

ADVISORY COMMITTEE ON SHAREHOLDER RESPONSIBILITY

SPRING 2017 REPORT

Heather Williams, Chair; T.L. Guest, '17, Student Chair;
Matthew Gibson, Economics Department; Chase Epstein '17;
David Love, Provost; Frederick Pudderster, Vice President and Treasurer;
Paul Neely '68; Laurie Thomsen '79; Abigail Wattlely '05, Investment Office, ex officio

Executive Summary

In the Spring of 2015, after campus activism and a report from the Advisory Committee on Shareholder Responsibility (ACSR) concerning the issue of fossil fuel consumption¹, the President and Trustees of Williams College laid out initiatives for reducing the College's greenhouse gas emissions and addressing the community's impact on global warming².

In this report, the current version of the ACSR first reviews the advantages and disadvantages of the various options available to the college, such as divestment, improving energy efficiency on campus, educational initiatives, and impact investing of the college's endowment (in this report, we use the President and Trustees' definition for impact investing: "companies, projects, or technologies focused on the reduction of global greenhouse gas emissions"). We then summarize the progress the college has made in the areas defined by the President and Trustees. In particular, we highlight the successful and continuing efforts of the College administration and the Zilkha Center in the area of campus and local/regional energy efficiency initiatives. We also note that the events that make up the 2016-7 campus-wide initiative on Confronting Climate Change have been both visible and successful.

We present five recommendations for furthering the college's efforts in combatting climate change. Given the diverse viewpoints represented by committee members, consensus is hard to achieve and these recommendations did not receive uniform support.

1. Adjust the number of carbon offsets purchased to account for their imperfections.

When the college purchases carbon offsets to reduce its net footprint, it should take into account the fact that these offsets cannot be guaranteed. Thus we recommend that the college purchase more offsets than are nominally required to achieve its goals.

2. Increase campus efforts to reduce energy consumption. The work that campus committees and student groups that address energy efficiency and sustainability could be better coordinated and publicized. The College should also consider implementing internal incentives and constraints directed at changing collective choices that have an impact on fossil fuel consumption.

¹ The 2015 ACSR report can be found at <https://committees.williams.edu/other-committees/shareholder-responsibility/>

² <https://president.williams.edu/board-of-trustees/statement-by-the-board-of-trustees-and-president-adam-f-falk-on-the-colleges-role-in-addressing-climate-change/>

- 3. Introduce additional educational initiatives.** We recommend that additional educational initiatives be undertaken to provide practical experience for students interested in policies that mitigate climate change. One such possibility is Winter Study courses – such courses could, for example, address the drafting of legislation or regulations.
- 4. Publish the letter to investment managers and a summary of responses.** The letter of the Investment Office to fund managers urging sensitivity about fossil fuel investments could be made more easily available online, and a summary of responses to that letter should also be prepared and made available online.
- 5. Increase impact investing activity.** We recommend that the Investment Committee and the Investment Office work on finding ways to increase the pace of impact investing in sustainable energy sources while retaining their existing strategies and practices for choosing managers. Some, but not all, of us consider a goal such as that of moving 10% of the endowment into this class of investments over the next ten years to be realistic, achievable, and in line with comparable institutions. The Investment Office may need additional resources to put a more aggressive approach to impact investing in place.

The Williams College Response to Global Climate Change

General Considerations

There is overwhelming evidence that global average temperatures are increasing rapidly and that this change is in large part due to human use of fossil fuels³. As the President and Trustees of Williams College have noted, the consequences of global warming for future generations, and especially for the socioeconomically disadvantaged, represent an existential threat to human society⁴. Institutions such as ours, which have an investment in and commitment to the future, are taking action to minimize greenhouse gas emissions.

In this report, we review the options available to the College, summarize the actions that the President and Trustees have already taken, report on the status of their implementation, and recommend some future actions that are consistent with the approach Williams is already taking with respect to the role of fossil fuels in climate change.

