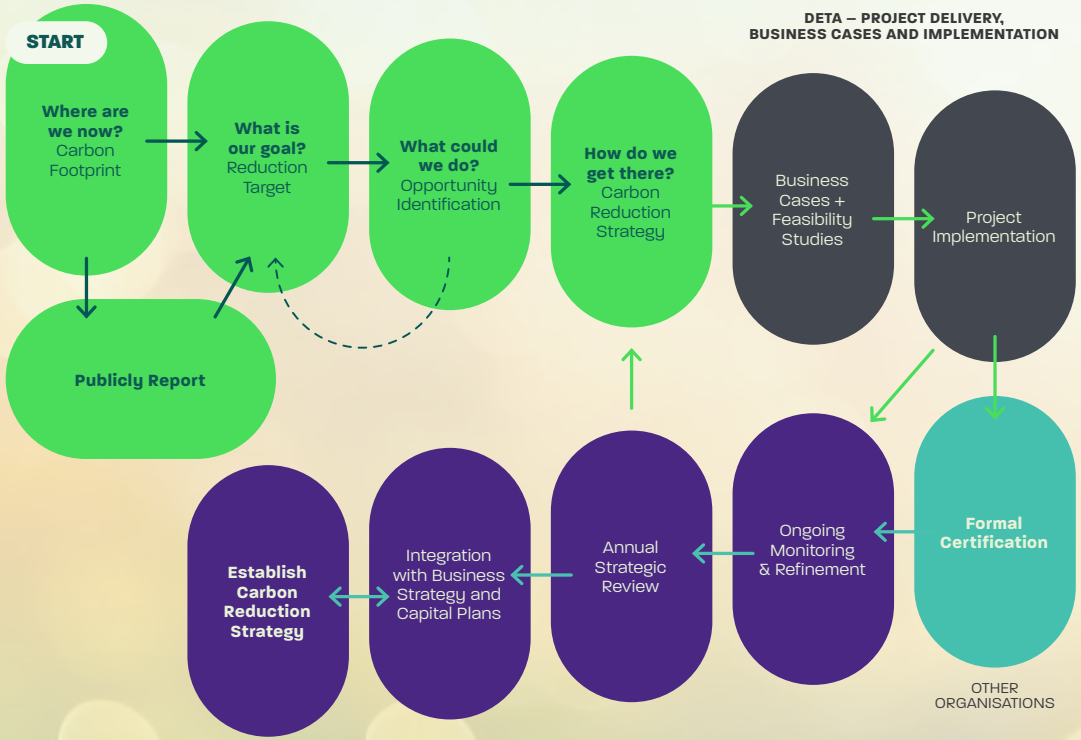
It includes a:

- Carbon Footprint
- Reduction Target
- Process/Business Flow Schematic
- Carbon Reduction Plan including:
  - Energy Transition Pathway (Opportunity Summary)
  - Reinvestment Strategy Curves
  - Marginal Abatement Curve

What will be the next steps?

This process forms a springboard from which you can jump into the refinement and detailed evaluation of the recommended opportunities. This can either be a one-off interaction with DETA or part of an ongoing partnership through implementation and an ongoing strategic relationship.

