vector

TCFD REPORT 2021

Vector's journey to a new **energy future**

Our climate risks and opportunities based on the recommendations of the Task Force on Climate-related Financial Disclosures

September 2021

Task Force on **Climate-related** Financial Disclosures

Our position on climate change

Vector is well-positioned to enable decarbonisation within New Zealand, the Asia-Pacific region, and globally. We are guided by our vision, which is **to create a new energy future.** Despite the challenges of today, our integrated Group strategy we call Symphony is preparing us for the opportunities of a decarbonised future.

Symphony aims to transform the traditional one-way energy chain into an intelligent, multi-directional energy system that gives the customer more choice and control. Fundamentally, it is about creating a decentralised energy system that opens up future possibilities, delivering decarbonisation consistent with reliable and affordable energy solutions for customers.

Vector Lights on Auckland Harbour Bridge, Lighting up the city with solar-battery technology

Vector acknowledges the climate change science underpinning this need to act and welcomes the large role we can play in this transition. Vector is a founding member of the Climate Leaders Coalition[1], a partner of the Sustainable Finance Forum[2], and member of the Sustainable Business Council[3], which has underpinned our support for the Paris Agreement and the establishment of the Climate Change Commission. Our participation in these coalitions also signals our commitment to reducing our own carbon emissions to help with New Zealand's transition to a low carbon economy.

Decarbonisation brings both risks and opportunities

Vector is leading the transformation of the energy sector to create a new energy future, identifying and developing options that will provide value, choice and service for our customers while delivering sustainable shareholder returns. The primary challenge in leading this transformation, however, is that we cannot make or alter energy policy unilaterally.

The impacts of climate change, and more broadly, of global responses to climate change, represent material risks and opportunities for our business. We are closely monitoring developments in New Zealand and our other key markets around climate action. For instance, in January 2021, the Climate Change Commission released its draft advice for the New Zealand Government[4], framing the nation's energy transition. We engaged in the public consultation[5] that fed into the Commission's final advice, released in May 2021[6]. This process, even ahead of the Government's response later in 2021, has already presented both opportunities and challenges for our business, as covered in this disclosure.

Why the Task Force on Climate-related Financial Disclosure (TCFD) matters to us

The TCFD framework provides a way for companies to produce consistent climate-related disclosures, demonstrating how climate-related risks and opportunities are incorporated into their risk management and strategic planning processes. Why is this so important? As companies' and investors' understanding of the financial implications associated with climate change grows, markets will be empowered to channel investment to the solutions, opportunities, and business models needed for a new energy future.

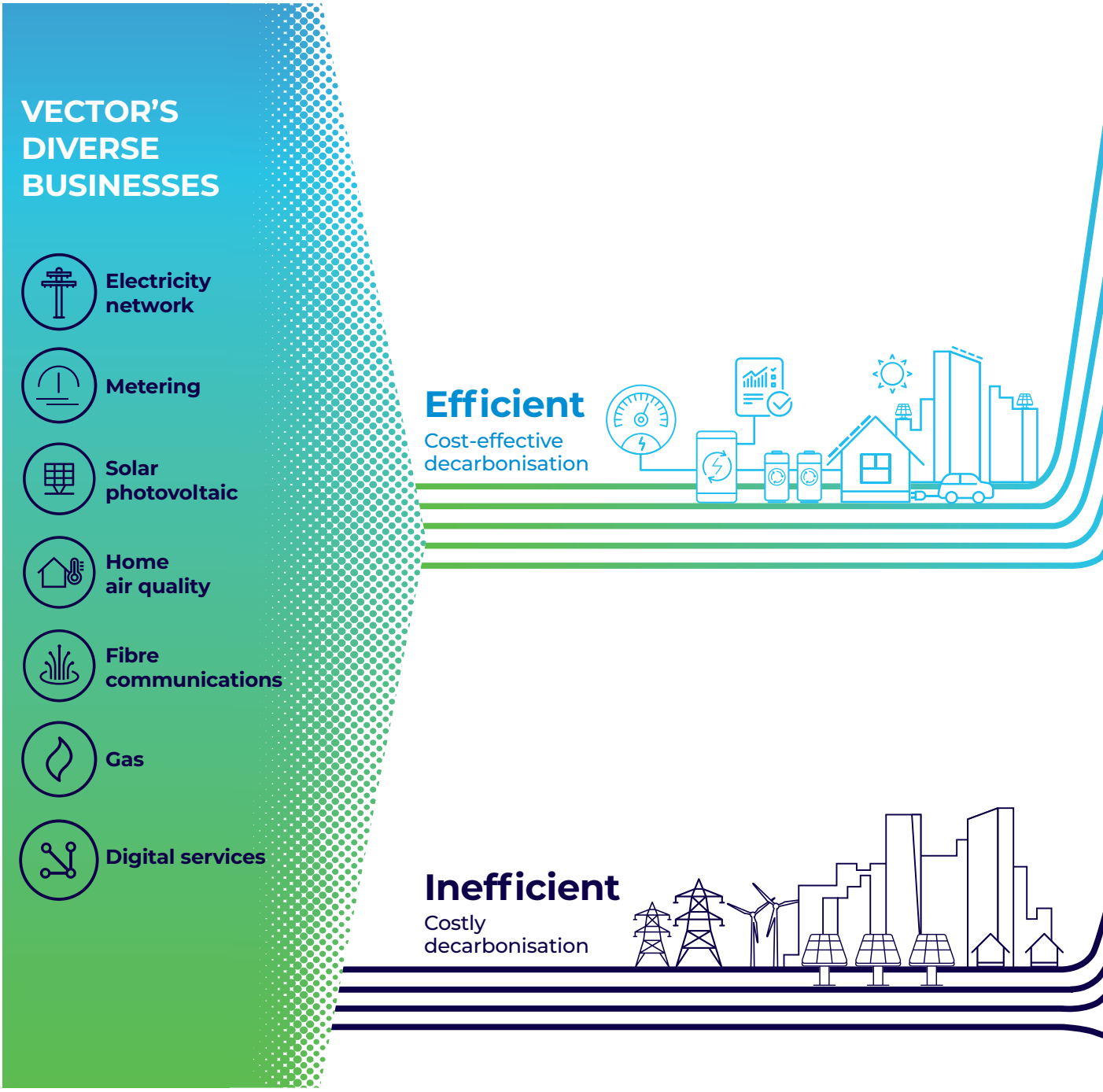
When it launched in 2017, the TCFD recommended that companies make 11 disclosures to identify the possible climate impacts on their business. New Zealand is the first country to enshrine a TCFD reporting obligation on major private sector entities. While that reporting will not become mandatory until 2023, we are nonetheless embarking on this journey in advance of that deadline. Our reasoning is simple: it is in our interest as a company to lead the transformation of the energy sector and to provide our stakeholders with the information that serves their long-term interests.