Options: Divestment, Energy Efficiency, Impact Investing, Education/Leadership

A variety of approaches can be taken to address the issue of human consumption of fossil fuels, and different groups have different views on which of these actions are the most important and effective. Divestment – removing all fossil fuel companies from the College’s endowment portfolio – has clear symbolic advantages. A second set of options includes increased energy conservation and use of alternative energy sources to reduce demand for fossil fuel extraction. Impact investing is a third option; this involves moving some portion of the endowment into “companies, projects, or technologies focused on the reduction of global greenhouse gas emissions”, such as renewable energy installations, smart grid enterprises, or transportation options that do not rely heavily on fossil fuels. A fourth option is to invest in leadership in these areas, by increasing opportunities for students to learn about and take on increasing roles in science, policy, and education initiatives that address global warming.

There is broad agreement across the entire campus community, including students, faculty, administration, alumni, and trustees, that the College’s and society’s goal should be to take initiatives to reduce global warming, and that one of the best ways to do so is to dramatically reduce fossil fuel consumption – locally, nationally, and globally – and hence decrease carbon emissions. In the spring of 2015, the Trustees defined initiatives that would increase Williams College’s energy conservation, enhance its role in education about global warming issues, and promote investment in alternatives to fossil fuels. The Trustees chose not to pursue divestment strategies, one of which (divestment from coal) had been proposed in the report of the 2015 Advisory Committee on Shareholder Responsibility (ACSR) and also had strong support from the campus community. Upon re-examining the issues, the current ACSR concurs with the Trustees in finding that Williams can have a larger impact on climate change by pursuing energy conservation, impact investing, and educational initiatives. Our reasons

³ There are many studies that support this statement. Perhaps the most comprehensive review of climate change and its anthropogenic causes is the 2013 report by the Intergovernmental Panel on Climate Change (subtitled “The Physical Science Basis”), which is available at www.ipcc.ch/report/ar5/wg1/

⁴ See the 2014 report by the Intergovernmental Panel on Climate Change, (subtitled “Impacts, Adaptation, and Vulnerability”), which is available at www.ipcc.ch/report/ar5/wg2/

are 1) that the economic impact of divesting is minimal at best, and 2) that the structure of the endowment and its management make this option impractical.

Divestment, despite the important symbolic message it sends, has essentially no impact on the activities of fossil-fuel producing companies or their consumers. The potential role of divestment for addressing fossil fuel contributions to climate change was addressed in detail in the report of the 2015 ACSR⁵. To summarize, companies that extract and refine fossil fuels do not rely on the equities market (funds derived from selling shares) to do business. Instead they generally finance their activities from current revenues (see Appendix A). In addition, calls for divestment usually focus on fossil fuel extraction, but the issue of fossil fuel use extends to consumption as well – and consumption would also be unaffected by divestment. For Williams College, divestment is also profoundly impractical; nearly all of the College’s endowment is held in “co-mingled funds”, or financial instruments that include many different companies and which frequently change their holdings based on the judgment of the funds’ managers. These managers are responsible to multiple stakeholders in addition to the College, and the College’s holdings in their funds are not sufficient to give the College sole control in defining investment strategies. Thus divestment, in its purest form, is difficult in practical terms (it would require a restructuring of how the endowment is managed, an expensive and difficult task), and would affect neither the production of fossil fuels nor their consumption on the time scale that is necessary for changing the trajectory of global warming. We note that some other colleges and universities have announced that they have “divested from direct holdings in fossil fuel companies”. Our situation is identical: Williams College does not hold any fossil fuel stocks directly. However, the trustees and administration of the College quite rightly do not consider that the absence of direct holdings represents divestment, and thus have made no misleading claims.

Instead of full divestment, the President and Trustees of Williams College chose to take initiatives in the areas of a) efficiency and sustainability in the energy use (in essence, making institutional and individual choices that move the College towards carbon neutrality), b) increased investment in education and leadership that relates to climate change issues, and c) impact investing (which, again, refers to investments in companies, projects or technologies that focus upon the reduction of greenhouse gas emissions). We will now review the status of these initiatives.