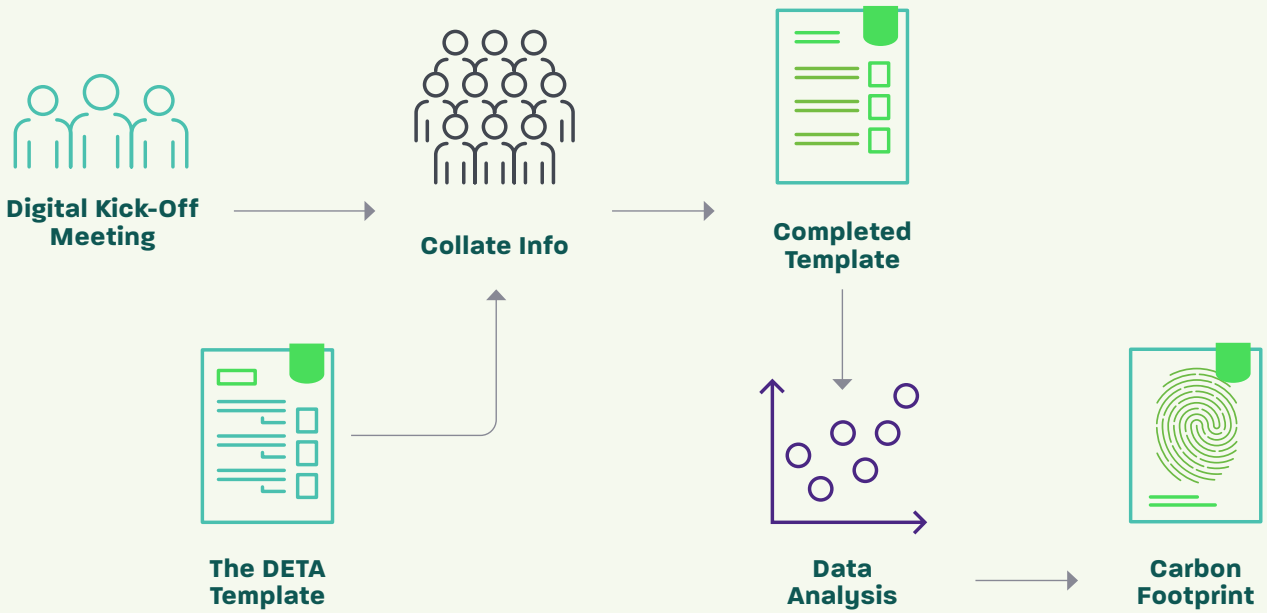
Our Roadmap to get you there



Follow us as we take you through the DETA Carbon Kickstarter step by step.

Where are we now? Developing your Carbon Footprint

Carbon footprints are created from measuring all the carbon emissions associated with a business. A carbon footprint will tell you where you are today from an emissions perspective, and sets a baseline to measure reduction progress and action going forward.



The Purpose?

- To understand where your organisation is currently sitting emissions-wise
- What emission sources currently exist?
- Which sources are necessary to include in the **DETA Carbon Kickstarter**?

The outcome is a simple presentation of your existing Carbon Footprint which will immediately highlight where the most effort should be spent.

How it works?

1. Discussion to identify boundaries for the footprint
2. DETA provides a template for data collection
3. DETA transfers your information into our templates and provides a one page **Carbon Footprint** report including boundaries (see page 19)

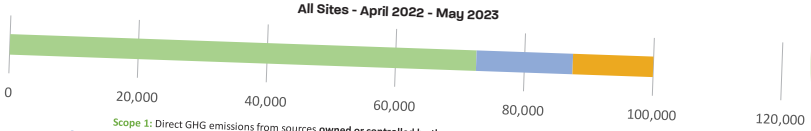
Here we introduce a fictitious manufacturing company called Starscan Foods. Let's take you through our DETA Carbon Kickstarter process step by step, starting with a 1 page Carbon Footprint.

STARSCAN FOODS

Carbon Footprint - Starscan Foods

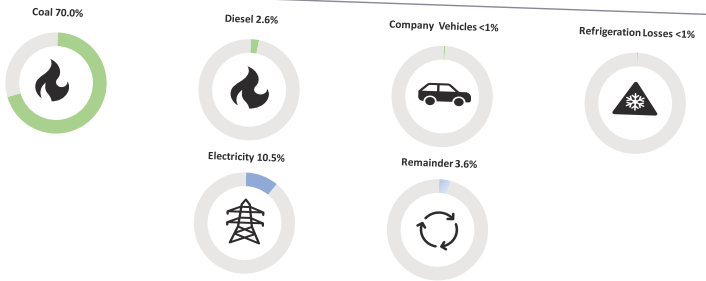
Total Carbon Emissions - 100,000 tCO_2e

All Sites - April 2022 - May 2023



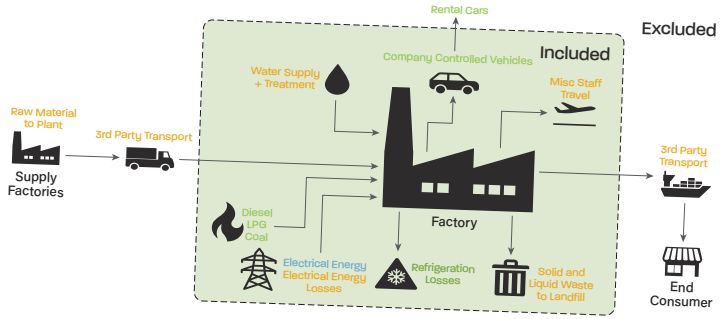
Scope 1: Direct GHG emissions from sources **owned or controlled by the company** (i.e. within the organisational boundary).
Scope 2: Indirect GHG emissions from the generation of **purchased energy** (in the form of electricity, heat or steam) that the organisation uses.
Scope 3: Other indirect GHG emissions occurring because of **the activities of the organisation** but generated from sources that it does not own or control

