INVESTMENT STRATEGIES INCORPORATING ENVIRONMENTAL OPERATIONAL RISK ASSESSMENT DATA:

CLEAR Info case studies for active and passive investors

SUMMARY

CLEAR Info is a project that aims to demonstrate a system for integrating company and site level environmental data into decision making. Part of this involves using operational risk assessment (Opra) scores that are produced annually by the Environment Agency (EA) for companies that it regulates and provides permits.

One project aim is to show that investors can identify stocks that better manage their environmental risks and that those companies offer higher returns for lower risk. In particular, Opra data provides insight into resource efficiency, non-compliance and management performance. This report discusses three approaches to analysing investor's environmental risk: **sector profiling**, **engagement** and **enhanced indexing**.

Sector profiling uses Opra data to identify environmental risks inherent to companies operating in a given sector. Opra data is an EA published site level environmental score that covers 170,000 UK company sites calculated on data collected in regulatory filings. This report demonstrates how that sector knowledge can help in two ways: firstly, to hone in on engagement themes; and secondly, to identify an anchor for an environmentally enhanced index.

Sector profiling identifies material risks for investors to engage companies. Investors can extract a wealth of information from the data because it is robust and the scoring methodology is transparent. Furthermore, the score has five separately scored subcategories that investors can use to highlight engagement themes: operational complexity, emissions, proximity to sensitive areas, operator performance and compliance. The engagement section focuses on emissions scores.

Sector profiling can include calculating sector average scores. Those average scores are useful for enhanced indexing because index construction can adjust stock weights based on deviation from the sector's environmental score mean. This report suggests that Opra's operator performance data is used to tilt the index because on average good operator performance scores correlated with better risk adjusted returns in the 10 years up until March 2012. The recommended enhancement rewards better environmentally scoring companies with higher investment weight allocations.

The CLEAR Info project is ongoing and will proceed to demonstrate environmental data integration into investment strategies. Investors can already access Opra data to build sector profiles, engage companies with UK sites and inform stock selection. In 2014, the project intends to backtest an enhanced UK small cap index for benchmark tracking and outperformance, deliver training workshops for environmental integrations, share best practice with EU regulators and explore new ways to share data with investors and companies.

OPRA DATA FOR INVESTORS

The Environment Agency's (EA) operational performance risk assessment (Opra) data can help investors in three ways:

(I) Sector profiling

(II) Engagement targets and themes

(III) Enhanced indexing

The Opra score is a combination of complexity, emissions, location, operational performance and compliance scores which each measure relevant environmental risks [see Opra score explained].

Opra data supports development of sector environmental profiles. Those profiles identify material environmental risks through five score subcategories. The sector profiling section reviews one specific approach that develops sector averages. In particular, the approach uses the emissions Opra score subcategory and shows its consistency with another market data provider.

All five Opra score subcategories can help investors target companies for engagement on environmental factors. The engagement section focuses on offsite waste, air and land emissions in the construction sector. The EA assesses sites using an ordinal score from A, which is good, to E, bad. The analysis converts those scores to numerical ones so that A translates to 1, B to 2, which continues up to 5. Engagement opportunities are then identified as outliers using site score comparison to the sample's sector averages.

Stock selection and enhanced indexing can also use Opra data. On average investing in good Opra operator performance score companies would achieve better risk adjusted returns. The report focuses on enhanced indexing and recommends tilting stock weights according to environmental risk factors. Risk averse investors can closely track an index, but also benefit from tilting away to achieve better risk adjusted performance. Existing large cap indices, including LGIM's UK Equity Carbon Optimized Index Fund and S&P IFCI Carbon Efficient Index, already successfully implement environmental themed tilts. The opportunity for the Opra data is a small cap UK tilted index and the report recommends backtesting an Opra score driven tilt.

OPRA SCORE EXPLAINED

The Opra assessment provides a risk rating which the Environment Agency can use to allocate its regulatory resources and to determine how much a business will be charged for an activity.

Opra looks at what activity is being done, where it is done and how it is done. This allows EA to target resources at those facilities that pose the greatest risk to the environment and human health.