Vector is leading the transformation of the energy sector to create a new energy future.

1. https://www.climateleaderscoalition.org.nz/who
2. https://www.theaotearoacircle.nz/partner
3. https://www.sbc.org.nz/about/our-members/sbc-members
4. https://haveyoursay.climatecommission.govt.nz/our-advice-and-evidence/
5. https://blob-static.vector.co.nz/blob/vector/media/vector2021/vector_submission_ccc_draft_advice.pdf
6. https://www.climatecommission.govt.nz/our-work/advice-to-government-topic/inaia-tonu-nei-a-low-emissions-future-for-aotearoa/

Vector's climate-related opportunities and risks

Climate change brings both risks and opportunities for Vector, as detailed in this report. With a diverse business portfolio of energy solutions, Vector is well-positioned to lead the energy transition to our customers' advantage. Many of our climate-related opportunities correspond with the role we can play in creating new solutions and driving efficient, sector-wide decarbonisation. Many of our risks emerge from the possibility that decarbonisation occurs in a way that is inefficient and costly, impacting Vector and our customers. In identifying these risks and opportunities, our intentions are more firmly resolved than ever. We are working to be a first-class energy company globally, playing a leading role in enabling a bright future for our customers.



Climate-related Opportunities

TIME FRAME (YEARS)

Data-driven energy	A decarbonised energy sector requires a redesign of how energy is invested in, managed, delivered, and consumed. Vector is an important enabler of a data-driven transition through the development of new digitised platforms, products, and services.	SHORT TERM 0→3
Enabler of electrification	As an electricity network manager, an opportunity for the utilisation of distributed energy resource management systems to enable the electrification of transportation, and low temperature heat, in line with governmental ambitions and the variable nature of renewable electricity generation.	SHORT TERM 0→3
Distributed renewables	Distributed energy resources, such as photovoltaic solar, can provide renewable energy resilience, especially during dry years.	SHORT TERM 0→3
Advanced metering	Increase in advanced metering infrastructure and services as the electricity sector scales.	MEDIUM TERM 3→10
Biomethane/ Green hydrogen	The New Zealand gas industry has set a decarbonisation plan that focuses on green hydrogen and biomethane. Vector is working with the gas industry to understand options for our existing gas customers to access low carbon gas technologies.	MEDIUM TERM 3→10

Climate-related Risks

Weather disruption	Hours per year of wind speeds above 70km/h are projected to increase significantly which may increase outages from vegetation and tree fall due to severe storms. Damage to the network also imposes a health and safety risk. Increase in extreme rainfall events and number of dry days.	SHORT TERM 0→3
Regulatory misalignment	Regulatory misalignment with government policy limits Vector's ability to drive its decarbonisation strategy. Investment in demand-side management and optimised utilisation must occur now to reduce future customer costs.	SHORT TERM 0→3
Peak load impact	Home charging of electric vehicles, distributed generation, and transition from gas to electricity will have a large impact on the peak loads of our network. Unmanaged transitions will result in significant physical asset installation that will incur large costs to our customers.	SHORT TERM 0→3
Limitations on gas	Potential policy and legislative changes to limit gas and gas metering growth, changes in customer preferences, increasing taxes or carbon costs.	MEDIUM TERM 3→10
Energy unaffordability	The combination of misaligned regulatory and policy frameworks with unmanaged electricity growth risks increasing electricity costs for customers. This not only restrains decarbonisation strategies but also exaggerates social inequities - both heightening the prospect of significant government intervention across the energy sector.	MEDIUM TERM 3→10

1. Strategy

TCFD recommends that organisations:

- Describe the climate-related risks and opportunities the organisation has identified over the short, medium, and long term.
- Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy, and financial planning.
- Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

At the centre of the energy transition

Vector is committed to working with its stakeholders to transform the energy system, as it is not only critical to our daily lives, but also to our collective future through its role in enabling the decarbonisation of transport and industry. Legacy energy systems across the whole sector are increasingly unable to meet these new challenges, and must become vastly more sophisticated and adaptable. Vector is well advanced globally in developing and operating emerging technologies with digital platforms to manage these changing requirements.

