So far, there are few signs that either companies or countries have been able to decouple economic growth from carbon emissions growth. PWC
There are a number of significant drivers accelerating the integration of ESG into mainstream investment analysis.

**Regulatory**
- Fiduciary duty
- FASB disclosure
- SEC disclosure

**Client Demand**
- UN PRI ($30tr); CDP ($67tr)
- EAI ($2.4tr)
- ABP, CalPERS, CalSTRS, NYCERS, FRR, PGGM, CPPIB, etc.

**Market**
- Sell-side ESG Research departments
- Specialist Independent Research, Ratings, Data and Consultancy businesses
- Increased corporate awareness

**Advisors**
- CFA Institute
- Mercer; Pricewaterhouse; McKinsey
- Rise of NGO’s (KKR and EDF)

**SRI + Mainstream**

"More mainstream investors recognize that they can improve their financial returns by focusing on companies that prioritize sustainability…"  
- Abby Joseph Cohen, Goldman CIO

"a company must disclose potential legislation or other significant risks that it faces, whether those risks are due to increased competition or severe weather.”  
- Mary Shapiro, Former SEC Chair

"ESG factors represent a broad set of intrinsic concerns that may ultimately affect valuation of equity, fixed-income, real estate and infrastructure investments...”  
- Matt Orsagh – CFA Institute

"Mercer believes that ESG factors are important - our clients (some of the largest asset owners in the world) do too.”  
- Craig Metrick, Mercer Investment Consulting
As a result, products and initiatives are now proliferating across asset classes, types and organizations.

The range of institutions integrating ESG into their business illustrates uptake:

**Mutual Funds (Equity and Fixed Income)**
- AllianzGI Global Water Fund
- Calvert Bond Portfolio (CSIBX)
- PIMCO Socially Responsible Emerging Markets Bond Strategy

**Sell-Side Research**
- ESG & Sustainability
  - Bank of America
  - Merrill Lynch
  - Goldman Sachs
  - GS SUSTAIN

**Index Products**
- Barclays MSCI ESG Fixed Income Indices - Product Launch
- STOXX ESG Leaders Indices
- FTSE4GOOD INDEX SERIES

**Exchange Traded Product**
- iShares MSCI USA ESG Select ETF
- iShares MSCI KLD 400 Social ETF
- PowerShares Cleantech Portfolio
- ESGShares PAX MSCI EAFE ESG Index ETF

**Stock Exchanges**
- Sustainable Stock Exchanges Initiative
- NASDAQ OMX
- NYSE Euronext
- BM&FBOVESPA
- JOHANNESBURG STOCK EXCHANGE

**Private Equity**
- KKR
- Environmental, Social & Governance Practices at Actis
It is now estimated that nearly 1 in 10 AUM $$ globally is managed using ESG criteria in varying forms.

Bloomberg has seen a 41% annual growth rate in users of ESG data since 2009
Climate change around the world has been a prominent topic.  The UN Climate Change Conference in Paris in Dec. 23 adds to longer-term concerns about growth in fossil fuel use.  In 2013, more than 1,000 companies representing $800 billion in assets committed to divest fossil fuels, according to Arabella Advisors. This is part of a growing trend of divestment from companies, which is also being driven by government and institutional investors.

Figure 1: Total Assets Divested By Sector ($50 billion)

Source: Arabella Advisors, Measuring the Global Fossil Fuel Divestment Movement, Sep 22, 2014

For interactive exhibit on Bloomberg, run: DOCC CF US000000002172866401 P2<GO>
Though increasing calls on fossil fuel companies is unlikely to trigger any direct impact on share prices, as buyers would turn away. A campaign may succeed in lowering valuations by changing investor assumptions about future cash flow probability, according to research from the University Stranded Assets Programme. This suggests coal, oil and gas stigma may succeed in lowering company valuations, without an earnings impact.