THE OPRA SCORE SUBCATEGORIES:

1. Complexity
•   Operational activities and on-site hazardous waste
•   Released and potentially released pollution Types of EA monitoring procedures

2. Emissions
•   Releases to air
•   Releases to water
•   Releases to land
•   Waste coming onto site
•   Waste transferred off site

3. Location
•   Proximity to residential, commercial and recreational areas
•   Proximity to areas under specific legal protection
•   Proximity to surface water and groundwater
•   Potential for direct release to water
•   Whether site is in a specific council target area for air pollution

4. Operator performance
•   Implemented Management systems
•   Recent formal enforcement action taken at the site

5. Compliance
•   Keeping within conditions of the permit
•   Potential environmental implications of non-compliance
•   Suggested penalties for failing to meet permit conditions

OPRA DATA FOR INVESTORS

(I) SECTOR PROFILING

Opra site emissions data can inform construction and material sector emission averages to benchmark companies for corporate engagement. Extending benchmark calculations to more sectors and other Opra score subcategories would further benefit stock selection and enhanced indexing.

This report recommends sector profiling with Opra data because it aligns with existing environmental vendor data, but further testing with larger data samples and more sectors would further support the report's findings. In addition, a consistently applied, relevant and robust methodology to create a benchmark is needed to accurately reflect the other four subcategory's information and to conduct meaningful data set comparisons.

AN OPERATIONAL EMISSIONS FOCUS
High operational air and land emissions correlate most with poor construction and materials sector overall Opra performance. We use that finding to narrow our focus on emissions to develop Opra sector averages.

A CONSTRUCTION AND MATERIALS SECTOR FOCUS
The analysis targets construction and materials companies because that sector had the most number of regulated sites in our sample.

Complements data vendor information

Opra emissions data supports market vendor company profiles and so helps investment managers with engagement. Construction and materials sector Opra emission score profiles match stock environmental profiles published by Trucost, an environmental risk consultancy. The similarities between the different data sets support the use of Opra data to inform corporate engagement because it can complement existing environmental investment strategies.

Trucost data was used to assess disclosed UK construction company operational environmental performance data. A randomly selected company from the analysed construction and materials sample disclosed performance data via its annual environmental reports and the CDP in 2011. Trucost data identified the top five

emissions sources to include waste, greenhouse gas and air pollution [see table 1].

This is mirrored by 106 construction and materials company sites' Opra scores. Air emissions (64% of the sites), land emissions (60%) and waste (48%) are the three most regulated indicators in the emissions Opra category. Furthermore, the construction and materials sector, on average, scores worst on its land emissions with a score of 3.7, air emissions are second worst and averages a 2.7 and waste performance is best of the three with a 1.9 average [see figure 1].

FIGURE 1: CONSTRUCTION AND MATERIALS INDUSTRY AVERAGE COMPANY SCORES
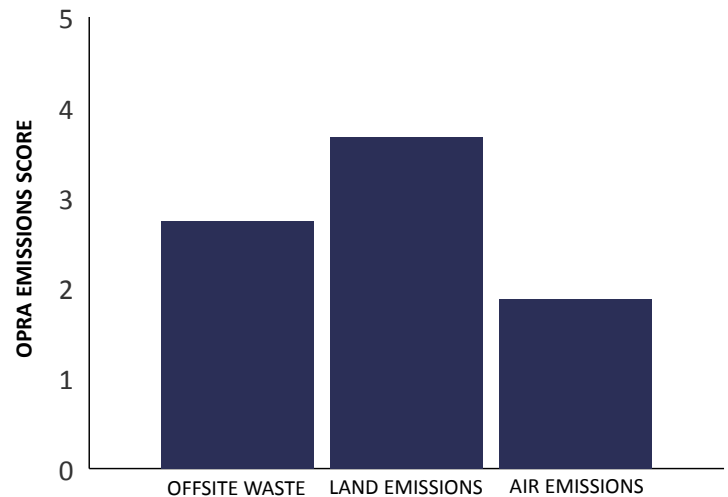
LIMITATIONS
1. Emissions data was compared against one data vendor for one sector. Further analysis should at least extend to more sectors.

2. Financial data availability limited the analysis to 106 sites. Increasing the sample size will improve robustness of the results.