As energy systems are transformed to meet the needs of tomorrow, our view is that many of our climate related opportunities correspond with the role we can play in creating new solutions and driving efficient, cost effective, sector-wide decarbonisation.

Our strategic resilience

While many aspects of New Zealand's – and the world's – climate response remain unknown, the diversity of Vector's business portfolio provides us with valuable insights over a range of energy related issues, which enables us to develop actions and plans towards societal and financial resilience. We can also use our diverse portfolio to test and integrate multiple technologies, positioning us to create new solutions, and drive sector-wide decarbonisation. We also recognise the challenge posed by our gas infrastructure. The ability to transform some, or all, of our existing gas infrastructure to support alternative energy sources – such as biomethane and green hydrogen – will be important to ensuring our long-term resilience in a decarbonising economy.

Opportunities

Our innovations will help transform energy systems

Consumers are demanding cleaner, more reliable, and more affordable energy. We are taking critical steps to transform how the energy industry operates to support these changes. Our vision is to transform the energy industry by using data to redesign how energy is invested in, managed, delivered and consumed. We are actively underway in developing solutions to enable this transformation, partnering with other organisations where we see opportunities to help achieve our goals.

This data-led transformation can displace legacy systems, leveraging a step-change in processing power, flexibility, and accuracy, addressing the rapidly changing requirements of customers, energy retailers, network operators, and other energy market participants. We see this as a critical building block for the transformation of energy systems.

We have also established a new entity, Vector Technology Services, to take to market solutions developed as part of our digital transformation journey. We are exploring global opportunities for key priority solutions including distributed energy resources, data driven energy solutions, advanced metering technologies, the scaling of electrification, and opportunities for renewable gases such as green hydrogen and biomethane. These are discussed in more detail in Table 2, page 11.

New Zealand's first floating solar farm, built by Vector Powersmart for Watercare, produces the same amount of electricity as would be needed to power approximately 10,000 homes

Our carbon handprint

We aim to provide solutions that give our customers the choice and opportunities to help lower their emissions. This is our carbon handprint; using our position as a leading New Zealand energy solutions business to help widen the scope for decarbonisation beyond what is in our own ability to control.

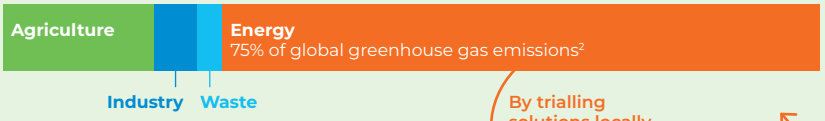
Our work to demonstrate the effectiveness of electric vehicle smart charging technology supports efficient investment in the infrastructure required to support an affordable transition to electric vehicles. This helps keep the costs of the transition down for our customers, and in turn helps their ability to choose lower carbon technology.

We provide home heating solutions through our HRV business that enable people to make energy efficient choices.

Our Vector Powersmart business provides a range of services relating to commercial-scale solar photovoltaic installations and battery energy storage systems, facilitating business and industry to decarbonise their energy use.

GLOBAL CO_2e EMISSION BREAKDOWN[1]

Global carbon challenge
To enable the decarbonisation of 3/4 of global greenhouse gas emissions

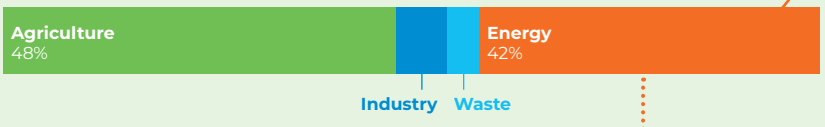


By trialling solutions locally

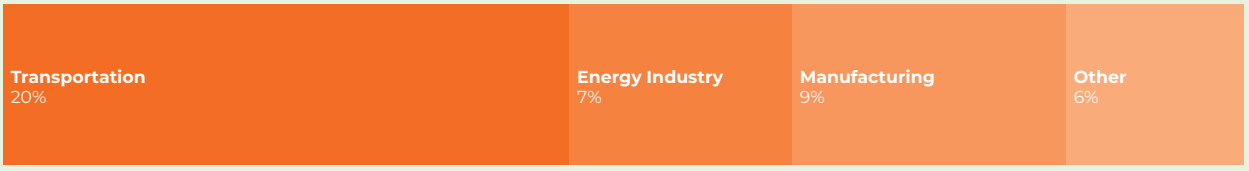
Impacts can be scaled globally

NEW ZEALAND CO_2e EMISSION BREAKDOWN[3]

Our local handprint
Supporting New Zealand to decarbonise its energy sector



WHAT NEW ZEALAND IS TARGETING[4]



Light Vehicle: 16%
- Reducing travel demand
- Mode shift from light vehicles to public transport, walking and cycling
- Vehicle fuel efficiency
- Vehicle electrification