Scope 1 + 2 Carbon Emissions - 87,500 tCO_2e



Scope 3 Carbon Emissions - 12,500 tCO_2e

Boundary and Exclusion Identification



Key : Scope 1 Scope 2 Scope 3

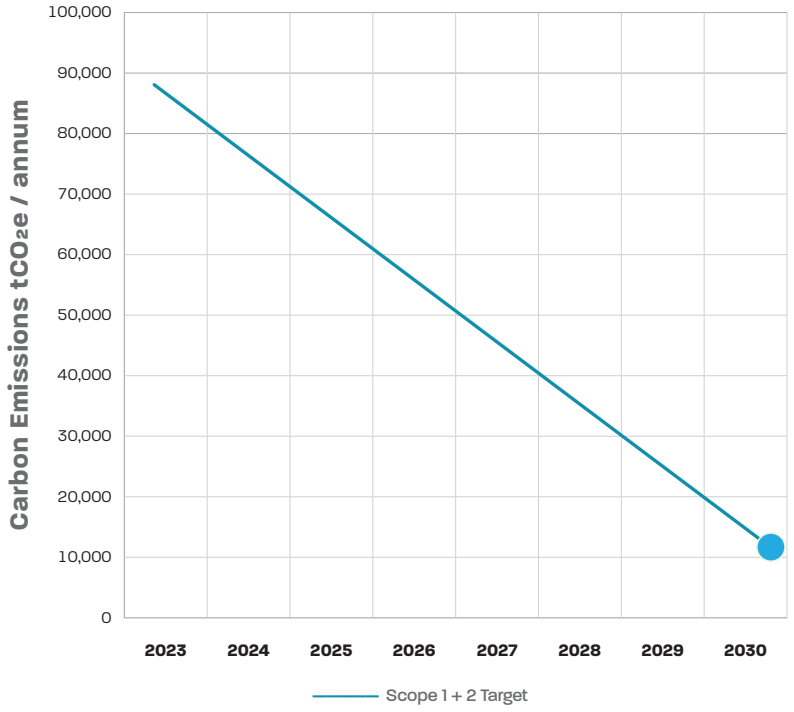
- **Coal** is the largest emitter for Starscan Foods highlighting the need to focus on the thermal systems at the site for the next stages
- Company Vehicles expands to include all vehicles 'controlled' by the company
- **Scope 3** emissions are not accounted for in the next steps in the process – but good to understand for the future!
- Where **Scope 1** or **2** emissions sources aren't available and are considered minimal these can be excluded
- **Scope 3** emissions are collated here for some sources but not all - such as upstream transport shown here

What is our goal? Setting a Reduction Target

After a Carbon Footprint the next step is a Carbon Roadmap.

The roadmap helps Starscan Foods set goals and reduction targets, and identify opportunities for reducing emissions.

- Starscans Foods target is to reduce its absolute Scope 1 and 2 Greenhouse Gas (GHG) emissions 90% by 2030 from a 2023 base-year.
- Starscan Foods has also committed to engaging with supply chain partners to improve understanding of Scope 3 Emissions and a full breakdown of these emissions is targeted for inclusion in the 2023 Carbon Footprint.



Consider these questions to make a start setting reduction targets for your business

- What is the extent of current opportunities? How far could the current known opportunities take you?
- What is the market dictating and what are competitors doing?
- What would be the competitive advantage of targeting different levels of reduction?
- What is your business plan for the next 10 years? Are you expanding, maintaining status quo, diversifying?