TABLE 1: A UK BASED CONSTRUCTION COMPANY'S EMISSIONS

EMISSION	UNIT	SOURCE	QUANTITY
Landfill Non-Hazardous	Tonnes	Environmental report	504,215
Carbon Dioxide To Air	Tonnes	CDP	348,522
Nitrogen Oxide To Air	Tonnes	CDP	8,103
Particulates To Air	Tonnes	CDP	568
Sulphur Dioxide To Air	Tonnes	CDP	526

OPRA DATA FOR INVESTORS

Opra sector profiles for investors

Sector profiles can help identify characteristic sector environmental risks and to calculate sector benchmarks. Investors can use those sector environmental risks in at least two ways: risk identification for engagement and as an anchor for enhanced indexing.

Asset managers can highlight corporate engagement themes using Opra data. The engagement targets and themes sections demonstrates one approach, which compares poor performance against the industry average to flag improvement opportunities. Waste, air and land emissions are most material to the construction and material sector, according to both Opra and Trucost data, and are used for engagement target analysis.

Top down stock selection processes can use sector profiles because investments in companies with good Opra operator performance scores on average deliver better risk adjusted returns.

Enhanced indexing can also reweight using Opra operator performance data and achieve better returns for a given risk level. A sector neutral enhanced indexing strategy adjusts allocation weights to benefit stocks that are better than the industry operational score average at the expense of those that are worse.

SCORING
The EA assesses sites using an ordinal score from A, which is good, to E, bad, to assess performance at each site. The sector profile analysis converts those scores to numerical ones so that A translates to 1, B to 2, which continues up to 5.

(II) ENGAGEMENT

Outlier analysis on the construction and materials sector identifies five target companies across three environmental indicators. One approach to identify engagement opportunities is to compare a company's site level performance versus an industry's benchmark.

This example analysis isolates the construction and materials sector and limits environmental indicators to three subcategories of the emissions score: air emissions, emissions to land and waste production.

Companies with the most significant and regular outliers can be targeted for engagement. Investors can identify outliers through benchmark comparisons of operational sites. For example, a construction company with much higher air emissions than the sector's average will possibly be an outlier. In figures 2 to 4, the sector average line is the mean score of all the construction and materials sites' emissions scores.

Air emissions
Four of Company 7's six sites were scored for air emissions and each of the four were outliers for the sector. Company 7 should be an engagement target [see figure 2].

Land emissions
Companies 1, 20 and 27 are identified as land emissions engagement opportunities because they consistently emit more than the industry average [see figure 3].

Off-site waste
Off-site waste is a problem for Companies 13 and 27. Indeed, eight of nine sites operated by Company 27 had worse than average scores and three of those were outliers within the sample [see figure 4].