Heavy Duty: 2%
- Low-carbon fuels

Aviation: 1%

Electricity & Heat: 5%
- Renewable energy use (50% by 2035)
- Energy efficiency

Refining & solid fuel manufacture: 2%

Food, Beverage, Paper, and Chemical: 7%
- Switching boilers to biomass / electricity

1. Climate Watch, 2018, https://www.climatewatchdata.org/ghg-emissions, accessed July 2021
2. International Energy Agency, Net Zero by 2050, published 2021
3. Ministry for the Environment, New Zealand's Greenhouse Gas Inventory 1990 – 2019, published 2021
4.Ināia tonu nei: a low emission future for Aotearoa, Climate Change Commission 2021

1. Strategy (continued)

Our approach to using climate scenarios

Climate scenario analysis enables Vector to explore the potential implications of a range of future states, with divergent policy settings, climate conditions, available technologies and market responses. As a network manager, Vector has focused its initial scenario work on modelling the consequences of different future network loads on the electricity network. In parallel, we commissioned EY to help model the physical vulnerabilities of the network under future climate conditions. This modelling was completed in 2017. In 2018, we also commissioned EY to conduct economic modelling of New Zealand's transition to a decarbonised future. Due to current policy and regulatory uncertainty associated with New Zealand's Emission Reduction Plan, we made the decision to delay the further development of our scenario analysis until next year. Revisiting or expanding our existing scenarios for the sake of immediate disclosure would have quickly diminished in value as the government moves to respond to the Commission's advice over subsequent months. The coming year may provide improved certainty on many settings in New Zealand's climate response, in turn allowing us to develop more comprehensive scenarios and elaborate on our climate risks and opportunities, for our electricity and other key businesses.

TRANSITION RISKS

What we analysed

It is clear that electrification of transport and industry, combined with enhanced renewable generation, will form a key approach to decarbonising New Zealand's economy. Through our internal modelling, we assessed three scenarios of the future network load on the electricity network, to inform both our asset management plan and broader business strategy.

What we found

These scenarios reveal the importance of decarbonising the energy network in the most efficient, resilient and cost-effective manner[7, 8]. An unmanaged decarbonisation transition presents potential risks for Vector and would result in increased costs for our customers. As a result, in our risk assessment for this disclosure, regulatory misalignment was identified as one of our top climate risks.

Informed by these scenarios, peak load impact also emerged as one of our top climate-related risks. This could occur, for example, with a significant increase in the uptake of electric vehicles and localised charging clustered at peak hours. From a network perspective, our key challenge is ensuring we can meet peak demand while maintaining a transition to renewable energy generation, which is variable by nature. Investing in assets which do not reconcile these factors is likely to result in inefficient allocation of capital, which would ultimately lead to higher costs for our customers. Inequality is likely to be exacerbated as these costs are inevitably spread across all customers.

Conversely, our diverse portfolio represents a strong business advantage for supporting a cost-effective, resilient energy transition. Several of the products and services developed by our businesses can play a role in enabling this transition directly, or by supporting it through data, digital platforms and connectivity.

How we are responding

A transition to a decarbonised society is not only a climate imperative but also an opportunity for significant optimisation and digitalisation of our energy assets. To this end, we are working closely with policymakers and regulatory bodies, both in New Zealand[9] and internationally[10], to advocate that decarbonisation cannot merely focus on adding more large-scale generation. In our view, it must give equal importance to optimised demand side management, energy efficiency, and distributed low-carbon generation. All of this is in the long-term interest of our customers.

We are also working to scale the impact of our response through partnerships and collaborations with leading energy and technology partners. Vector is developing new products and services to allow customers to use low-carbon energy solutions and enable renewable energy generation. Many of these products and services appear as top climate-related opportunities for Vector, and are elaborated on in Table 1 on page 10.

Demand side management, energy efficiency, and distributed low-carbon generation is in the long term interest of our customers.

7. https://blob-static.vector.co.nz/blob/vector/media/vector-regulatory-disclosures/final-electricity-amp-update-2017.pdf
8. https://blob-static.vector.co.nz/blob/vector/media/vector-regulatory-disclosures/vec194-amp-2019-2029.pdf
9. https://blob-static.vector.co.nz/blob/vector/media/vector2021/vector_submission_ccc_draft_advice.pdf
10. https://blob-static.vector.co.nz/blob/vector/media/vector-regulatory-disclosures/annex-1-recosting-energy.pdf

PHYSICAL RISKS

What we analysed

Vector commissioned EY to undertake a risk assessment of Vector's electricity network assets in the Auckland region against the potential future physical impacts from climate change through to 2050. Changes in wind, precipitation, and temperature were modelled to two $C0_2$ scenarios set out by the International Panel on Climate Change (namely, RCP4.5 and RCP8.5). We supplemented this analysis with the 2020 National Climate Change Risk Assessment, commissioned by the Ministry for the Environment.

What we found

Changes in the climate, including those already locked-in for future decades, pose a risk for Vector. Vector has a historical record of unplanned outages during high wind speeds, primarily caused by vegetation falling on lines and assets. With a projected extreme wind speed increase of more than 10 percent during the next 20 years[10], the risk to our overhead network is expected to increase. This will not only disrupt our operations, resulting in a financial impact, but also presents risks to the health and safety of our customers, employees and contractors.