For interactive exhibit on Bloomberg, run: DOCC CF US000000002140685370 P35<GO>
Fuel Investment Scrutiny Grows Even Without Carbon Tax

Gregory Elders

214

After Australia’s repeal of a carbon tax in July, investors have been ramping up attention to their fossil fuel exposure in their superannuation funds. The group Super Switch launched a campaign Sept. 2 calling on fund managers to not invest in Whitehaven Coal operations in Queensland. The initiative has prompted fund managers to not invest in coal holdings.

For interactive exhibit on Bloomberg, run:
HTTP 3674263<GO>
Stranded Carbon Assets: Tools For Investors

Gregory Elders

14

The growing environmental pressure to reduce or divest fossil fuel investments because of climate change creates a challenge for managers in matching the investment characteristics. While divestment is feasible, no alternative matches oil or its scale, yield and earnings according to Bloomberg New Energy Finance. Spreading investments across technology, non-energy, (green) real assets and others could offer a way to deploy capital.


For interactive exhibit on Bloomberg, run: DOC CF US0000000002169553253 P12<GO>
Stranded Carbon Assets: Tools For Investors

The announcement of a FTSE Index Fossil Fuel Index is one of a wave of which global asset managers are following. BlackRock will run a fossil-free, divestment capital from the fossil-free market will be the driving force behind the growing interest in carbon. The interest in carbon is that explicitly avoids funding of asset-exposed assets.
The Fossil Free Indexes has focused on 200 public companies with the largest fossil fuel reserves. The largest contributor is China, followed by Coal India, and Shenhua.

For interactive exhibit on Bloomberg, run:
DOCC CF US0000000002140728720 P11<GO>
Shareholder Support Spells Out Carbon Financing Risk

American investors rejected the Bank of America's request to report on carbon emissions linked to companies it finances. That said, 24% voted against (shareholder votes are unanimous), including financial institutions such as Norges Bank and the BofA is the only bank to report on the carbon intensity of its dirty U.S. utilities loan portfolio. Its was 0.58 metric tons of CO2 per year in 2010, vs. a U.S. average of 0.56, and 0.54 for its nuclear-produced electricity.
University is the latest to move toward divesting in coal, saying it will remove holdings from its endowment (PDF), bowing to student demands at least 11 other schools that have pledged to divest fossil fuels and 426 that have signed petitions, including MIT. (College that was planning to divest from apartheid investments, which the fossil fuel divestment campaign is modeling after, corrects to say that it is not only divesting coal.)
FREQUENTLY ASKED QUESTIONS

How much carbon dioxide is produced per kilowatthour when generating electricity with fossil fuels?

You can calculate the amount of carbon dioxide (CO₂) produced per kilowatthour (kWh) for specific fuels and specific types of generators by multiplying the CO₂ emissions factor for the fuel (in pounds of CO₂ per million Btu) by the heat rate of a generator (in Btu per kWh generated), and dividing the result by 1,000,000.

Below are the number of pounds of CO₂ produced by a steam-electric generator for different fuels using the above formula and the average heat rates for steam-electric generators in 2012 for calculating the amount of CO₂ produced per kWh:

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Lbs of CO₂ per Million Btu</th>
<th>Heat Rate (Btu per kWh)</th>
<th>Lbs CO₂ per kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>265.300</td>
<td>10,197</td>
<td>2.08</td>
</tr>
<tr>
<td>Bituminous</td>
<td>212.700</td>
<td>10,197</td>
<td>2.16</td>
</tr>
<tr>
<td>Lignite</td>
<td>215.400</td>
<td>10,197</td>
<td>2.18</td>
</tr>
<tr>
<td>Natural gas</td>
<td>117.080</td>
<td>10,416</td>
<td>1.22</td>
</tr>
<tr>
<td>Distillate Oil (No. 2)</td>
<td>161.386</td>
<td>10,416</td>
<td>1.68</td>
</tr>
<tr>
<td>Residual Oil (No. 6)</td>
<td>173.596</td>
<td>10,416</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Last updated: April 17, 2014
More than a decade later, Europe’s biggest economy is on course to miss its 2020 climate targets and greenhouse-gas emissions from power plants are virtually unchanged. Germany used coal, the dirtiest fuel, to generate 45 percent of its power last year, the highest level since 2007, as Chancellor Angela Merkel is phasing out nuclear in the wake of the Fukushima atomic accident in Japan three years ago.