OPRA DATA FOR INVESTORS

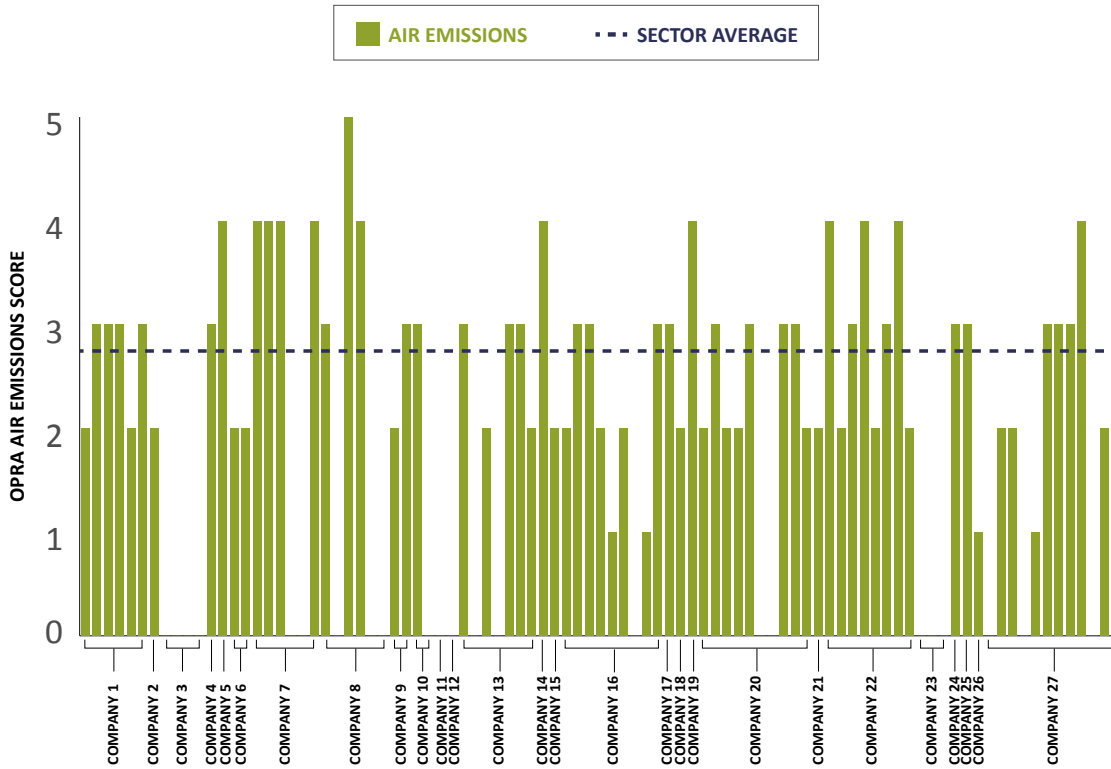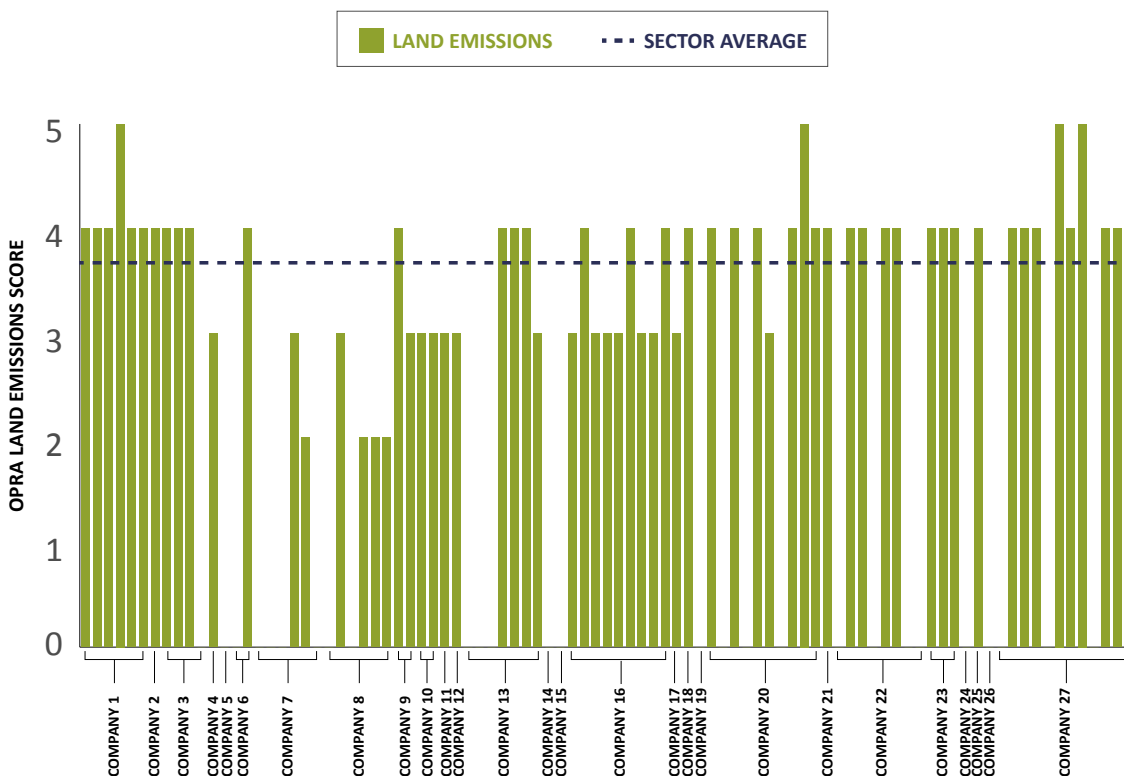**FIGURE 2: CONSTRUCTION AND MATERIALS SECTOR COMPANY AIR EMISSIONS VS SECTOR AVERAGE**

FIGURE 3: CONSTRUCTION AND MATERIALS SECTOR COMPANY LAND EMISSIONS VS SECTOR AVERAGE

OPRA DATA FOR INVESTORS

(III) ENHANCED INDEXING

Index construction can use Opra operator performance scores to enhance and index and help deliver outperformance, reduce risk and promote environmental sustainability, but still track a benchmark. There are two index enhancement strategies: a full universe tilt and a sector neutral tilt.