Any reduction in rainfall in the North Island, which some models have predicted, may also increase the prevalence of dry years, presenting a supply risk for the New Zealand energy network.

How we are responding

This assessment has informed Vector's asset management planning over subsequent years. Details are publicly-available in our most recent asset management plan[11]. Vector has also developed a network resilience plan that includes vegetation management, customer resilience technologies, distribution automation, undergrounding, micro-grids, and predictive weather outage modelling.

OUR MATERIAL CLIMATE OPPORTUNITIES AND RISKS

Vector's top climate-related opportunities and risks are detailed in Tables 1 and 2, respectively. To produce these tables, a full list of climate opportunities and risks was first collated in close consultation with Vector's diverse business units. These were then assessed according to Vector's Enterprise Risk Management Framework, with entries flagged as 'High' or 'Very High' consolidated to produce the top five opportunities and top five risks for the Vector Group.

These can be periodically reassessed to present an updated picture of our material climate risks and opportunities. In future disclosures we intend to detail our efforts to link these climate-related risks and opportunities to other material enterprise risks.

We categorise the time frames for these opportunities and risks as follows:

- **short term (0-3 years)**, to reflect our typical business planning cycles;
- **medium term (3-10 years)**, to reflect our asset management plans for gas and electricity networks;
- **long term (10-30 years)**, to account for the expected life of new residential connections.

Vector provides free electric vehicle charging stations across Auckland

10. National Climate Change Risk Assessment for New Zealand, Ministry for the Environment (2020). https://environment.govt.nz/publications/national-climate-change-risk-assessment-for-new-zealand-main-report
11. https://blob-static.vector.co.nz/blob/vector/media/vector2021/vec224-amp-2021-3031_310321.pdf

1. Strategy (continued)

Table 1: Vector's climate-related opportunities

OPPORTUNITY	TYPE	TIME FRAME	EVALUATION	HOW WE ADDRESS THIS OPPORTUNITY
Data-driven energy distribution and management	Products and Services	0 – 3 years	A decarbonised energy sector requires a redesign of how energy is invested in, managed, delivered, and consumed. Vector is an important enabler of a data-driven transition through the development of new digitised platforms, products, and services.	Strategic alliances with leading technology partners to develop data-driven products and services to optimise renewable energy consumption, management and delivery throughout New Zealand, Australia and globally.
Enabler of electrification	Products and Services	0 – 3 years	As an electricity network manager, an opportunity for the utilisation of distributed energy resource management systems to enable the electrification of transportation, and low temperature heat, in line with governmental ambitions and the variable nature of renewable electricity generation.	First trials of smart electric vehicle charging with close to 200 electric vehicles in Auckland to reduce peak electricity loading and understand user behaviour. Vector is also a founding member of the Battery Industry Group (B.I.G) aiming to tackle end-of-life issues for electric vehicle batteries. Integration of Vector's business units allows us to create new solutions, such as 'grid edge' technologies that involve synergies between residential renewable generation, battery storage and electric vehicle smart charging.
Distributed renewable generation	Products and Services / Energy Sources	0 – 3 years	Distributed energy resources, such as photovoltaic solar, can provide renewable energy resilience, especially during dry years.	Network strategy already enables the connection of distributed energy resources. Working with commercial customers to accelerate solar generation adoption, and operations such as micro-grids, to meet their carbon targets.
Advanced Metering	Products and Services	3 – 10 years	Increase in advanced metering infrastructure and services as the electricity sector scales.	Working with governments to drive importance of advanced meter uptake. Partnerships with distributors, retailers, and technology platforms for distributed energy management services with a global impact.
Biomethane / green hydrogen	Energy Source	3 – 10 years	The New Zealand gas industry has set a decarbonisation plan that focuses on green hydrogen and biomethane. Vector is working with the gas industry to understand options for our existing gas customers to access low carbon gas technologies.	Engaged with an alliance of gas producers devising approaches to transition current gas networks to low carbon alternatives.