⁵ The 2015 report of the ACSR, with a careful consideration of the case for and against divestment as a tool for influencing climate change, can be downloaded at committees.williams.edu/files/2015/09/ReportofACSR1.pdf

Progress Report: Williams College Initiatives to Address Climate Change

A. Efficiency and sustainability: Reducing Williams' greenhouse gas emissions.

Energy Efficiency. In their 2015 letter describing initiatives to address climate change, President Falk and the Trustees of Williams College made a commitment to reduce Williams' emissions to a level 35% below the 1990 benchmark, and to do so by 2020. This represents a deeper cut than had been previously targeted (in 2007 Williams had committed to reducing emissions to 10% below 1990 levels). Five initiatives to reach this goal were outlined in the President and Trustees' letter to the community:

- **Heavy and consistent investments in new projects to lower energy use in existing buildings.**

Status: A yearly budget line of \$1 million exists for such projects. Opportunities exist for further retrofitting or re-commissioning of existing buildings that could substantially increase energy savings, and the College needs to pursue such retrofitting aggressively. The College is also being careful to keep in mind the issues of 1) potential discrepancies between designed and actual energy savings and 2) setting priorities so that the money invested in existing buildings maximizes overall energy efficiency.

- **New buildings will be designed to meet ambitious energy goals, both during construction and when completed.**

Status: The College is closely monitoring the design and construction of the new science buildings with an eye to energy efficiency. The new CDE residence hall will take advantage of a geothermal system, and other features are designed to make this a net-zero building (at a cost of \$2 million). Here again, the college has worked to develop standards and methods for measuring progress so that energy savings are verifiable.

- **New solar electricity generation on projects on campus and college-owned land will decrease the college's reliance on fossil fuels.**

Status: Solar electricity generated on campus currently accounts for approximately 3% of the college's energy consumption. Solar panel installations on the Horn dormitory building and the new south science building are ready for construction, but the College has been waiting for National Grid to give permission to attach them to the regional electrical grid for some time. It is anticipated that by 2020 (when the next rounds of construction are completed and all associated solar electricity generation is on line) 15% of the electricity used on campus will be generated by local solar installations.

- **As much electricity as possible will be purchased from renewable sources.**

Status: Williams College is pursuing several paths towards acquiring electricity from renewable sources. It is part of a group of five colleges that is arranging energy purchasing agreements with companies building sustainable energy facilities (e.g., wind turbines, large solar installations). This will enable such facilities to obtain the financing they need for construction. The College is also considering investing directly in renewable energy facilities that would provide electricity for the campus. Both options would cut our emissions substantially.

- **Investment in local projects that produce energy from renewable sources.**

Status: As of March 2017, the College has invested in two local projects.

- *The College made a \$5.3 million investment in the solar panel project at the former Williamstown landfill. This project had been abandoned by Solar City, and funding from Williams allowed the project to be completed. Although the solar installation is a local initiative the College will be selling the renewable energy credits that it produces, which will yield a return of approximately 7%. At this time, the last piece that needs to fall into place is for the regional electricity distributor, National Grid, to finally make the connection to the distribution grid.*

- *The College also provided a \$350,000 bridge loan to the Williamstown Youth Center to allow their solar generation facility to be completed five years earlier than would otherwise have been possible; this facility produces 100 kilowatts. The College is engaged in a pilot project to determine the feasibility of investing in energy conservation and efficiency in local non-profit and educational buildings specifically for the purpose of reducing carbon emissions.*

Achieving sustainable carbon neutrality in electricity consumption by the end of 2020. In addition to the commitment to reducing emissions to a level 35% below that of 1990 by 2020, the College plans to achieve net carbon neutrality in its use of electricity by purchasing carbon offsets and renewable energy credits. As the President and Trustees noted, the College would ideally meet this goal without such purchases, but it is probably impossible to do so with current technology.

Status: As noted above, effective production of electricity by on-campus solar facilities is slowed by the failure of the regional electric company (National Grid) to give permission to connect solar facilities to the grid. The Zilkha center projects that, if planned solar installations are brought online in a timely fashion, 15% of campus electricity will be produced by local solar facilities by 2020. The College intends to generate or procure the other 85% from utility scale renewable energy facilities off campus. However, achieving the goal of deriving 100% of our electricity from renewable sources is only part of the way to full carbon neutrality. The College will also need to purchase carbon offsets for the portions of our emissions that come from the central heating plant and air travel.

