

The Climate Risk of New Zealand Equities

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Introduction/Overview

- Examine the Climate Risk exposure of New Zealand Equities, specifically NZX50 companies
- Measuring company Transition Risk through collating firm emission data
- Company Survey and Emission Descriptives
- Predicting Emission Disclosure
- Hypothetical Carbon Liabilities

Measuring Transition Risk

- Transition Risk through collating firm emissions
- Aimed to collate emissions for all the constituents of the NZX50.
- Unique as our dataset consists of Scope 1, Scope 2, and Scope 3 emissions, ESG scores and Emission Intensities for each firm.
- Carbon Disclosure Project (CDP) reports, Thomson Reuters Asset4, Annual reports, Sustainability reports and Certified Emissions Measurement and Reduction Scheme (CEMAR) reports.
- 86% of the market capitalisation of the NZX50.

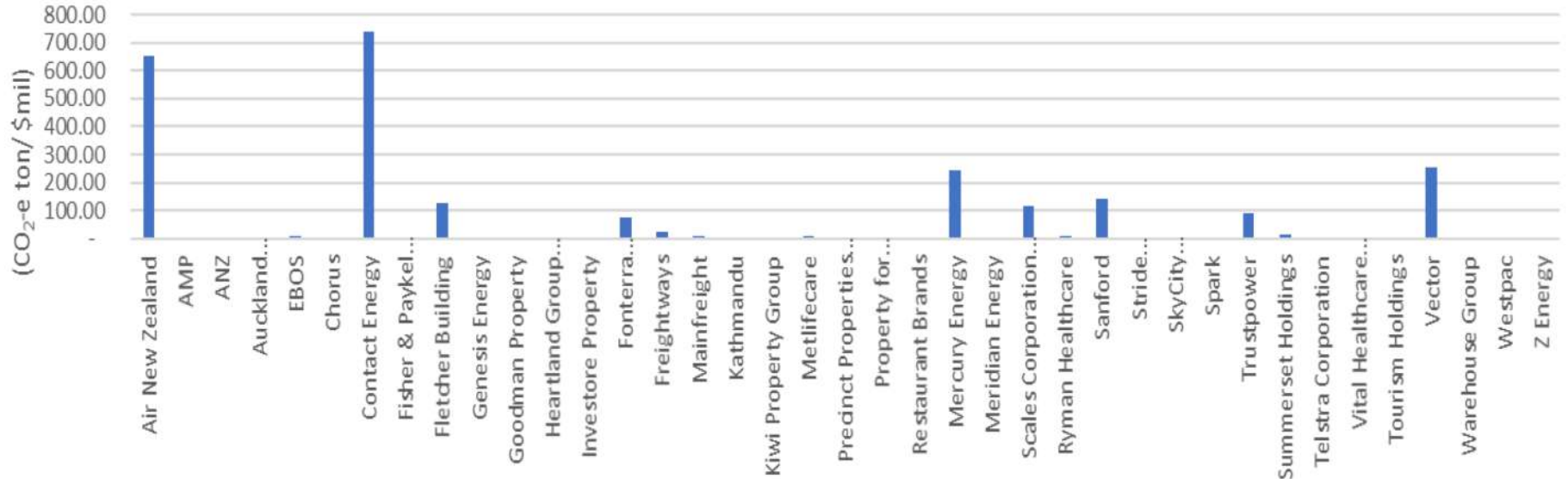
- Scope 1: Classified as direct GHG emissions from sources that are owned or controlled by the company.
- Scope 2: Classified as indirect emissions occurring from the generation of purchased electricity.
- Scope 3: Classified as other indirect GHG emissions occurring from the activities of the company, but not from sources owned or controlled by the company.
- Emission Intensity =
$$\frac{(\text{Scope 1} + \text{Scope 2})}{\text{Firm Revenue}}$$