Table 2: Vector's climate-related risks

RISKS	TYPE	TIME FRAME	EVALUATION	HOW WE ADDRESS THIS RISK
Weather-induced disruption to the network	Physical – Acute	0 – 3 years	Hours per year of wind speeds above 70km/h are projected to increase significantly which may increase outages from vegetation and treefall due to severe storms. Damage to the network also imposes a health and safety risk. Increase in extreme rainfall events and number of dry days.	Pioneering a risk-based approach to vegetation management with local council, and ongoing undergrounding of electricity lines. Asset management and operational enhancements, such as data driven outage modelling, to improve the resilience of the network. Asset location plans developed with flood levels and inundation zones. Utilising weather data to inform network configurations and equipment ratings (such as disabling "risk of fire" assets during dry weather), and predicting weather impact areas in near real time. Trialling microgrid solutions for 'grid edge' resilience such as Vector's Vehicle-To-Home trial, and automated generator in Piha.
Misaligned regulatory and policy frameworks	Transition – Policy	0 – 3 years	Regulatory misalignment with government policy limits Vector's ability to drive its decarbonisation strategy. Investment in demand-side management and optimised utilisation must occur now to reduce future customer costs.	Working with regulatory bodies (Electricity Authority and Commerce Commission), and the Ministry of Business Innovation and Employment to unlock capital and capability to drive system-wide decarbonisation that puts the customers at the centre. Strong advocation for coordinated, future focused, governance to streamline a "whole systems" approach.
Peak load impact of rapid, unmanaged decarbonisation	Transition – Technology	0 – 3 years	Home charging of electric vehicles, distributed generation, and transition from gas to electricity will have a large impact on the peak loads of our network. Unmanaged transitions will result in significant physical asset installation that will incur large costs to our customers.	Our Symphony strategy proactively enables customer decarbonisation by enabling digital platforms, and integration of customer renewables within a low voltage network. We have included energy system analytics to identify trends and behaviours at the customer level, as well as explore the possible energy futures and impact it has on the network. A smart charging trial with close to 200 electric vehicles is ongoing.
Limitation in gas businesses	Transition – Policy, Technology	3 – 10 years	Potential policy and legislative changes to limit gas and gas metering growth, changes in customer preferences, increasing taxes or carbon costs.	Working with industrial partners to investigate low carbon alternatives such as biomethane and green hydrogen. Policy changes are monitored to enable gas to be an enabler for the overall decarbonisation strategy.
Energy unaffordability	Transition – Policy	3 – 10 years	The combination of misaligned regulatory and policy frameworks with unmanaged electricity growth risks increasing electricity costs for customers. This not only restrains decarbonisation strategies but also exaggerates social inequities – both heightening the prospect of significant government intervention across the energy sector.	Our Symphony strategy strives to give customers more choices, with energy affordability being one of its core objectives. We strongly advocate that decarbonisation cannot just work with more large-scale generation and transmission. Rather, customers must be actively informed through demand side technologies and platforms. This is a cross sector issue, and we are actively engaging with customers and stakeholders including regulatory bodies, and policy makers, to meet future decarbonisation goals more efficiently.

2. Governance

TCFD recommends that organisations:

- Describe the Board's oversight of climate-related risks and opportunities.
- Describe management's role in assessing and managing climate-related risks and opportunities

Vector's Board of Directors is responsible for oversight and governance of its business objectives and strategies, including climate-related risks and opportunities. The Risk and Assurance Committee is a sub-committee of the Board which has been delegated responsibility for ensuring Vector manages its risks and compliance appropriately, including its climate-related risks. The Chief Executive Officer is responsible for the day-to-day leadership and management of Vector's New Zealand and Australian businesses to ensure the identification and development of business objectives and strategies are delivered.

Board of Directors	Risk and Assurance Commitee	CEO and Executive Management	Executive Risk and Assurance Commitee (ERAC)	Vector's staff with climate related risk responsibilities
Protecting and enhancing Vector's value, through the establishment of a sound framework for recognising and managing risks and opportunities, including those related to climate change.	Delegated responsibility for overseeing Vector's risk and assurance practices, including ensuring the enterprise-wide and business-specific climate change risks are identified and managed appropriately.	Executive leadership and day-to-day management for ensuring delivery and development of the strategic objectives. The Chief Public Policy and Regulatory Officer is the holder of climate-change risks. An executive Climate Change Steering Committee supports key staff in accelerating climate change related decisions.	Leading and promoting the desired risk culture by driving the implementation of the Enterprise Risk Management Framework (which covers climate-related risk). Receiving updates on key climate risks, Vector's sustainability performance, and progress on carbon targets.	Monitoring, analysing and remaining abreast of the physical/ transitional impacts of climate change and the potential risk and opportunities from a transition to a lower emissions economy. Staff members focusing on climate change risk and opportunities are coordinated via the Senior Risk Partner and Senior Sustainability Partner.

Risk Management Policy
Outlines Vector's risk management intent, objectives, and provides a framework for risk assessment and mitigation

Sustainability Policy
Outlines key objectives to lead our group decarbonisation efforts

Environmental Policy
Sets out Vector's commitment for managing the environmental aspects of its businesses

3. Risk Management

TCFD recommends that organisations:

- Describe the organisation's processes for identifying and assessing climate-related risks
- Describe the organisation's processes for managing climate-related risks
- Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organisation's overall risk management.

The approach we have developed will allow our TCFD reporting to continue to mature over time.

Vector's approach to risk management reflects the nature of our business as an essential service provider, supplier of critical infrastructure and an operator of high-hazard businesses.

We have a comprehensive enterprise risk management (ERM) framework consistent with the Risk Management Standard ISO 31000:2018, which is embedded in our business through our risk governance, policies, guidelines and risk partnership model that Group Risk maintains with the different business units to support their risk management practice.

Our Board Risk and Assurance Committee has responsibility for overseeing and reviewing our enterprise risk management framework policies and processes and material risks to the Vector Group.

Climate change has been identified on our Group Risk Profile as a material risk for a number of years, reinforcing our ongoing work to understand and respond to the evolving impact of climate change on our business, as well as the opportunity to enable our vision of creating a new energy future.

To further identify and evaluate climate-related risks and determine their applicability to the business, Vector has modelled scenarios of the impact of decarbonisation on the electricity network. Furthermore, Vector has undertaken two significant studies at Group level in conjunction with external specialists. These studies cover (i) an assessment of physical climate change impacts on our Auckland electricity network and (ii) the economic impacts associated with a transition to a decarbonised future (see TCFD – Section 1 – Strategy for more detail). More detailed work is now being conducted into the direct financial impacts from climate-related transition risks across Vector's major business units to help inform and shape our future direction and strategy.