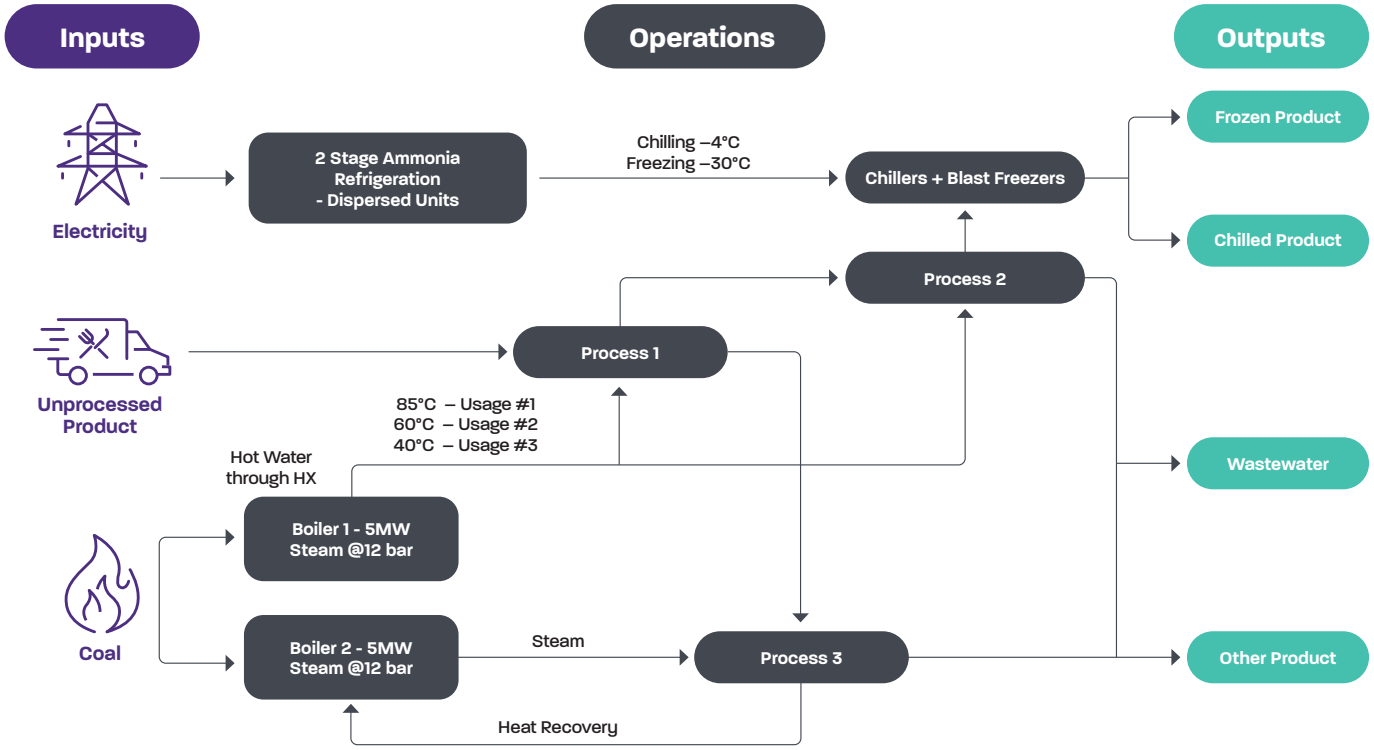
What could we do? Opportunity Identification

Now we have reduction targets, let's identify the opportunities to achieve them.

The steps of opportunity Identification

1. Workshop with key stakeholders to map business inputs, operations, emission sources and outputs.
2. Create the Process or Business Flow Schematic. See example 1 and 2.
3. Identify efficiency and technology improvement opportunities – usually lower capital.
4. Identify large-scale process changes and/or fuel switching opportunities – usually higher capital.

Example 1 - Starscan Foods Process Flow Schematic



The Process Flow Schematic above guides Starscan Foods to ask the right questions and reveal opportunities.

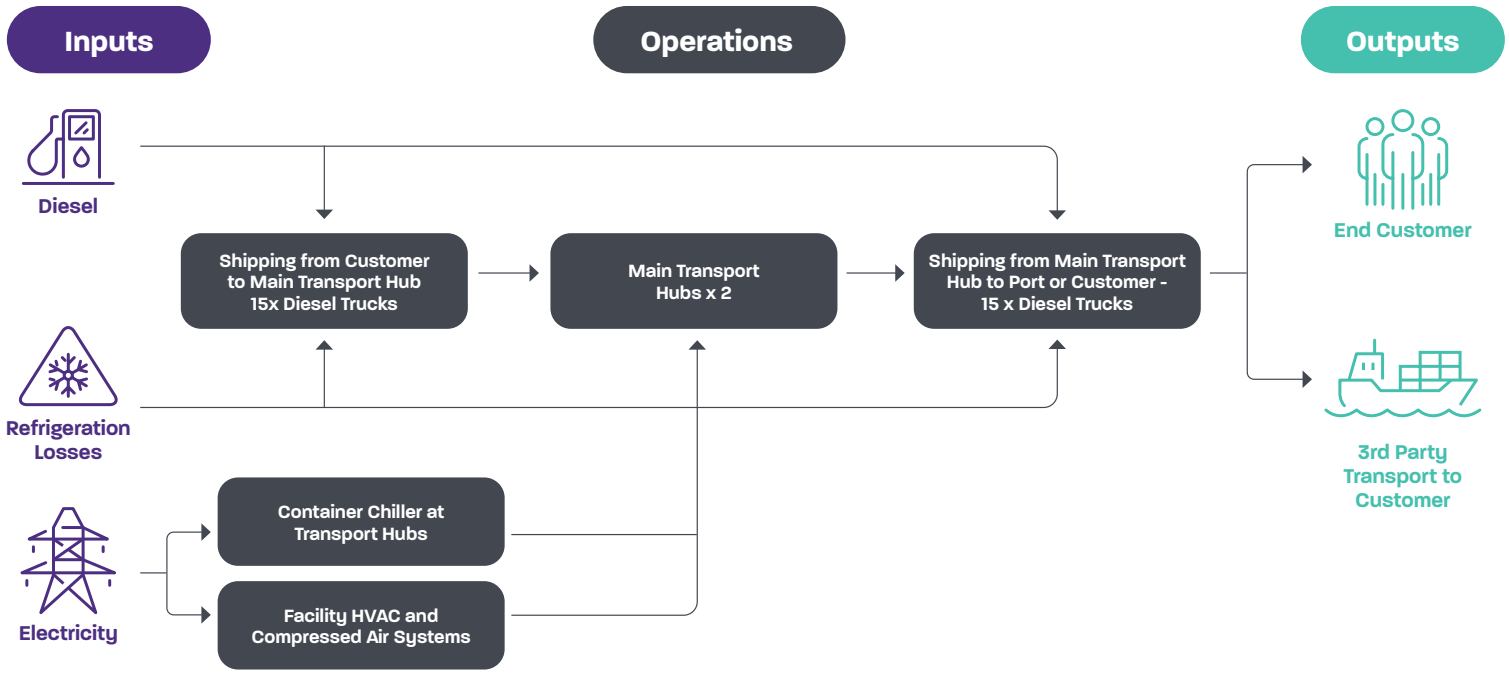
- How could we optimise hot water usage?
- Could we improve recovery?
- Do we need to use water at all?
- Are the kWh/m² of HVAC within normal bounds – does this warrant investigation?
- What opportunities are there to change the fuel source?
- Does the list of opportunities vary depending on geographic location, size and temperatures required?