A challenge to the community (students, faculty, and staff) to reduce fossil fuel consumption. The President and Trustees asked that the college community engage in thoughtful consideration of our own resource consumption, and develop recommendations.

Status: The Campus Environmental Advisory Committee (CEAC) is charged with developing policy on matters of environmental stewardship at the college. In the Spring of 2015, the CEAC recommended that the college put in place a more ambitious goal for reducing energy consumption, and the President and Trustees adopted a revised goal (that of a reduction to 35% below 1990 levels). The 2016 CEAC report⁶ made additional recommendations about long-term goals. There are many other groups on campus with an interest in reducing fossil fuel consumption; some of them are listed at sustainability.williams.edu. All of these groups include many dedicated individuals who invest much time and energy in their work. One effort we would like to highlight is the

⁶ CEAC reports can be found at sustainability.williams.edu/student-opportunities/committees

student-led effort to set up a Green Revolving Fund to carry out energy efficiency projects on campus; the group is currently working on its charter, and will be able to draw on approximately \$70,000 for its projects. These funds will be generated by the sale of credits from the Youth Center's solar facility, which was made possible by a bridge loan from Williams College (see item 5 above).

The question of how to change individual and collective behavior so as to reduce energy consumption is difficult, as it necessarily involves choices in areas such as thermostat settings and air travel. This issue also impinges on other areas, such as building design, which needs to take into account how individuals live and work in the spaces they inhabit. Although this issue has not received much institutional attention yet, we encourage a broader discussion of individual and collective choices that affect energy consumption.

B. Increasing the College's educational investment in climate change.

Tenure track positions. The President and Trustees asked the College to create and separately fund two new positions for faculty whose scholarship and teaching are in the areas of climate change or related public policy.

Status: Several departments and programs submitted requests for these new positions in the Spring of 2016, but no hiring was authorized. Departments and programs are preparing new requests for the Spring of 2017; if hiring is authorized and searches are successful, the two new faculty members would presumably join Williams College for the 2018-2019 academic year.

Confronting Climate Change: Focusing campus inquiry on anthropogenic climate change in 2016-2017. The President and Trustees asked that the college generate an interdisciplinary program of activities to address scientific and public policy issues related to climate change.

Status: The year began with the Williams Reads program's choice of Elizabeth Kolbert's "The Sixth Extinction" as the book to be read and discussed by all first-year students, and more than 25 activities around the theme of "Confronting Climate Change" have been scheduled throughout the year⁷. We would particularly like to highlight the awards at Convocation with the associated talk by Maxine Burkett, and the Sustainable Investing Symposium held during Winter Study. Participation has been excellent.

C. Investment initiatives.

Divestment. For the reasons described earlier in this report, the President and Trustees decided not to pursue divestment. However, they asked the college to set up opportunities for alumni to make donations and college employees to invest retirement savings in low-carbon and fossil fuel-free funds.

Status: The college has set up three avenues for alumni to target their donations and employees their retirement funds to low-carbon or fossil-fuel free financial instruments.

⁷ See sustainability.williams.edu/ccf for a list of lectures, programs, courses, and resources.

- *A fossil-fuel free index fund has been set up for major endowment gifts (at least \$250,000) from alumni. At the time this report was written, there were not yet any investments in the fund.*
- *Contributors to the Alumni and Parents fund can designate their donations for use in sustainable projects⁸. Between September 2015 and March 2017, 267 donations totaling nearly \$45,000 were received.*
- *A low-carbon fund within the TIAA plan has been added to the options that employees can choose for investing their retirement contributions. As of March 2017, 25 employees had taken advantage of this option and had invested more than \$1 million in the low-carbon TIAA fund.*

In addition, the Investment Office has sent a letter to the managers of funds that Williams College has invested in, asking them to consider the effects of climate change in formulating their investment strategies. The Investment Office notes that it has received several thoughtful and positive replies to this letter.