Company Survey Responses

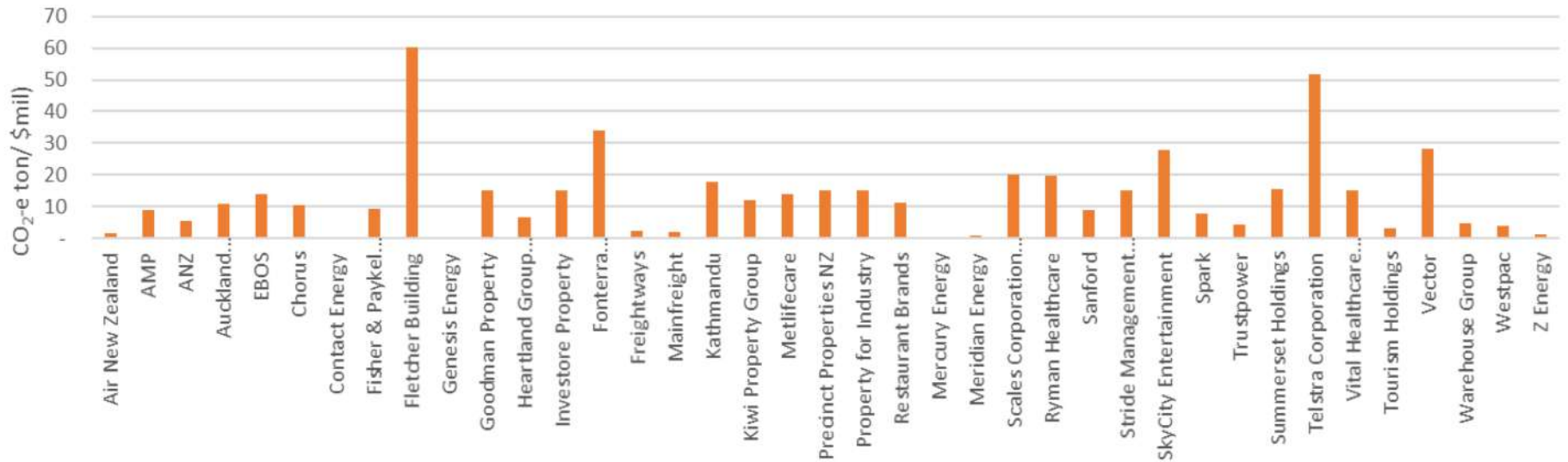
Did not Email	No Response to Email	Responded to Email	Response
<i>Company</i>	<i>Company</i>	<i>Company</i>	
<i>Air New Zealand Ltd.</i>	<i>The a2 Milk Company Ltd.</i>	<i>Arvida Group Ltd.</i>	<i>Do not report</i>
<i>ANZ Group Ltd.</i>	<i>EBOS Ltd.</i>	<i>Heartland Group Holdings Ltd.</i>	<i>Do not report</i>
<i>Argosy Property Ltd.</i>	<i>Goodman Property Ltd.</i>	<i>Metro Performance Glass Ltd.</i>	<i>Do not report</i>
<i>Chorus Ltd.</i>	<i>Infratil Ltd.</i>	<i>Pushpay Holdings Ltd.</i>	<i>Do not report</i>
<i>Contact Energy Ltd.</i>	<i>Investore Property Ltd.</i>	<i>Property for Industry Ltd.</i>	<i>Do not report</i>
<i>Fisher & Paykel Hlth. Ltd.</i>	<i>Kiwi Property Group Ltd.</i>	<i>AMP Ltd.</i>	<i>Provided Links to Data</i>
<i>Fletcher Building Ltd.</i>	<i>NZX Ltd.</i>	<i>Fonterra Shareholders Group</i>	<i>Provided Links to Data</i>
<i>Freightways Ltd.</i>	<i>Pacific Edge Ltd.</i>	<i>Genesis Energy Ltd.</i>	<i>Provided Links to Data</i>
<i>Auckland Intl. Airport</i>	<i>Port of Tauranga Ltd.</i>	<i>Kathmandu Ltd.</i>	<i>Provided Links to Data</i>
<i>Mainfreight Ltd.</i>	<i>Precint Properties NZ Ltd.</i>	<i>Mercury Energy Ltd.</i>	<i>Provided Links to Data</i>
<i>Meridian Energy Ltd.</i>	<i>Rakon Ltd.</i>	<i>Ryman Healthcare Ltd.</i>	<i>Provided Links to Data</i>
<i>NZ Oil & Gas Ltd.</i>	<i>Resturant Brands Ltd.</i>	<i>Spark Ltd.</i>	<i>Provided Links to Data</i>
<i>Sanford Ltd.</i>	<i>Scales Corporation Ltd.</i>	<i>Summerset Holdings Ltd.</i>	<i>Provided Data</i>
<i>Trustpower Ltd.</i>	<i>Skellerup Ltd.</i>	<i>Tourism Holdings Ltd.</i>	<i>Provided Data</i>
<i>Warehouse Group Ltd.</i>	<i>Sky Network Television Ltd.</i>	<i>Synlait Milk Ltd.</i>	<i>Announcement Soon</i>
<i>Westpac Corp.</i>	<i>SkyCity Entertainment Ltd.</i>	<i>Metlifecare Ltd.</i>	<i>Email Forwarded On</i>
<i>Z Energy Ltd.</i>	<i>Stride Management Ltd.</i>		
	<i>Steel Tube Ltd.</i>		
	<i>Telstra Corp. Ltd.</i>		
	<i>Vector Ltd.</i>		
	<i>Vista Group International Ltd.</i>		
	<i>Vital Healthcare Property Ltd.</i>		