While new supplies sent wholesale power prices to their lowest level in nine years, consumer rates are soaring to fund the new plants. Germany’s 40 million households now pay more for electricity than any other country in Europe except Denmark, according to Eurostat in Brussels.
Stranded Carbon Assets: Tools For Investors

Oil and gas may find assets stranded by steps climate change depend profitability, not just policy. Even without action, tightening pollution rules from China may crimp oil Pressuring the price. With rising costs already hurt returns, may find more projects ideal. Strong climate policy combating the impact.

For interactive exhibit on Bloomberg, run: XLTP XCO2<GO>
Bloomberg provides ESG data, analytics, research and news to support integration into investment decisions.

**OVER 10,000 COMPANIES COVERED; 700 DATA POINTS**

**FA ESG <GO>**

**BI ESG <GO>**

**TOP ESG <GO>**
Screening

Building on the idea that environmental factors have real impacts on profitability, screening on GHG emissions, fuel intensity, and water consumption is leading to strategies that identify sustainable signals as well as scoring models based on qualitative and quantitative data.
Screening out sector exposure

Negatively screen out sectors or screen +100 ESG fields including custom scores
## CO2 PRODUCTION: WORKS OFFENDERS

### Table: CO2 Production and ESG Risk

<table>
<thead>
<tr>
<th>Ticker</th>
<th>Short Name</th>
<th>Total GHG1 / CO2 Emiss</th>
<th>CDLI Score:Y</th>
<th>CDP Rep CO2 Met:Y</th>
<th>Coal Used:Y</th>
<th>Revenue T12M</th>
<th>Market Cap</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) NRG</td>
<td>NRG ENERGY</td>
<td>19.01</td>
<td>78.00</td>
<td>0.13</td>
<td>49.19</td>
<td>4.40B</td>
<td>7.89B</td>
<td>53.48</td>
</tr>
<tr>
<td>2) AEP</td>
<td>AMERICAN ELECTRIC</td>
<td>9.63k</td>
<td>86.00</td>
<td>49.74</td>
<td>22.73k</td>
<td>13.39B</td>
<td>10.55B</td>
<td>31.25</td>
</tr>
<tr>
<td>3) DUK</td>
<td>DUKE ENERGY CORP</td>
<td>6.32k</td>
<td>68.00</td>
<td>121.93</td>
<td>55.00k</td>
<td>16.64B</td>
<td>26.04B</td>
<td>53.28</td>
</tr>
<tr>
<td>4) ETR</td>
<td>ENTERGY CORP</td>
<td>4.84k</td>
<td>67.00</td>
<td>N.A.</td>
<td>39.55k</td>
<td>25.39B</td>
<td>52.61B</td>
<td>74.38</td>
</tr>
<tr>
<td>5) SO</td>
<td>SOUTHERN CO</td>
<td>3.77k</td>
<td>100.00</td>
<td>34.49</td>
<td>2.14k</td>
<td>12.25B</td>
<td>13.80B</td>
<td>76.82</td>
</tr>
<tr>
<td>6) CNX</td>
<td>CONSOL ENERGY</td>
<td>3.42k</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>18.05B</td>
<td>39.13B</td>
<td>43.69</td>
</tr>
<tr>
<td>7) NI</td>
<td>NISOURCE INC</td>
<td>3.35k</td>
<td>78.00</td>
<td>0.21</td>
<td>N.A.</td>
<td>3.82B</td>
<td>8.75B</td>
<td>38.01</td>
</tr>
<tr>
<td>8) TEG</td>
<td>INTEGRYS ENERGY</td>
<td>2.60k</td>
<td>50.00</td>
<td>13.67</td>
<td>6.17k</td>
<td>6.33B</td>
<td>12.54B</td>
<td>39.76</td>
</tr>
<tr>
<td>9) D</td>
<td>DOMINION RES/VA</td>
<td>2.33k</td>
<td>32.00</td>
<td>8.48</td>
<td>N.A.</td>
<td>7.20B</td>
<td>5.34B</td>
<td>66.77</td>
</tr>
<tr>
<td>10) PNW</td>
