

## Case Study: Proxy Carbon Price Strategy

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### SMITH COLLEGE

**Keywords** proxy carbon price, lifecycle cost, financial decision-making, campus as lab

**Synopsis** Smith College designed its proxy carbon price strategy to help guide major design and construction and other decision-making processes in a way that reflects the social, ecological, and economic costs of carbon dioxide emissions while creating opportunities for students to learn about climate, energy, economics, and organizational change. Consistent with Smith College's goal of carbon neutrality by 2030, the proxy carbon price strategy highlights cost- and carbon-saving options within the facilities management department's planning processes. The proxy carbon price strategy is also a way to manage the risk posed by future carbon regulations by modeling a cost of carbon emissions when evaluating purchasing decisions. This project has utilized the campus-as-classroom teaching method articulated in Smith's strategic plan (Smith College, 2016), engaging an undergraduate honors thesis student in the design and development process and a senior capstone group in the use of the tool, along with faculty from three departments. Ultimately, the proxy carbon price strategy works to align the operations of the campus with the social and climate goals outlined in the Smith College Study Group on Climate Change report.

Smith is currently piloting the proxy carbon price strategy with a price of \$70/ton. This price will rise at 2.5% per year and be applied in two general approaches: 1) monetizing the value of avoided carbon emissions associated with renewable energy and 2) building the proxy carbon price into lifecycle cost estimates. To date, the proxy carbon price has been used to evaluate renewable energy credit options, retrofit options for a planned renovation of a dormitory, and the purchase of electric vs. gasoline utility carts.

**Primary stakeholders involved** The Smith College Study Group on Climate Change (SGCC), which was composed of faculty, staff, trustees, and students, recommended the policy. Two faculty members and the Director of Sustainability and Space Planning advised an undergraduate honors thesis (Parker, 2018) in collaboration with members of the Facilities Management and Finance & Administration departments. Smith's Committee on Sustainability—composed of faculty, staff, and students—was briefed on price options and selected a price range. Facilities staff will be trained to use the price and associated tool in future decisions.

**Timeline** Effort start date: Spring 2017; Implementation date: Fall 2018

**Scope** The proxy carbon price strategy is in the pilot phase of implementation. The strategy has been used to evaluate two capital/purchasing decisions and one investment to reduce carbon emissions in the electricity sector. The first decision was a residential building renovation, which applied the proxy carbon price within a lifecycle cost (LCC) framework to evaluate five retrofit options to increase energy efficiency. Capital construction staff identified retrofit options and engineering faculty provided energy modeling to quantify savings associated with each option. The second purchasing decision was electric vs. gasoline utility carts. A group of students in a capstone course analyzed the options using the LCC framework.

The proxy carbon price was also used to analyze future options for renewable energy credits (RECs). Smith College invested in an off-site solar project to ensure purchased electricity was zero-emission. The proxy carbon price was used to estimate the value of avoided carbon emissions (\$/MWh) associated with

the RECs generated by the project. This will help the college to evaluate when to retire or sell the credits (and seek other emissions reductions) as REC prices change.

**Determining a carbon price** Various carbon price estimates were gathered to select the best price for Smith's goals (see "Selecting the Price" in this toolkit). Carbon price values were organized into a memo that included the methods, price ranges, and key reasons to select a given price. This memo was then sent out to the Committee on Sustainability for evaluation and selection. In March of 2018, the committee selected a starting range of \$60–75 which was implemented as proxy carbon price of \$70/ton which will rise at 2.5% per year. Among other factors, this price was prioritized as consistent with a broader trajectory towards keeping global temperatures below 2°C and estimating the social cost carbon in a way that places a higher value on impacts on future generations.

**Development process** Smith College committed to becoming carbon neutral by 2030 and soon after published the Sustainability & Climate Action Management Plan (SCAMP) to address the goal. This plan was revisited as part of a broader Study Group on Climate Change (SGCC) Report which provided tangible actions to achieve the 2030 goal, as well as recommendations for academics, campus programming, adaptation, investments, and institutional change. The report had a specific action request to, "Develop an internalized cost of carbon emissions—such as a carbon-proxy price—to help guide major capital budget management and other decision-making processes" (SGCC, 2017).

In 2017–18 a senior Environmental Science & Policy student, Breanna Jane Parker, conducted honors thesis research, "Designing a Proxy Carbon Price Strategy at Smith College" to address the SGCC action request. She collaborated with faculty from Environmental Science & Policy and Economics, the Director of Sustainability and Space Planning, and other key stakeholders within Smith. Her thesis provided the theoretical framing for the proxy carbon price strategy, background on and insights from current internal carbon prices at other academic institutions (e.g. Princeton, Swarthmore, Yale), an excel LCC tool tailored to Smith College, and two pilot projects (renewable energy credits and a building retrofit, described above). A group of students in the spring 2018 Environmental Science & Policy capstone course used the proxy carbon price and draft LCC tool in their final project to evaluate a capital purchasing decision on utility carts.

In the spring of 2018, the Committee on Sustainability selected the value of the proxy carbon price (\$70/ton, rising over time). The pilot project on the residential building renovation continued into the summer of 2018 as the LCC tool was refined, more detailed options evaluated, and energy modeling provided by an Engineering faculty member. The thesis team worked throughout the summer to write a paper for publication in a peer-reviewed journal. Another honors thesis planned for 2018–19 in the Economics department will refine approaches to treatment of energy from the combined heat and power plant, while facilities staff begin to selectively use the tool.

**Other key implementation/context notes** Engaging students in the process of designing and implementing internal carbon price policy presents immense learning opportunities that use the campus as a classroom—an approach to teaching that contextualizes coursework in real-world challenges. This approach to teaching is articulated in Smith's current strategic plan (Smith College, 2016) which also highlights the importance of "Emerging Methods, Fields and Pedagogies" and "Complex, Urgent Problems" like climate change and "enabling students to test their classroom learning in real-world contexts". The expectation at Smith is that students in economics, environmental science and policy, engineering, and other departments will work with and refine the tool and use the proxy price in other analyses.

Additionally, the hope is that Smith's efforts will create tools and technical background for other institutions to adopt internal carbon prices, eventually generating a dataset large enough to better understand the design and implementation of carbon prices more generally.



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**References**

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