Vector Group Risk and Sustainability teams work in partnership with senior management and operational business units to identify, assess and manage our climate-related risks and opportunities in line with our enterprise risk management framework.

For this disclosure, Group Risk and the Sustainability team led a Vector-wide programme to identify our climate-related risks and opportunities. This process was built upon existing work, and involved close consultation with Vector's diverse business units. As a result of this consultation, we formulated a consolidated list of risks for reporting purposes at Vector Group level.

Risks and opportunities with a high consequence in the short-to-medium term were prioritised and refined for the purposes of this disclosure. These were reviewed at our Climate Change Steering Committee, and approved by the Board.

The approach we have developed to identify, assess and manage climate-related risks and opportunities will allow our TCFD reporting to continue to mature over time. The approach is aligned to our overarching risk management approach to provide quarterly oversight and review of climate risk across the Group. New or amended climate-related risks and opportunities will be examined by the Climate Change Steering Committee and Executive Risk and Assurance Committee, elevated to the Board as required.

4. Metrics and Targets

TCFD recommends that organisations:

- Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.
- Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas (GHG) emissions and the related risks.
- Describe the targets used by the organisation to manage climate-related risks and opportunities and performance against targets.

a. Greenhouse gas emission targets

Vector measures its greenhouse gas emissions in alignment with the Greenhouse Gas Protocol. This splits emissions into three categories:

- Scope 1 – Emissions we directly control such as vehicle fleet fuel combustion, diesel back-up generators, methane leaks, and SF6 leaks.
- Scope 2 – Vector's operational electricity consumption, and losses along the network.
- Scope 3 – All indirect emissions, such as customer energy consumption, and supply chain emissions.

Vector has set an emissions reduction target, aligned with methodology by the Science Based Target initiative (SBTi), of reducing Scope 1 and 2 emissions (excluding electricity line losses) by 53.5% by FY2030 from a FY2020 baseline.

We have already made a reduction of 18% in FY2021 against the FY2020 baseline. This is largely due to reductions in our fugitive natural gas emissions, and fuel combustion for diesel generation.

We have a target to achieve net carbon zero operations for our Scope 1 and 2 emissions (excluding electricity losses) by 2030. Vector also aims to enable global decarbonisation beyond our own carbon footprint, for example through services that can identify or enable the integration of low carbon technologies. This is known as our carbon handprint, as introduced in page 7.

b. Electrical power outages

Two metrics to guide power line outages are:

- SAIDI (System Average Interruption Duration Index) – Time of interruption in the power supply per customer in minutes.
- SAIFI (System Average Interruption Frequency Index) – Total number of interruptions per customer.

Vector constantly monitors these two metrics throughout the year to sit under the regulatory limits which are currently 104.83 and 1.3366 for SAIDI and SAIFI respectively.

Vector also tracks investments into infrastructure and operations to minimise power outages.

c. Electric vehicle uptake

Vector is conducting a smart charging trial with close to 200 electric vehicles. The results to date demonstrate the urgent need for policy support for managing the transition to an effective electric vehicle charging system. Vector is working towards electric vehicle registration on its network to optimise electricity distribution.

Vector is transitioning our corporate light vehicle passenger fleet to 100 percent electric or plug-in hybrid, and is currently trialling its first electric truck.

d. Solar and battery uptake

Vector registers photovoltaic solar and battery uptake in the Auckland region, as key metrics for optimal energy distribution management.

e. Scope 3 emission reduction

Vector sees great potential in abating Scope 3 emissions through the distribution of low carbon alternatives to standard fossil fuel derived gas. These include biomethane and green hydrogen.

While we cannot directly control the decarbonisation efforts and ambitions of our customers, suppliers and field service providers, Vector is nonetheless committed to supporting these actors to reduce their overall energy consumption and transition to low carbon solutions. This work is ongoing so that future Vector TCFD disclosures can set out any relevant metrics and strategies we develop to support these Scope 3 reductions.

f. Performance goals

A yearly decarbonisation measure makes up 5 percent of overall short-term incentive payments to executive staff and senior management.