<td>PINNACLE WEST</td>
<td>2.32k</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>13.06B</td>
<td>40.16B</td>
<td>68.92</td>
</tr>
<tr>
<td>11) APA</td>
<td>APACHE CORP</td>
<td>2.21k</td>
<td>48.00</td>
<td>N.A.</td>
<td>N.A.</td>
<td>3.44B</td>
<td>6.24B</td>
<td>56.51</td>
</tr>
<tr>
<td>12) FLR</td>
<td>FLUOR CORP</td>
<td>1.85k</td>
<td>70.00</td>
<td>6.13</td>
<td>N.A.</td>
<td>15.15B</td>
<td>36.91B</td>
<td>96.51</td>
</tr>
<tr>
<td>13) XOM</td>
<td>EXXON MOBIL CORP</td>
<td>1.74k</td>
<td>48.00</td>
<td>N.A.</td>
<td>N.A.</td>
<td>23.61B</td>
<td>11.07B</td>
<td>70.27</td>
</tr>
<tr>
<td>14) HCP</td>
<td>HCP INC</td>
<td>1.69k</td>
<td>80.00</td>
<td>126.00</td>
<td>N.A.</td>
<td>391.49B</td>
<td>414.19B</td>
<td>97.12</td>
</tr>
<tr>
<td>15) SE</td>
<td>SPECTRA ENERG</td>
<td>1.60k</td>
<td>97.00</td>
<td>0.03</td>
<td>N.A.</td>
<td>2.14B</td>
<td>18.35B</td>
<td>39.99</td>
</tr>
<tr>
<td>16) COP</td>
<td>CONOCOPHILLIPS</td>
<td>1.61k</td>
<td>98.00</td>
<td>N.A.</td>
<td>5.80B</td>
<td>27.13B</td>
<td>40.44</td>
<td></td>
</tr>
<tr>
<td>17) LYB</td>
<td>LYONDELLBASELL-A</td>
<td>1.49k</td>
<td>83.00</td>
<td>18.72</td>
<td>N.A.</td>
<td>56.13B</td>
<td>99.05B</td>
<td>80.56</td>
</tr>
<tr>
<td>18) MRO</td>
<td>MARATHON OIL</td>
<td>1.40k</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
<td>45.54B</td>
<td>58.41B</td>
<td>114.0</td>
</tr>
<tr>
<td>19) EVC</td>
<td>EVLON CORP</td>
<td>1.39k</td>
<td>98.00</td>
<td>35.38</td>
<td>N.A.</td>
<td>35.94B</td>
<td>39.59B</td>
<td>54.44</td>
</tr>
</tbody>
</table>

*Note: CO2 Production values are in thousands.*
Score, Rank, Backtest results

Backtest the portfolio of screened stocks.

Create rankings, scores, & alerts on screened criteria.
Backtesting: Exclude Carbon users, Overweight Value

Historical analysis versus a benchmark

Statistical overview and analysis available in PORT
Portfolio Risk and Analytics

Portfolio Risk and Analytics tools have advanced to allow investors to quantify risks and understand how non carbon portfolios might behave.

<table>
<thead>
<tr>
<th>Model</th>
<th>Total Return</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>EQBT-ESG: Ex vs BIG RUSS</td>
<td>232.91</td>
<td>132.09</td>
</tr>
<tr>
<td>Active Return</td>
<td>100.82</td>
<td></td>
</tr>
</tbody>
</table>

| Active Return Attribution Summary | | |
|-----------------------------------|---------------------------------|
| Active Return | Allocation | Selection |
| 100.82 | 6.44 | 94.32 |

<table>
<thead>
<tr>
<th>Excess Return Summary Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg Active Weight</td>
</tr>
<tr>
<td>6.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Attribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Care</td>
</tr>
<tr>
<td>74.84</td>
</tr>
</tbody>
</table>

Bloomberg // Stranded Carbon Assets: Tools For Investors
Portfolio Risk and Analytics

Multi Factor Modeling makes predicted risk analysis possible, for instance predicting a portfolio's effectiveness in inflationary environments.