Impact investing (of the endowment, in funds that reduce fossil fuel emissions). The President and Trustees committed to allocating a portion of the endowment to funds whose managers focus on investing in companies, projects, or technologies that target reducing greenhouse gas emissions. They also stated that the return on such investments would be evaluated both in terms of impact on climate change as well as in financial terms.

Status: As of March 2017, the Investment Committee has approved and the Investment Office has made one small inaugural commitment to fund projects that produce renewable energy.

In summary, Williams College is making good progress in many areas towards accomplishing the goals laid out in the 2015 letter from President Falk and Trustees.

We would particularly like to note the attention given to energy efficiency in the construction of new buildings (and the careful approach to measurement, design, and auditing of energy savings), the progress towards the goal of reducing consumption to 35% of the 1990 levels, the investment in the solar project at the Williamstown landfill (with a strong financial return anticipated), and the “Confronting Climate Change” programming during the 2016-7 academic year.

Some of the other initiatives are proceeding more slowly, often because of logistical or structural constraints beyond the control of Williams College. We anticipate progress in the purchasing of renewable energy as part of the five-college consortium, in increasing the amount of energy produced by on-campus solar installations, and in retrofitting existing buildings to increase energy efficiency.

We hope to see more fruits of ongoing efforts in the areas of education and impact investing in the near future.

⁸ giving.williams.edu/designated-giving/sustainability

Recommendations

The ACSR has many constituents and many viewpoints. Rather than presenting only recommendations about which all the members agree, we have chosen to bring forward those that are favored by more than one member, and to give the sense of the committee's discussions about these recommendations. Since we reviewed the College's progress on the entire set of initiatives set out by the President and Trustees, we have also brought forward some recommendations that do not lie squarely within the area of shareholder responsibility.

- 1) **Carbon Credits.** We recommend that, if credits or offsets are used to achieve the college's goal of reducing its carbon footprint, that the number purchased take into account the fact that "permanence" cannot be ensured (in economists' terms, carbon credits are "incomplete contracts" that are unenforceable). Thus the College should purchase the most verifiable credits that are available, and should also purchase an additional percentage – beyond the nominal carbon offsets needed to reach neutrality – to ensure that the College will in fact offset its own release of greenhouse gases. The amount of additional purchase necessary is not clear at this point, and mechanisms for guaranteeing permanence of such instruments may improve. Williams College has consistently chosen to use the highest standards in its accounting for energy efficiency and carbon footprint, and appropriate over-purchasing of carbon offsets would conform with this policy.
- 2) **On-campus sustainability efforts.** The large number of groups at Williams that are involved in efforts around the themes of sustainability can make it difficult to coordinate the process of generating thoughtful recommendations and acting on them. Greater visibility for the CEAC at faculty meetings, and wider publicity for the CEAC reports and recommendations as well as the activities and recommendations of other campus groups would be useful. In addition, we urge the administration, committees, and student groups (including JAs) to begin to address the issue of how best to make meaningful changes in the way we live.
- 3) **Educational Investment.** The programming around the theme "Confronting Climate Change" has been very successful; many students and faculty think that the campus inquiry should be sustained. Related programming could continue in future years, as the issues that need to be addressed have only been sharpened by the November 2016 election. We applaud the College's plan to hire two tenure-track faculty members with expertise and research interests in climate change. We recommend that the College make a further educational investment by increasing the number of Winter Study adjuncts and visiting faculty members who offer courses directly related to investigating and implementing pragmatic approaches to climate change. For example, a Winter Study course with an instructor who is a member of a state legislature and which analyzes or drafts potential legislation or regulations would provide valuable skills and experience. Using semester courses taught by visitors as well as Winter Study courses taught by adjuncts in this way would provide the College with a way to remain nimble in its approach to a rapidly changing discipline.

