Harvard's Financing of CO_2 Emissions from the Reserves of Fossil Fuel Companies

Executive Summary

Harvard University's $36 billion endowment publicly reports direct holdings for less than $1 billion of its portfolio. For this directly held portion, Harvard finances 2.3 million tons of potential CO2 emissions related to the reserves of fossil fuel companies. Of this amount, 55% is financed through the holding of seven exchange-traded fund (ETF) positions, and 45% through the ownership of the equities of four fossil fuel companies. Harvard's policy portfolio, which guides its strategic asset allocation, suggests that a third of the endowment is invested in public equities through investment manager mandates. Assuming typical emissions intensities associated with equity categories, the Harvard endowment is estimated to finance more than 100 million tons of potential CO_2 emissions from the reserves of fossil fuel companies through direct and indirect holdings of public equities. This large amount reflects a high strategic policy allocation to emerging market equities, the most emissions intensive segment. Such a level of emissions would rank a company at #88 on The Carbon Underground Oil & Gas 100 list.

Introduction

Harvard University's $36 billion endowment, run by the Harvard Management Company (HMC), publicly discloses less than $1 billion of its direct holdings through 13F SEC filings. The remainder is mostly delegated to outside investment managers, whose holdings on behalf of Harvard are not disclosed.

As of year-end 2014, Harvard Management Company directly held the stock of four companies that were on Fossil Free Indexes' Carbon Underground 200™ (CU200) list. The Carbon Underground 200 includes the 100 public companies with the greatest potential CO_2 emissions based on reported coal reserves (expressed in gigatons of carbon dioxide, or Gt CO_2), and the 100 public companies with the greatest potential CO_2 emissions based on reported oil and gas reserves.

Harvard held $19.6 million of equity in Anadarko Petroleum, Petrobras, Range Resources, and Vale. The total potential CO_2 emissions from the oil, gas, and coal reserves of these four companies, if all their current reserves were to be burned, would exceed 11 gigatons (Gt) of CO_2.

Harvard Direct Holdings of Carbon Underground Companies, December 2014

Company Name	Market Value of HMC Holdings ($M)	Rank in CU100*	Potential CO_2 Emissions from Reserves ($GtCO_2$)
Anadarko Petroleum	11.6	22	0.984
Petrobras	2.0	7	5.432
Range Resources	1.7	40	0.443
Vale	4.3	22	4.401
Total Above	**19.6**		**11.26**

**Vale rank in CU100 Coal; others rank in CU100 Oil & Gas*

Excludes indirect holdings of fossil fuel equities through investment managers

Source: Fossil Free Indexes LLC

Harvard Financed Reserve Emissions through Direct Equity Holdings

Harvard was allocated a portion of the total reserves-related potential CO_2 emissions of each directly held fossil fuel company using methodologies used by financial firms to assess the carbon footprint of their portfolio holdings. These "financed emissions", representing its share of total reserves-based emissions allocated in proportion to its ownership of equity, amounted to more than 1 million tons of CO_2.

The largest portion of this was contributed by Harvard's holding of Vale, the Brazilian mining corporation ranked #22 on FFI's Carbon Underground Coal 100 list. Harvard owned slightly more than 0.01% of the equity market capitalization of Vale, and was allocated that share of the company's total potential reserve based emissions. As a result, Harvard was financing almost 460,000 tons of potential CO_2 emissions from Vale's coal reserves.

Harvard Financed Reserves-Based CO_2 Emissions
Through Direct Stock Holdings as of December 2014

Company Name	HMC Share of Equity Market Cap (%)	HMC Financed Emissions (tCO_2)
Anadarko Petroleum	0.027%	263,311
Petrobras	0.004%	221,236
Range Resources	0.019%	85,094
Vale	0.010%	459,816
Total Above	**n/a**	**1,029,457**

Source: Fossil Free Indexes LLC

Harvard Financed Reserve Emissions through Direct ETF Holdings

Harvard also finances potential reserves-based CO_2 emissions through its holdings of exchange-traded funds (ETFs). More than 1.25 million tons of CO_2 is financed through seven ETF holdings.[1]

The largest contributors to this were a $21 million stake in Market Vectors Indonesia Index ETF, and a $22 million holding of iShares China Large-Cap ETF. The high emission intensity of the China ETF results from the concentrated nature of the portfolio and inclusion of three of the largest reserve owners in the world (China Shenhua, China Coal Energy, and Petrochina).

[1] HMC has a few additional ETF holdings but they are not included here as they represent negligible or no reserves-based emissions.