Reports Emissions for ≥ 2 Years		Reports Emissions for One Year		Never Report's Emission's	
<i>Company</i>	<i>Market Cap. (\$mil)</i>	<i>Company</i>	<i>Market Cap. (\$mil)</i>	<i>Company</i>	<i>Market Cap. (\$mil)</i>
Westpac Corp.	\$108,292.49	Port of Tauranga Ltd.	\$4,394.44	The a2 Milk Company Ltd.	\$9,368.75
ANZ Group Ltd.	\$84,867.47	Precinct Properties NZ Ltd.	\$2,450.17	Mainfreight Ltd.	\$4,103.47
Telstra Corp. Ltd.	\$44,956.67	Restaurant Brands Ltd.	\$1,478.39	EBOS Group Ltd.	\$3,980.11
Meridian Energy Ltd.	\$12,328.03	Sky Network Television Ltd.	\$405.94	Infratil Ltd.	\$3,165.77
Auckland Intl. Airport	\$10,871.96	NZX Ltd.	\$350.12	Goodman Property Trust	\$3,062.60
Fisher & Paykel Hlth. Ltd.	\$10,871.96			Trustpower Ltd.	\$2,563.25
Spark NZ Ltd.	\$8,156.48			Synlait Milk Ltd.	\$1,739.28
Mercury Energy Ltd.	\$6,879.62			Vital Hlthcare. Prop. Trust	\$1,224.71
AMP Ltd.	\$6,701.37			Argosy Property Ltd.	\$1,215.96
Fonterra Shldrs. Fund	\$6,674.08			Property for Industry Ltd.	\$1,199.43
Ryman Healthcare Ltd.	\$6,375.00			Metlifecare Ltd.	\$1,026.00
Contact Energy Ltd.	\$5,505.16			Heartland Grp. Holdings	\$935.50
Fletcher Building Ltd.	\$3,862.28			Pushpay Holdings Ltd.	\$867.07
Vector Ltd.	\$3,574.37			Stride Management Ltd.	\$862.23
Genesis Energy Ltd.	\$3,275.67			Arvida Group Ltd.	\$823.68
Air New Zealand Ltd.	\$3,211.24			Scales Corporation Ltd.	\$740.46
SkyCity Entertainment Ltd.	\$2,613.75			NZ Oil & Gas Ltd.	\$647.03
Kiwi Property Group Ltd.	\$2,383.09			Vista Group Intl. Ltd.	\$625.65
Chorus Ltd.	\$2,336.13			Investore Property Ltd.	\$496.74
Z Energy Ltd.	\$2,148.00			Skellerup Holdings Ltd.	\$444.04
Summerset Holdings Ltd.	\$1,485.72			Steel Tube Ltd.	\$151.06
Freightways Ltd.	\$1,231.23			Pacific Edge Ltd.	\$97.16
Warehouse Group Ltd.	\$912.20			Metro Performance Glass	\$66.74
Kathmandu Ltd.	\$872.73			Rakon Ltd.	\$60.70
Sanford Ltd.	\$674.18				
Tourism Holdings Ltd.	\$524.53				
Average	\$13,137.90	Average	\$1,815.81	Average	\$1,644.47