Customizable scenario's allow testing of portfolio shocks.
Portfolio Optimization Settings

Investors can run complex optimization strategies to enhance their understanding and confidence in those strategies.

Multiple goals and constraints can be used.
## Portfolio Optimization Suggestions

### Optimization Summary
- **Round lot constraint has been violated for:**
  - **Turnover (%):** 20
  - **# of Buys:** 19
  - **# of Sells:** 18

### Goal Summary
- **Active Total Risk:** 1.23 → 1.06
- **Inflation:** 5.61 → 5.84

### Proposed Trades

<table>
<thead>
<tr>
<th>Security</th>
<th>Name</th>
<th>Trade</th>
<th>Quantity</th>
<th>Init. Weight (%)</th>
<th>Opt. Weight (%)</th>
<th>Wgt Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEG US</td>
<td>PUBLIC SERVICE ENTERPRISE</td>
<td>Buy</td>
<td>15,909</td>
<td>0.14</td>
<td>0.7</td>
<td>0.57</td>
</tr>
<tr>
<td>SHW US</td>
<td>SHERWIN-WILLIAMS CO/THE</td>
<td>Buy</td>
<td>2,642</td>
<td>0.13</td>
<td>0.63</td>
<td>0.68</td>
</tr>
<tr>
<td>PPG US</td>
<td>PPG INDUSTRIES INC</td>
<td>Buy</td>
<td>2,602</td>
<td>0.18</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>BA US</td>
<td>BOEING CO/THE</td>
<td>Buy</td>
<td>4,200</td>
<td>0.52</td>
<td>1.02</td>
<td>0.52</td>
</tr>
<tr>
<td>EMN US</td>
<td>EASTMAN CHEMICAL CO</td>
<td>Buy</td>
<td>6,176</td>
<td>0.08</td>
<td>0.58</td>
<td>0.58</td>
</tr>
</tbody>
</table>

### Portfolio and Group Constraint Results

<table>
<thead>
<tr>
<th>Field</th>
<th>Relative</th>
<th>Min</th>
<th>Max</th>
<th>Initial Value</th>
<th>Final Value</th>
<th>Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>PORTFOLIO</td>
<td>Turnover</td>
<td>INIT_PORTFOLIO</td>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PORTFOLIO</td>
<td>Trade Size (%)</td>
<td>INIT_PORTFOLIO</td>
<td>0.5</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Stored Results

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Benchmark</th>
<th>Reporting Currency</th>
<th>SubmitTime</th>
<th>Status</th>
<th>Cancel</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIVESTMENT</td>
<td>SPX</td>
<td></td>
<td>07/08/2014 10:27:23</td>
<td>Completed</td>
<td>Cancel</td>
</tr>
<tr>
<td>DIVESTMENT</td>
<td>SPX</td>
<td></td>
<td>07/08/2014 08:18:41</td>
<td>Completed</td>
<td>Cancel</td>
</tr>
<tr>
<td>DIVESTMENT</td>
<td>SPX</td>
<td></td>
<td>07/08/2014 07:59:05</td>
<td>Completed</td>
<td>Cancel</td>
</tr>
</tbody>
</table>
Portfolio Optimization Analysis
Recap of tools

Screen on an ever increasing set of Environmental, Social and Governance data at the Company level

Score, rank and backtest model portfolios

Understand the environmental impact of a portfolio

Stress test scenarios such as inflation

Optimize a portfolio towards a benchmark

Contact your sales rep: CANCEL<GO>
John Fisher, CFA  jfisher1@bloomberg.net