Financial Year 2021 Emissions profile, tonnes-CO_2 equivalent

Figure 1 : Major Scope 1 & 2 emissions in tonnes of CO_2 equivalent

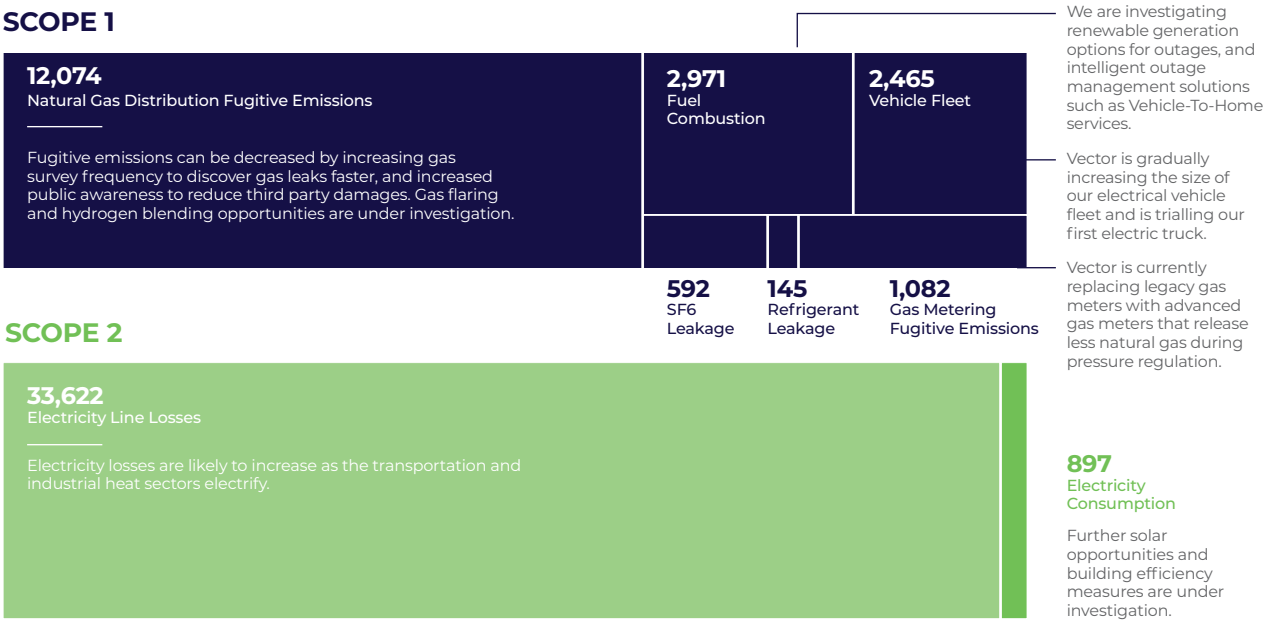
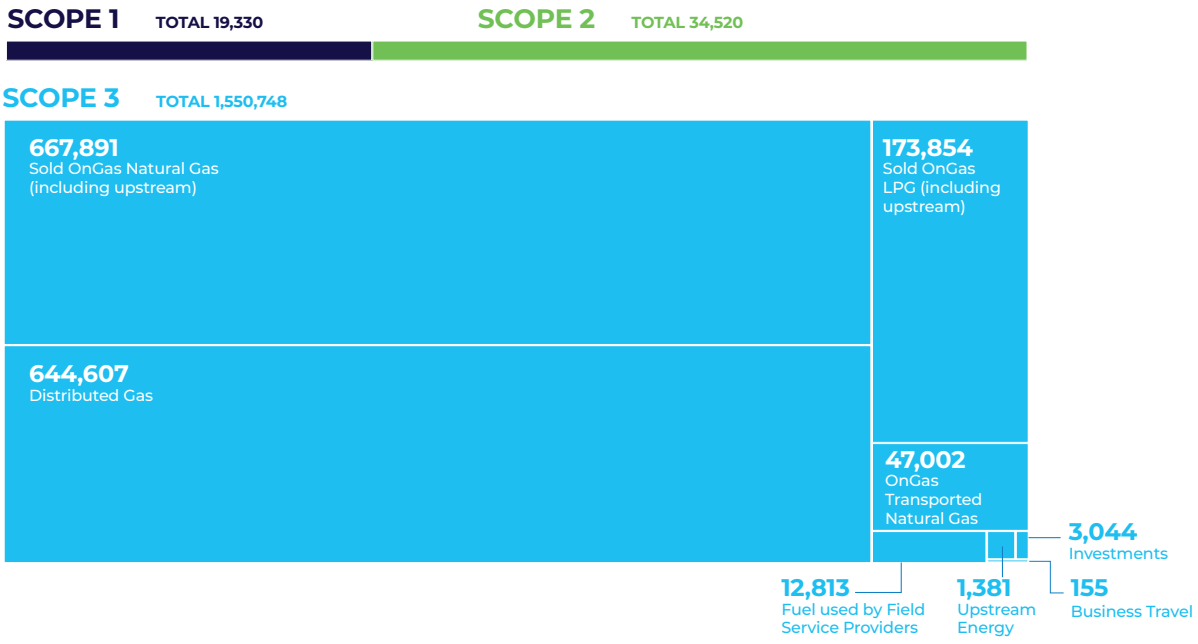


Figure 2 : Major Scope 1, 2, 3 emissions in tonnes of CO_2 equivalent



Emission trend in tonnes of CO_2 equivalent

YEAR ENDED 30 JUNE	FY20*	FY21	CHANGE FROM FY20 BASELINE
Scope 1	23,669	19,330	-18%
Scope 2	33,439	34,520	+3%
Scope 3**	1,758,042	1,550,748	-12%

* Although only divested in March 2020, Kapuni emissions are excluded in the updated FY20 footprint calculation to facilitate future comparisons to FY20 as our base year.

** Scope 3 includes all other indirect emissions that occur in Vector's value chain. This includes upstream well-to-tank emissions for fossil-gas (Category 1) and fuel (Category 3), fuel consumed by field service providers (Category 1), T&D losses for consumed electricity (Category 3), business travel (Category 6), combustion of sold and distributed fossil-gas (Category 11), and investments with more than 10% share (Category 15, accounting for proportional Scope 1 and 2 emissions).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