- 4) **Communication about Fund Managers' responses to the Investment Office's letter about goals.** We are pleased that the Investment Office has sent a letter to the managers with whom the endowment is invested that explains the College's concerns about fossil fuel investments and sustainability, and that the office has received thoughtful responses from many of its managers. We note that it would be useful to make both the letter itself and a summary of responses to that letter (including the number of written responses) easily available online. This can be done without disclosing the identities of the managers or the level of investment in specific funds; see for example, the letters that have published online by Yale University⁹.
- 5) **Impact investing.** Making recommendations in the area of managing the endowment is inherently more fraught. There are many constraints that are implicit in the strategies the Investment Committee has chosen and in the way the Investment Office operates. Some of these are:
- The College's endowment is not invested in specific stocks, but in managers; these managers accept investments from many other entities, and all these investors rely on the managers' judgments about stocks or other financial instruments. The Investment Office has specific and careful processes for choosing evaluating these managers and for shifting the college's resources among them and among types of instruments.
 - All investments must carry their weight in terms of return. Investing \$10 million – a very small proportion of the endowment – in a fund that returns 1.25% less than the College's overall goal would result in a relative loss of \$1.43 million in the endowment over a 10-year period, and an additional deficit of \$28,000 in the operating budget each year over that time span (see Appendix B).
 - The endowment is distributed in a variety of types of investments, according to a plan intended to achieve the Investment Committee's goals of balanced risk and a 5% real return, the level necessary to provide appropriate long-term support of the College's mission.

Thus, if the College does not wish to disrupt its investment strategies and planning, any increases in impact investing must keep these goals and constraints in mind. Some of the members of the ACSR feel that, with these constraints in place, the current pace of impact investing is appropriate.

Other members of the ACSR note the urgency of the issue of addressing climate change in the relatively near term. Given that the ability to contain the global effects of anthropogenic climate change is more strongly influenced by actions taken now than those taken ten or twenty years from now, they want to see the College making a larger contribution towards limiting global warming to 2°C by being at least a small part of the

⁹ Letter to managers of Yale University's endowments:
static1.squarespace.com/static/55db7b87e4b0dca22fba2438/t/5759a039d210b8cc671eee99/1465491513795/Climate+Change+2014+letter.pdf
Summary of responses:
static1.squarespace.com/static/55db7b87e4b0dca22fba2438/t/5759a0c9b6aa60c0ae6eeda0/1465491658321/Endowment+-+Climate+Change+Update+%28Final%29.pdf

additional \$1 trillion of investments in sustainable energy that is needed¹⁰. Those who see things this way recommend that the Investment Committee and the Investment Office take a more aggressive approach to impact investing. Some favor implementing specific goals or targets, informed by progress at other institutions. However, comparisons to other institutions are difficult, because of seemingly exaggerated claims for what proportion of the endowment is invested in sustainable resources. For example, the University of Washington has claimed to have 17% of their endowment in such investments, but this includes \$200 million in holdings of forested land. Based on 2011 data about “positive sustainability investments” that was reported by universities and college to the Association for the Advancement of Sustainability in Higher Education¹¹, Yale University had more than 7.5% of its endowment in such investments (as did, among others, Haverford College, Georgia Tech, Penn State, and Earlham College). The Rockefeller Brothers Fund, with an endowment approximately 1/3 that of Williams’ (but managed differently), currently has 13% of its total endowment in impact investments, and is moving towards a goal of 20% – while maintaining the same overall goals for returns as does Williams¹².

With these examples in mind, some of us have considered what might be an appropriate goal for Williams College in terms of sustainable investments: perhaps 5% of the endowment in three years, or 10% in ten years, acknowledging that progress towards such goals might accelerate towards the end of the specified time window when more opportunities that have undergone the vetting of the Investment Office become available. Those who favor more aggressive impact investing also favor increasing the resources allocated to the Investment Office so that they can devote more time and effort to evaluating the managers that provide appropriate investment opportunities, while recognizing that any increased expenses correspondingly diminish net returns.

Finally, we note that metrics for assessing the carbon impact of funds and investments are rapidly being developed and refined, and that “low-carbon” funds or enterprises often align better with the goal of reducing fossil fuel investments and consumption than do those designated as being “fossil-fuel-free”. Many of us favor the following recommendation: Whenever comparable investments or financial instruments are substantially equivalent along other dimensions (record of manager, risk, history, potential return), the Investment Committee should favor the option that ranks better in terms of sustainability or reducing carbon impact according to the metrics that are currently recognized as being the most reliable.