Opportunity Identification *cont.*

This process also works for non manufacturing businesses.

Here we introduce a fictitious logistics company called Movetracke Logistics and create a Business Flow Schematic

Example 2 - Movetracke Logistics Business Flow Schematic



The business flow schematic above guides Movetracke Logistics to ask the right questions and reveal opportunities.

- What electrification/fuel alternative options are there?
- Are drop-in fuels available or is fleet replacement required?
- At what carbon price does this make sense?
- Is the supply chain optimised to reduce fuel usage – co-loading wherever possible?
- Are the kWh/m2 of HVAC within normal bounds – does this warrant investigation?
- Are there refrigerant leaks? Could a less emissions intensive refrigerant be used?

How do we get there? Carbon Reduction Strategy

The next step is to prepare an energy transition pathway.

This involves a strategic plan with actions necessary to transition from conventional energy sources to renewable and sustainable alternatives.

An energy transition pathway will consider technical feasibility, economic viability and the environmental impacts of the opportunities identified.

Starscan Foods Energy Transition Pathway

	Actions	Year	Carbon Reduction	CAPEX ($k)	OPEX Savings ($k/y)	NPV ($k)
Energy Demand Reduction	Steam System Leak Repair + Insulation	**2023**	**2%**	$20	$4	$10
	Technology Change 1	**2025**	**15%**	$60	$45	$350
	Technology Change 2	**2026**	**10%**	$120	$25	$90
	Steam Optimisation	**2027**	**7%**	$250	$90	$500
	Hot Water Optimisation	**2028**	**5%**	$120	$60	$370
Fuel Switching	Option 1 HTHP	**2031**	**49%**	$1000	$50	-$1,430
	Option 2 Biomass LPHW	**2031**	**51%**	$860	-$270	-$3,130
	Option 3 Electric LPHW	**2031**	**40%**	$660	-$470	-$4,640
	Option 4 Biomass in Existing Boiler	**2031**	**51%**	$500	-$190	-$2,090
Network	Electricity Grid Factor Improvement	**2030**	**2%**	$0	$0	$0

The Energy Transition Pathway gives Starscan Foods the potential steps to meet carbon reduction targets

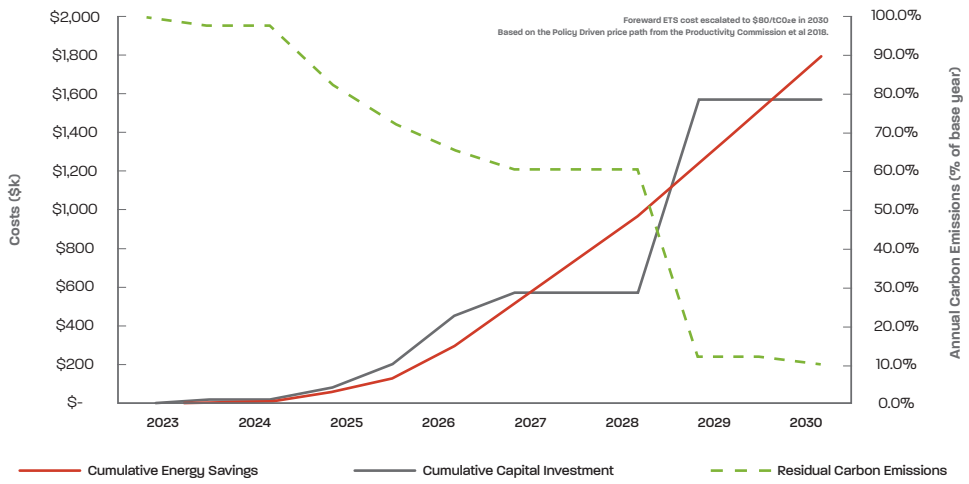
- We focus on the demand side before looking at fuel switching – better financial metrics + reduces capital cost of next stage
- CAPEX are +/-50% accurate capital cost estimates appropriate for project screening - factored off similar projects in terms of scope and scale
- Financial Measures for your energy transition pathway can be customised to your preferred metrics