SHARPE RATIO
A ratio developed to measure risk-adjusted performance. The Sharpe ratio is calculated by subtracting the risk-free rate, such as that of the 3-year U.K. government bond, from the rate of return for a portfolio and dividing the result by the standard deviation of the portfolio returns.

Investing in better operator performance companies achieves higher risk adjusted returns

The Environment Agency's Opra data could help investors achieve environmentally sustainable and better risk adjusted returns over the long term.

Over ten years to March 2012 better Opra scores correlated with a higher Sharpe ratio across five sectors [see figure 5]. Indeed, investors could access on average over 3 basis points improved Sharpe ratio by using an index enhancement strategy that overweighted the top half Opra scoring stocks and underweighted the bottom half.

However, tilting without sector neutrality can result in high sector concentrations. In response, normalising for any sector bias can match most benchmark risk factors and also allow for a slight tilt on environmental performance.

Operator performance scores focus on two indicators
i) Implemented Management systems
ii) Recent formal enforcement action taken at the site

FIGURE 5: SHARPE RATIOS OF TOP AND BOTTOM HALF OPRA SCORES
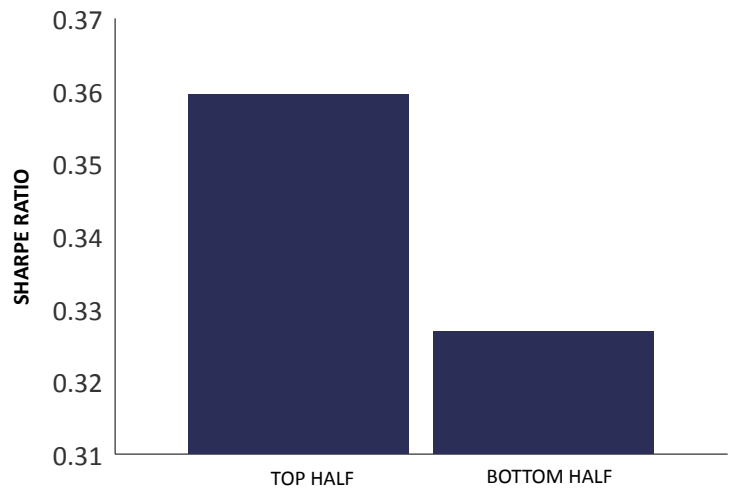
Top half tilts are good but best to normalise for sector bias

Investors can use operator performance data to achieve better risk adjusted returns across five sectors. However this strategy exposes investors to a sector bias and so the environmental data is better used for sector neutral enhancements.

Trucost analysed 10 years of total returns and volatility across 76 stocks to find that companies with top environmental operational performance scores tended to have better Sharpe ratios.

Across the five sectors, the risk adjusted performance mismatch arises partly because the Opra system gives better scores to low impact sectors. Evidently different sector operational characteristics diverge and often require varying levels of environmental management expertise. The Opra system won't normalise for those differences, which will cause sector scores to cluster.

For example, after splitting the sample in half, 75% of food and beverage (F&B) companies were in the better performing half of the operator performance scores. Furthermore, the F&B sector had second highest average Sharpe ratio, which lifted the top half's average risk-adjusted returns.

An investment strategy that enhanced index investments for operator performance scores would drive both higher risk adjusted returns and more sustainable investments. However, those tilts would also increase the risk of mismatching between the enhanced index and the benchmark mainly because the data has an intrinsic sector bias.

A sector neutral strategy can effectively reduce the factor risk mismatch and also capitalise on both the return and environmental benefits.