¹⁰ Fulton, M., and Capalino, R. 2014. The Clean Trillion. Closing the Clean Energy Investment Gap. Ceres. ceres.org/resources/reports/investing-in-the-clean-trillion-closing-the-clean-energy-investment-gap

¹¹ These data can be found at stars.aashe.org by searching for PAE-18 and the name of the institution. The first three categories for positive sustainability investments (sustainable industries, businesses with exemplary sustainability practices, and holdings in sustainability investment funds) were summed and expressed as a percentage of the total investment pool. For a summary of how the data are collated and their reliability, see the report by the Sustainable Endowments Institute: www.endowmentinstitute.org/app/uploads/2014/09/SEI-College-Endowment-Investment-Trends-and-Best-Practices.pdf.

¹² Presentation by Valerie Rockefeller Wayne, Chair of the Rockefeller Brothers Fund, and Jameela Pedicini, Director of Asset Management at Perella Weinberg Partners, Sustainable Investing Symposium, 18 January 2017, Williams College.

Fossil fuel divestment and real economic activity

Matthew Gibson, Assistant Professor of Economics

This memo briefly summarizes the economic view of whether and how divestment from fossil fuel producers might influence their real activities (e.g. fossil fuel extraction, transportation, and refining). As this is a relatively new question, related academic literature is thin. Much of the easily located material is from partisans. The paragraphs below highlight some of the most important and credible work.

Economic theory predicts no direct effect of divestment, even by a large institution, on a fossil producer's real activities. First, it predicts no share price effect. Shares are priced at the present value of the stream of future profits. If the marginal buyer has beliefs that accord with the current share price, she will pay that price. Second, there is no direct channel by which a share price effect could influence real economic activity. Publicly traded fossil producers do not finance new real investments (drilling platforms, etc.) by issuing shares. Instead they generally finance such investments out of operating revenues.

Ritchie and Dowlatabadi (2014) model the carbon footprint of a large Canadian university's publicly traded equities. They find that if this university divested from fossil fuel producers and invested instead in renewable energy, the carbon footprint of the endowment would fall by 3%. A more extreme portfolio reallocation, avoiding both producers and consumers of fossil fuels, would reduce carbon footprint by as much as 11%. This would require reallocating all investments to lower-carbon funds, and would lead the university to hold large stakes in financial services firms. Intuitively, most economic activity has some carbon footprint, so there is limited room to substitute away from carbon. Even the most aggressive reallocation would not alter economy-wide carbon emissions.

Linnenluecke et al (2015) analyze divestment by the Australian National University. They find that some firms from which the university divested had better environmental ratings than firms from which the university did not divest. There was no meaningful impact on returns.

Ansar et al (2013; not peer-reviewed) find, "the direct impacts of fossil fuel divestment on equity or debt are likely to be limited. The maximum possible capital that might be divested by university endowments and public pension funds from the fossil fuel companies represents a relatively small pool of funds. Even if the maximum possible capital was divested from fossil fuel companies, their shares prices are unlikely to suffer precipitous declines." The authors argue that valuation effects could arise only from: 1) changes in market norms; or 2) constrained debt markets, particularly for large projects in poor countries.

Ritchie and Dowlatabadi (2015) examine and reject the assumptions required to predict direct effects of divestment. They observe that over the period 2006-2011, fossil production from publicly traded firms declined 4%, but global production rose because of state-owned firms like Petrobras and Saudi Aramco. Seventy percent of proven global reserves are controlled by fully or partially state-owned producers. The authors also observe that divestment from fossil producers is not equivalent to divestment from fossil fuels: "...university endowments would find it easy to appear fossil fuel free by simply moving funds away from conventional energy companies and into economic sectors that end up creating the demand for fossil energy use throughout the economy."

In summary, both theory and empirical evidence suggest divestment will not influence real economic activity and carbon emissions.