How do we get there? Preparing to build a business case

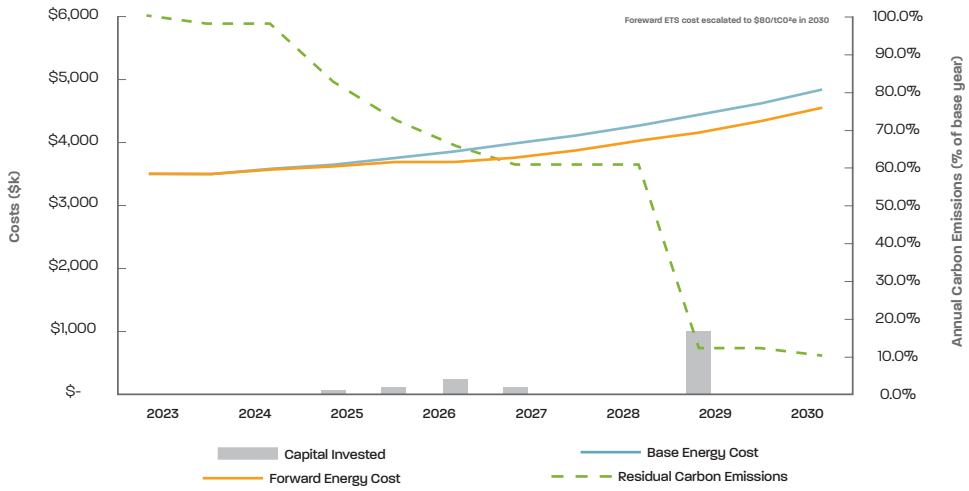
We're a big believer that carbon reduction can pay for itself. Reinvestment strategy curves display the cumulative capital investment against cumulative energy savings and carbon reduction.

Over time cumulative energy savings can match and exceed the capital investment. After a couple of years the projects pay for themselves!

Starscan Foods - Cumulative Forward Energy Costs vs Capital Invested



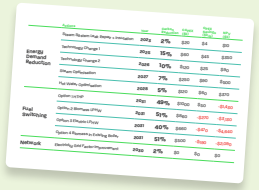
Starscan Foods - Forward Energy Costs



- Forward Energy Forecast Accounts for increase in carbon cost which will impact fuel prices

The reinvestment strategy curves visualise the benefits of investing in carbon reduction for Starscan Foods.

- Aligns with Carbon Reduction Plan!