A relatively small $5 million holding of the Vanguard FTSE Emerging Markets ETF financed a disproportionately large 125,000 tons of reserve-based CO_2 emissions. This reflects the importance of several large coal, oil and gas companies based in India, China, and Russia that are among the biggest reserve owners in the world.

Through its $21 million holding of the iShares Core S&P 500 ETF (IVV), Harvard finances 33,000 tons of reserve-based CO_2 emissions. The S&P500 index included 26 Carbon Underground companies at the end of 2014, together representing 28 Gt of potential CO_2 emissions from reserves. The $70 billion iShares Core S&P 500 ETF in total financed 108 million tons of potential CO_2. Every $10,000 invested in this ETF represents 15.6 tons of CO_2 reserves-based emissions. This is equivalent to the amount of CO_2 released by burning 1,750 gallons of gasoline.

Harvard Financed Reserves-Based CO_2 Emissions
Through ETF Holdings as of December 2014

Fund	Market Value of HMC Holdings ($M)	HMC Financed Emissions (tCO_2)
Market Vectors Indonesia Index ETF	21.4	583,610
iShares China Large-Cap ETF	22.3	421,080
Vanguard FTSE Emerging Markets ETF	5.4	124,545
Vanguard FTSE Developed Markets ETF	11.8	63,886
iShares Core S&P 500 ETF	21.5	33,049
iShares MSCI South Korea Capped ETF	44.9	14,808
Vanguard Dividend Appreciation ETF	6.1	10,885
Total Above	**133.4**	**1,251,863**

Source: Fossil Free Indexes LLC

Estimating Total Reserve Emissions for the Endowment

According to HMC's annual report, the policy portfolio of the endowment includes an 11% allocation to domestic equity, 11% to foreign equity, and 11% to emerging markets equity. The policy portfolio represents HMC's view on the optimal long-term mix for Harvard's endowment assets, and serves as a reference portfolio in allocating capital across markets and among asset classes.

Roughly $12 billion of the endowment is thus likely invested in public equities. Assuming typical emissions intensities of the three major equity segments (domestic, foreign, and emerging), in line with those observed for the index ETFs held directly by the portfolio, we estimate that Harvard's endowment may finance more than 100 million tons of potential CO_2 emissions from the reserves of fossil fuel companies, through both direct and indirect holdings of public equities. This large number primarily reflects the high emissions intensity of the emerging market equities and Harvard's large policy allocation to the segment. Such a level of emissions would rank a company at #88 on The Carbon Underground Oil & Gas 100 list.

Additional reserve emissions are likely financed through the holdings of the corporate bonds of fossil fuel companies.

The Carbon Underground 200™ and the Carbon Budget

The Carbon Underground 200 identifies the 200 largest public coal, oil, and gas companies based on estimates of the potential CO_2 emissions of their reported reserves. In 2015, the reserves of these companies total 555 Gt of potential CO_2 emissions, almost five times more than can be burned based on a carbon budget for the world to have an 80% chance of limiting global temperature rise to 2°C (3.6° F). The carbon budget is based on the IPCC's calculation of the amount of carbon that can be released into the atmosphere in the future and still have an 80% probability of keeping global warming under 2° Celsius increase over pre-industrial levels.

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For More Information

For questions on this research, email Fossil Free Indexes at: info@fossilfreeindexes.com. For information on how to subscribe to The Carbon Underground 200 quarterly updates and securities identifiers, and for tools to implement fossil-free investment strategies or for portfolio research, email Fossil Free Indexes at CU200@fossilfreeindexes.com. To stay current with our work, visit www.fossilfreeindexes.com, and follow the company on Twitter (@FossilFreeIndxs).

About Fossil Free Indexes

Fossil Free Indexes provides benchmarks, tools and research to support carbon responsible investing. The company's focus is on climate risk and the development of broad market indexes ex-fossil fuels, defined in line with the divestment movement.

In June of 2014, FFI released the Fossil Free Indexes US (FFIUS). Based on the S&P 500 and screened to exclude the largest oil, gas, and coal companies as identified by The Carbon Underground 200™ list, the FFIUS is the first index to leverage the long-term growth of US large cap indexes while addressing the risk of a carbon bubble.

FFI indexes are used as benchmarks and licensed for funds, ETFs, and separate accounts, as the basis for investable products and strategies.

FFI also provides research and consulting services to assist asset owners and investment managers in extending the scope of their carbon risk and carbon footprint analysis, and in identifying strategies to reduce the carbon intensity of investment portfolios.