References

- [1] Ansar, Atif, Ben Caldecott, and James Tilbury. "Stranded assets and the fossil fuel divestment campaign: what does divestment mean for the valuation of fossil fuel assets." Stranded Assets Programme, SSEE, University of Oxford (2013): 1-81.
- [2] Linnenluecke, Martina K., et al. "Divestment from fossil fuel companies: Confluence between policy and strategic viewpoints." *Australian Journal of Management* 40.3 (2015): 478-487.
- [3] Ritchie, Justin, and Hadi Dowlatabadi. "Understanding the shadow impacts of investment and divestment decisions: Adapting economic input–output models to calculate biophysical factors of financial returns." *Ecological Economics* 106 (2014): 132-140.
- [4] Ritchie, Justin, and Hadi Dowlatabadi. "Divest from the Carbon Bubble? Reviewing the Implications and Limitations of Fossil Fuel Divestment for Institutional Investors." *Review of Economics & Finance* 5 (2015): 59-80.

Appendix B
Spring 2017 ACSR Report
Abigail Wattley

Effects of accepting a return of 6.25% instead of the Investment Committee's target of a 7.50% return. For the purpose of illustration, this projection compares two portfolios, each starting with \$10 million, and drawing 5% from the portfolio to use towards the operating budget each year.

Assumptions:

Portfolio A assumes an annual return of 7.50%.
Portfolio B assumes an annual return of 6.25%.
Each portfolio spends 5.0% annually.
Each portfolio begins with \$10.0mm in assets.

Results After 10 Years:

After 10-years, Portfolio A has a balance of \$12.99mm, while Portfolio B has a balance of \$11.56mm, a difference of \$1.43mm.

Over these 10 years, in aggregate, Portfolio A has made distributions of \$5.92mm, while Portfolio B has distributed \$5.54mm, a difference of approximately \$380,000. On an annual basis, this represents \$38,000 in distributions, or approximately 50% of tuition for one student, per year.

Assumptions:

	Annual Expected Return	Annual Spending Rate
Portfolio A	7.50%	5.00%
Portfolio B	6.25%	5.00%

	Portfolio A	Portfolio B
Beginning of Year Balance (\$mm)	\$10.00	\$10.00
End of Year Balance (\$mm)	\$10.75	\$10.63
Spending (\$mm)	\$0.54	\$0.53
Beginning of Year Balance (\$mm)	\$10.21	\$10.09
End of Year Balance (\$mm)	\$10.98	\$10.72
Spending (\$mm)	\$0.55	\$0.54
Beginning of Year Balance (\$mm)	\$10.43	\$10.19
End of Year Balance (\$mm)	\$11.21	\$10.83
Spending (\$mm)	\$0.56	\$0.54
Beginning of Year Balance (\$mm)	\$10.65	\$10.28
End of Year Balance (\$mm)	\$11.45	\$10.93
Spending (\$mm)	\$0.57	\$0.55
Beginning of Year Balance (\$mm)	\$10.88	\$10.38
End of Year Balance (\$mm)	\$11.69	\$11.03
Spending (\$mm)	\$0.58	\$0.55
Beginning of Year Balance (\$mm)	\$11.11	\$10.48
End of Year Balance (\$mm)	\$11.94	\$11.13
Spending (\$mm)	\$0.60	\$0.56
Beginning of Year Balance (\$mm)	\$11.34	\$10.58
End of Year Balance (\$mm)	\$12.20	\$11.24
Spending (\$mm)	\$0.61	\$0.56
Beginning of Year Balance (\$mm)	\$11.59	\$10.67
End of Year Balance (\$mm)	\$12.45	\$11.34
Spending (\$mm)	\$0.62	\$0.57
Beginning of Year Balance (\$mm)	\$11.83	\$10.78
End of Year Balance (\$mm)	\$12.72	\$11.45
Spending (\$mm)	\$0.64	\$0.57
Beginning of Year Balance (\$mm)	\$12.08	\$10.88
End of Year Balance (\$mm)	\$12.99	\$11.56
Spending (\$mm)	\$0.65	\$0.58
Resulting Balance	\$12.99	\$11.56
Difference in Balance (\$)	--	(\$1.43)
Difference in Balance (%)	--	-11.04%
Aggregate Spending - 10 Years (\$)	\$5.92	\$5.54
Difference in Spending - 10 Years (\$)	--	(\$0.38)