OPRA DATA FOR INVESTORS

FIGURE 6: SHARPE RATIOS OF FIRST AND FIFTH QUINTILE OPERATOR SCORES
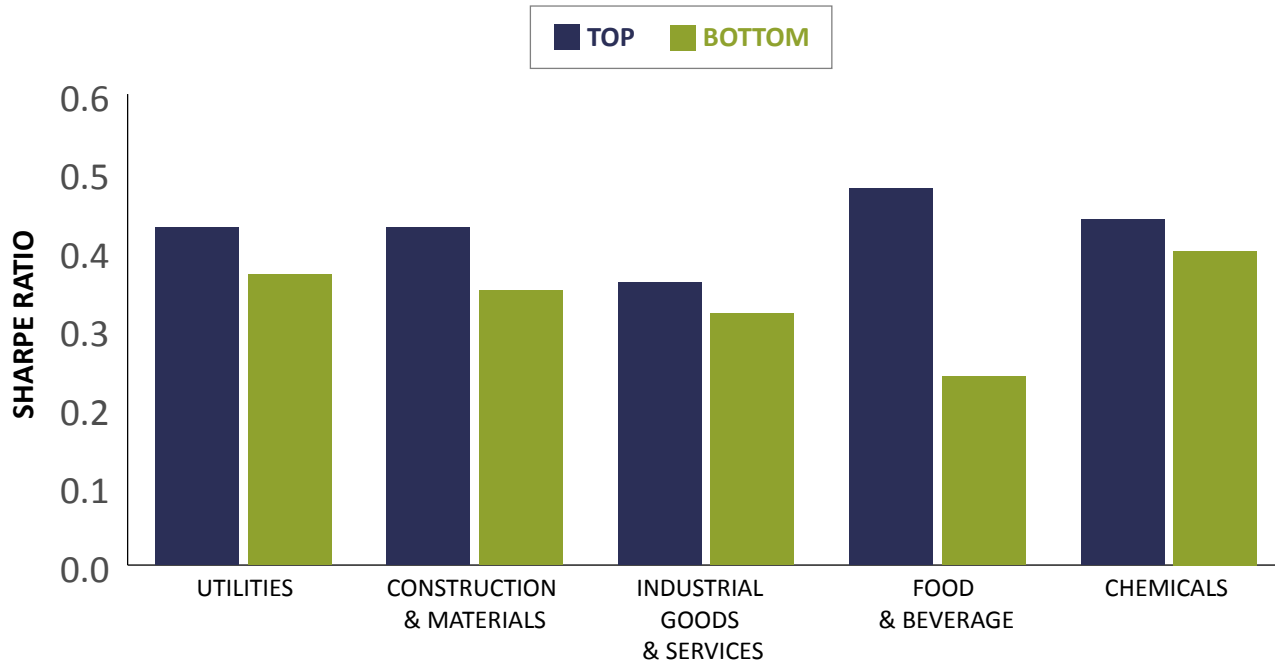
Better risk adjusted returns in all five sectors

Operator performance score data could enhance a UK small cap index because on average better scores achieve better risk-adjusted returns within each of the five sectors [see figure 6].

In all five analysed sectors, companies within the top quintile of Opra scores had higher Sharpe ratios than the fifth quintile. That relationship held for 10 years of total returns and volatility data across chemicals, construction, food and beverage, industrial goods and services, and utilities sectors.

Small cap index

Opra data can rebalance index exposure to favour better environmentally performing small cap companies, which is a new opportunity for investors and index providers. Historically, only large cap indices incorporated environmental tilts or investors preferred clean technology indices for specific industry exposure.

Indices tend to tilt large cap indices with environmental data because small cap data is not available. Indeed over 99% of the FTSE 100 report some environmental data but the all share data disclosure is far lower.

Alternatively, investors looking to capitalise on the growing demand for resource efficiency and green energy would buy into clean technology funds. However, investing in those funds would not offer the same diversification available to a market tracking index investor.

LIMITATIONS [CONT]

3. Emissions data was compared against one data vendor for one sector. Further analysis should at least extend to more sectors.

4. Financial data availability limited the analysis to 106 sites Increasing the sample size will improve robustness of the results.

OPRA DATA FOR INVESTORS

S&P IFCI Carbon Efficient Index is a good model

The S&P IFCI Carbon Efficient Index is designed to outperform, but closely track the performance of the S&P IFCI LargeMidCap, a broad emerging markets benchmark, while significantly reducing the carbon footprint of the overall portfolio.

Sector and country neutrality ensures that most risk factors align with the benchmark which allows for slight benchmark weighting mismatches based on intra-sector carbon efficiency. The index consistently outperforms the benchmark [see Figure 7]

Enhanced index opportunities

There is an opportunity for Opra data to drive a UK small cap enhanced index, but backtesting is first needed to further substantiate the relationship between good environmental management and better risk adjusted returns. Market data providers already offer environmental performance information on large cap listed companies. The Opra data's key benefit is it is collected for small cap UK based companies.