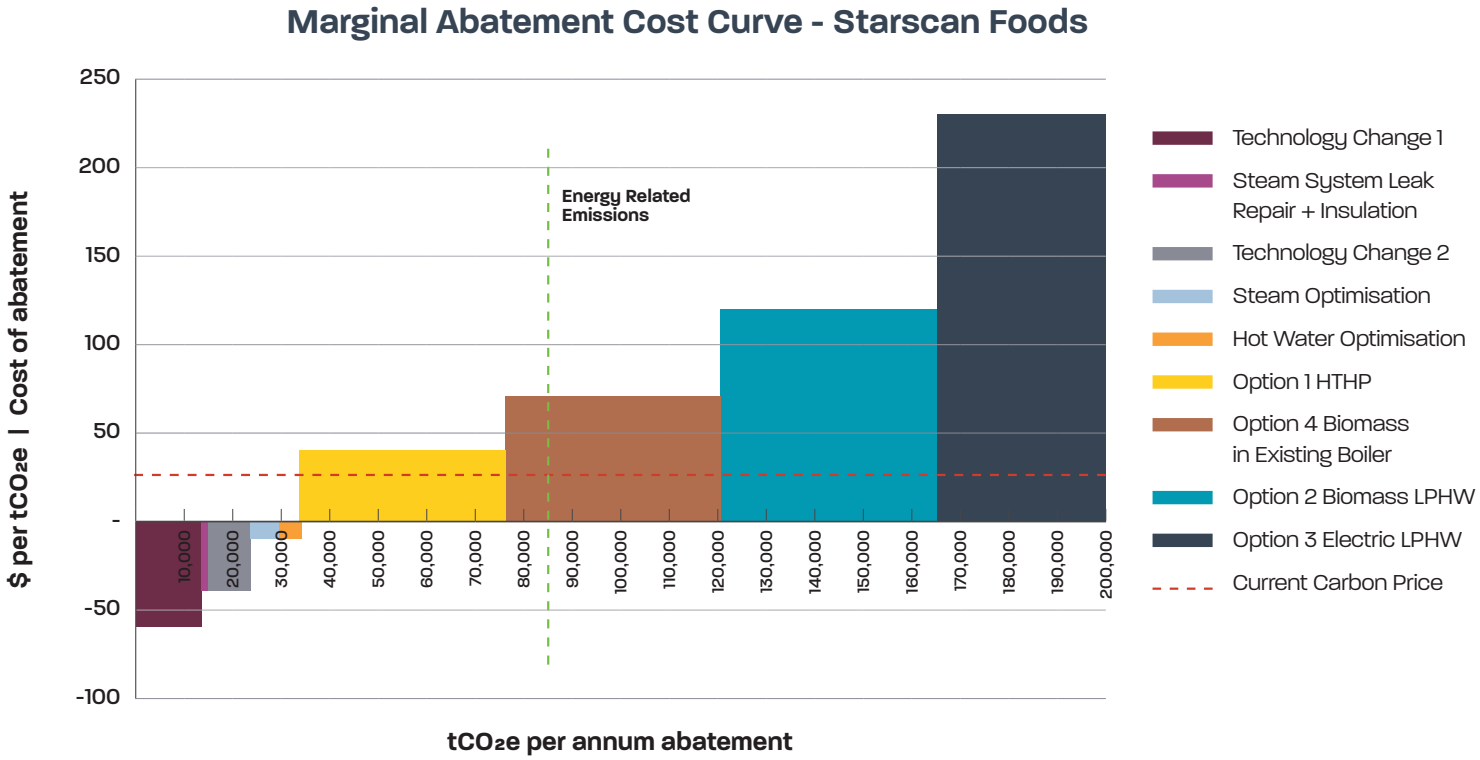


- Representative of where capital needs to be spent – This information can be integrated into CAPEX plans, business cases and feasibility studies

Preparing to build a business case *cont.*

Marginal abatement curves provide a visual representation of the various options available for reducing carbon emissions, ordered by their cost-effectiveness.

This helps guide investment decisions, identify cost effective opportunities and facilitate progress towards your carbon reduction target.



Starting from low-cost options on the left and progressing towards higher-cost options on the right, Starscan Foods can assess the effectiveness of each option in terms of reducing carbon emissions

- Represents the cost per ton of carbon removed – helps align with movement in carbon market
- Different options can be dropped in depending on initial preference
- Accounts for increase in carbon cost which will impact fuel prices

Where to from here?

For more information visit our website www.deta.global

Whether you decide to go down this path internally or you are looking for external partnership through a programme similar to our DETA Carbon Kickstarter, our door is always open for advice or discussion on all things decarbonisation, we are happy to have a chat.

Luke Rundle
Head of Business Development (NZ)
M +64 21 139 0787
luke.rundle@deta.co.nz

Domenic Chiavone
Head of Business Development Australia
M +61 427 237 139
domenic.chiavone@deta.global

Questions? check out our FAQs over page or get intouch with our team

Frequently Asked Questions

1. What is the purpose of measuring Scope 3?

The inclusion of Scope 3 emissions may seem unusual – why should my organisation be counting emissions from another company. However, the logic is that when choosing your freighting method or business travel method you have a level of control over the companies you work with and therefore you have a level of influence over them. This influence can be used to encourage improvement in sustainability performance and development of long-term relationships which can result in mutual improvements in carbon footprinting. In order to have the motivation to influence the supply chain the emissions of said supply chain need to be accounted for in your footprint. For the indirect emissions which are counted in Scope 3 such as water supply and wastewater treatments, while companies don't tend to have control or influence over how the wastewater is treated (on a municipal scale) they do have influence over how much wastewater they discharge and can therefore work at reducing their footprint this way.

As per Question Number 4 if a company has signification scope 3 emissions (over 40% of total scope 1, 2 and 3 emissions), it should set a scope 3 target.

2. What are the key documents referenced to measure your carbon footprint?

New Zealand - Ministry for the Environments' *'Measuring Emissions: A Guide for Organizations'.*

Australia - Department of the Environment and Energy's *'Technical Guidelines for the Estimation of Facilities in Australia'* which works in conjunction with an annual factors document.

3. What if the data I need isn't available?

A key issue often faced by organisations starting out on this path is the availability of data. Trying to piece together historical data from a multitude of different sources can be disheartening and momentum killing. We often recommend not getting bogged down in historical data and instead turn your attention forward and put systems in place to capture the required data on an ongoing basis. Whether it is using better accounting codes for airline trips or better collating refrigeration top-ups, the more data you have the more useful your footprint will be.