2010-2018 Average Company Scope 1 Intensity



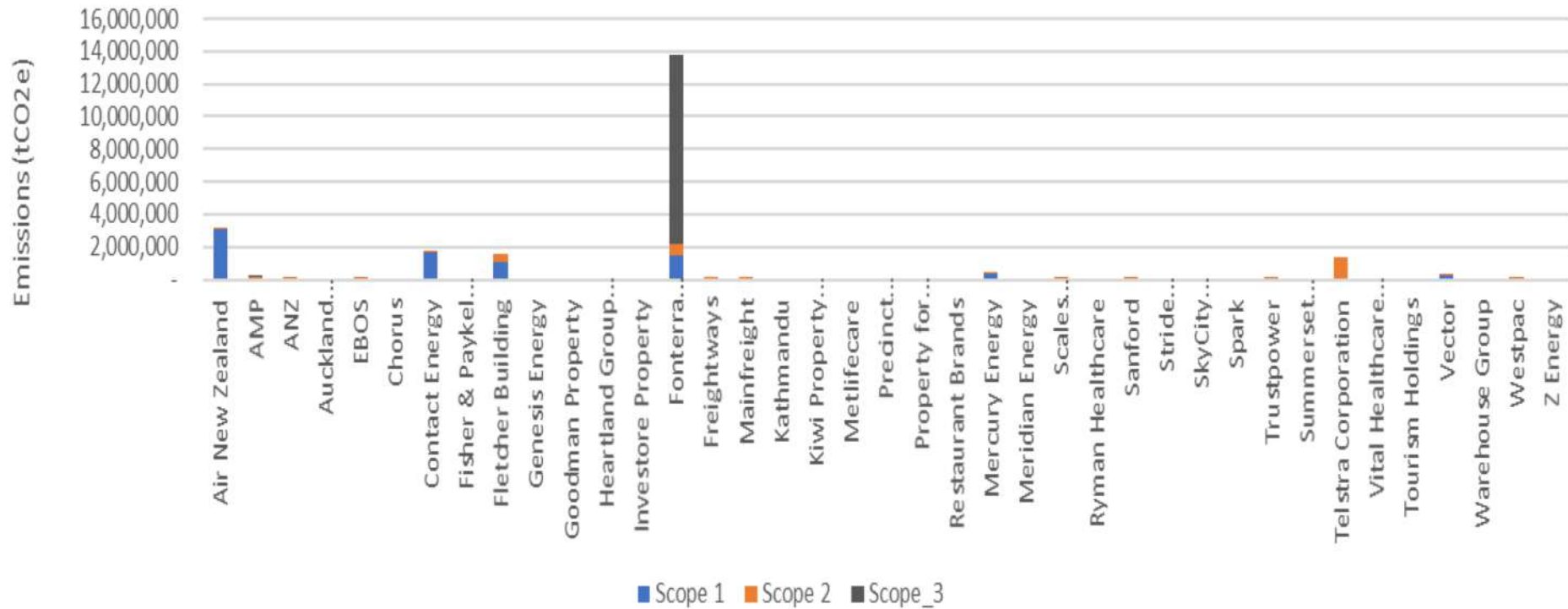
2010-2018 Average Company Scope 2 Intensity



Top 10 Companies by Absolute Emissions and Intensity

<u>Absolute Emissions</u>		<u>Intensity</u>	
<i>Company</i>	<i>(tCO2e)</i>	<i>Company</i>	<i>(CO2-e ton/ \$mil)</i>
Air New Zealand	3,116,102	Air New Zealand	655.15
Fonterra Shareholders Fund	2,179,694	Vector	281.99
Fletcher Building	1,566,272	Mercury Energy	242.18
Telstra Corporation	1,367,941	Fletcher Building	187.00
Mercury Energy	402,740	Contact Energy	160.05
Vector	344,531	Sanford	153.43
Contact Energy	343,546	Scales Corporation Limited	135.34
ANZ	206,160	Trustpower	124.62
Westpac	172,265	Fonterra Shareholders Fund	112.08
EBOS	144,415	Telstra Corporation	53.94

2010-2018 Average Company All Scopes incl. Fonterra's Scope 3



Predictive Disclosure Model

- Uses a Logistic Regression model with Binary outcomes of (1) Disclosure and (0) No Disclosure.
- Run for all firms from 2010-2018.
- Predictive Variables
 - Total Assets
 - Return on Asset
 - Firm Age
 - Revenue
 - Climate Coalition
 - Intense Sector