Domestic investors seeking higher returns often look for small cap UK investments. However, few products can offer both small cap indices and simultaneously promote sustainable development.

FIGURE 7: S&P IFCI CARBON EFFICIENT INDEX VS S&P IFCI LARGE/MID CAP COMPOSITE TOTAL RETURNS (REBASED TO 100)
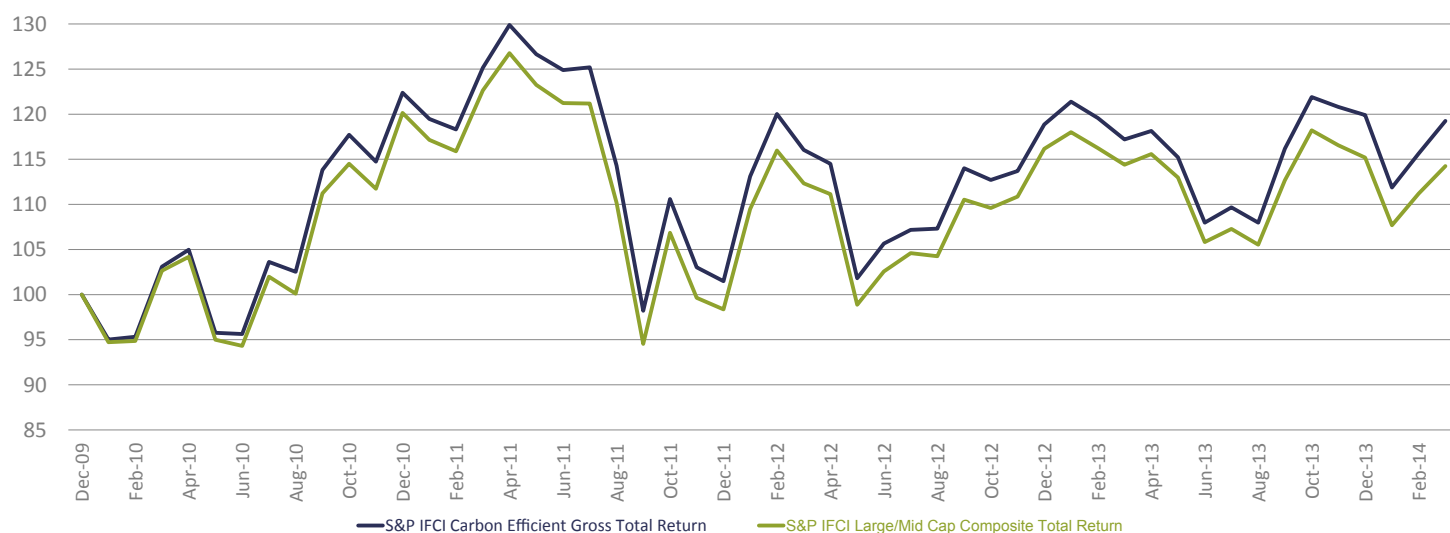
Potential data uses and next steps

Investors can reduce risk, increase returns and promote environmental sustainability by using the EA's Opra score during investment decision making. Opra data is available to investors and this report recommends three strategies to incorporate the data into investment decisions.

Firstly, investors can use Opra data to develop sector profiles and through that process identify material environmentally sourced investment risks. Secondly, the Opra scores are split between five subcategories, which allows investors to investigate aspects such as compliance, emissions and management performance through engagement with companies. The last approach incorporates sector profile environmental risks to assess stocks in a selection process.

The CLEAR Info project is ongoing and will proceed to demonstrate environmental data integration into investment strategies. In 2014, the project intends to backtest an Opra score enhanced UK small cap index, deliver training workshops for environmental integrations, share best practice with EU regulators and explore new ways to share data with investors and companies.

ABOUT THE AUTHORS

Trucost helps companies and investors identify environmental risks, as well as opportunities to manage them. Trucost offers expert advice and research to institutional investors, major corporations, both public and private, and to Government departments and associated agencies. Coverage includes the S&P 500, ASX 200, FTSE All-Share, Russell 1000, Nikkei 225, DJ STOXX and MSCI AWD and S&P/IFCI LargeMidCap indices.

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