4. What are science-based targets and why should I use them?

It is common practice to set an emissions target to reflect the Paris Agreement. For reference this is keeping temperature rise across the globe to significantly less than 2°C – at this stage we are on track to exceed the 2030 checkpoint by about 90%.

It is difficult to conceptualize what that translates to for a specific business, so we recommend using Science Based Targets.

So, what are science-based targets:

- "Generally, science-based target setting methods have three components: a carbon budget (defining the overall amount of GHGs that can be emitted to limit warming to 1.5°C or well-below 2°C), an emissions scenario (defining the magnitude and timing of emissions reductions) and an allocation approach (defining how the carbon budget is allocated to individual companies"

Reference: https://sciencebasedtargets.org/wp-content/uploads/2016/10/SBT-Manual-Draft.pdf

There are several methodologies to develop the target and companies are encouraged to pick the method and target that drives the greatest emission reduction in order to demonstrate sector leadership. In general, there are three types of target:

- **Absolute** – A % Reduction in Absolute Emissions e.g. Global food and beverage company Nestlé committed to reduce absolute scope 1 and 2 GHG emissions by 12% between 2014 and 2020.

- **Physical Intensity** – A Relative Reduction Emissions based on a directly comparable output e.g. Italian multinational manufacturer and distributor of electricity and gas Enel committed to reduce carbon emissions 25% per kWh by 2020, from a 2007 base year.
- **Economic Intensity** – A relative reduction in emissions based on dollars of value added by the Company e.g. manufacturer of outdoor power products Husqvarna Group AB committed to reduce scope 1 and scope 2 emissions 30% per unit of value added by 2020 from a 2015 base-year.

The specifics of what should be measured as part of these targets is available through Science Based Targets, but on a high level these targets should cover at least 95% of company-wide Scope 1 and 2 emissions and at least 66% of Scope 3 emissions, or the top three sources, depending on which is larger.

For more information get in contact with DETA or alternatively have a look at *https://sciencebasedtargets.org/*

5. What is Marginal Abatement Cost (MAC)?

This is a useful factor when prioritising carbon reduction opportunities. For a carbon reduction project the MAC is the cost of carbon at which the project has a Net Present Value of zero. Simplistically, a negative MAC represents a project that has strong economics in the absence of a carbon price. The higher the MAC is, the higher the equivalent carbon price needs to be in order to provide an economic return.

6. What is the difference in the economics of New vs Retrofitting?

The economics of a retrofit often make these more difficult to get approved when compared to the marginal cost of a more energy efficient technology on a project already going ahead. From a simplistic point of view changing out working halogen bulbs for new LEDs is not likely to be economic but if you were building from scratch or replacing failed bulbs it would be sensible to replace with LEDs.

7. We are now capturing a lot more data which has caused our footprint to increase – How do we account for that?

As previously noted in the development of the initial carbon footprint the baseline data availability is likely to be imperfect and as time goes on and better collection practices are implemented this will become more accurate. This may create complications in the footprint year to year with possible increases being seen despite the implementation of good reduction projects. For the majority of cases, new specified emissions will be replacing an 'indicative value' i.e. an estimate of flight kms based on $ spent rather than the new methodology of individual trip logging. This improvement methodology should be not be punished and therefore often the best way to account for this is to retrospectively apply the new learning to previous footprint assessments.

8. Why use DETA to identify opportunities?

The process of identifying opportunities varies from company to company. Often the inherent knowledge of operators and site management can be incredibly beneficial in looking at process changes.

But hand in hand with this is the benefit of using DETA who can approach the processes with a fresh perspective and help apply solutions from one industry to another, as well as undertaking technical evaluations such as Pinch Analysis for which there may not be sufficient experience onsite.

Looking to Start your Decarbonisation Journey?

Contact us for:

- Carbon Footprints
- Energy Transition Pathways
- Carbon Reduction Plans
- A full service **DETA Carbon Kickstarter**

Our team of engineers and project managers are experts in decarbonisation, water, energy management, and sustainability. We have helped businesses across Australasia for more than 10 years with long-term planning & strategies that create positive sustainability & net-zero solutions.

Services

- Carbon Strategy
- Energy Management
- Project Delivery
- Process Optimisation
- Sustainability Strategy
- Water & Wastewater Reduction

Offices

Aotearoa New Zealand

+64 3 338 8524
chc@deta.global

Locations
- Christchurch / Ōtautahi
- Wellington / Te Whanganui-a-Tara
- Tauranga / Tauranga Moana

Australia

+61 427 237 139
australia@deta.global

Locations
- Melbourne
- Sunshine Coast

www.deta.global

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