Predictive Disclosure Results

<i>Disclosure</i>	<i>Robust</i>						
	<i>Coef.</i>	<i>Std. Err.</i>	<i>Z</i>	<i>P> z </i>	<i>[95% Conf. Interval]</i>		
InTA	0.7133271	0.1589539	4.49	0.000	0.4017832	1.024871	
ROA	0.0511512	0.0223244	2.29	0.022	0.0073961	0.949063	
InFirmAge	0.1309282	0.2093414	0.63	0.532	-0.2793734	0.54123	
Intense Sector	0.8907975	0.3755592	2.37	0.018	0.154715	1.62688	
Revenue	0.0000818	0.0000557	1.47	0.142	-0.0000273	0.000191	
Climate Coalition	2.853003	0.3548553	8.04	0.000	2.157499	3.548506	

Hypothetical Carbon Liabilities

- Method is used to identify company specific Transition Risk

Carbon Liability=

(Total Scope 1 + Scope 2 Emissions) x \$Carbon Price

- These are calculated for 2018, 2030 and 2050.
- Based on scenarios present in the Productivity Commissions Low-emissions Economy Final Report.
- Carbon Prices are taken from this report along the PD-25 and PD-0 Scenarios.
- Assumption of Emissions remain constant at 2018 levels.
- Yearly Revenue is used as an average of the last three years.

Carbon Prices Used for Carbon Liabilities

<i>Pathway</i>	<i>2018</i>	<i>2030</i>	<i>2050</i>
<i>PD-25</i>	\$25	\$55	\$142
<i>PD-0</i>	\$25	\$80	\$200

- These carbon liabilities are used to represent the potential financial impact emissions may have on companies.
- These liabilities are subtracted off Revenue, affecting the cash flows of the business.
- Assumption of Cost-Past-Through as 0%.
- We have focused on the % change in revenue caused by these Carbon Liabilities.
- Companies are then ranked by this % change in revenue.
- Simple exercise to show which companies face greater climate risk.

Top 10 Companies with largest Percentage Change in Revenue

	<i>PD-25 Scenario</i>			<i>PD-0 Scenario</i>		
	2018	2030	2050	2018	2030	2050
Air New Zealand Ltd.	-1.70%	-3.74%	-9.65%	-1.70%	-5.44%	-13.60%
Contact Energy Ltd.	-1.42%	-3.13%	-8.08%	-1.42%	-4.55%	-11.38%
Vector Ltd.	-0.81%	-1.78%	-4.59%	-0.81%	-2.59%	-6.47%
Fletcher Building Ltd.	-0.71%	-1.57%	-4.05%	-0.71%	-2.28%	-5.71%
Mercury Energy Ltd.	-0.40%	-0.87%	-2.25%	-0.40%	-1.27%	-3.17%
Sanford Ltd.	-0.37%	-0.82%	-2.11%	-0.37%	-1.19%	-2.98%
Scales Corporation Ltd.	-0.37%	-0.81%	-2.10%	-0.37%	-1.18%	-2.96%
Trustpower Ltd.	-0.32%	-0.71%	-1.83%	-0.32%	-1.03%	-2.57%
Fonterra Ltd.	-0.30%	-0.67%	-1.72%	-0.30%	-0.97%	-2.42%
Telstra Corporation Ltd.	-0.12%	-0.27%	-0.69%	-0.12%	-0.39%	-0.97%
Fonterra Ltd. Incl. Scope 3	-2.79%	-6.13%	-15.82%	-2.79%	-8.91%	-22.28%

Conclusion

- Collated what we believe as the most comprehensive NZ emission dataset of NZX50 companies.
- Conducted a company survey to see where NZ companies are at regarding emission disclosure.
- Only 56% of NZX50 companies disclose their emissions for at least one year.
- Identified 10 companies who have the greatest climate risk. This is consistent across intensity analysis and under the carbon liability framework.
- Predictive disclosure model found:
 - Larger companies are more likely to report emissions
 - Companies with greater Return on Assets are more likely to report emissions
 - Companies in carbon intensive sectors are more likely to report emissions
 - Signatories of the Climate Coalition are more likely to report emissions

QUESTIONS
&
COMMENTS