

## Case Study: Carbon Charge

Casey R. Pickett and Kevin Koste, July 2018

### YALE UNIVERSITY

**Keywords** Internal price on carbon; carbon charge; applied research; experiment; revenue neutral; building energy consumption.

**Synopsis** In fiscal year 2017–18 Yale implemented a revenue-neutral carbon fee on emissions from its buildings. The Yale Carbon Charge, which uses the university as a laboratory for applied research, aims to inform energy policy, environmental economics, and climate change mitigation efforts by supporting research and publicly sharing the challenges and benefits of implementing a carbon fee. Total tons of greenhouse gas emitted per building are determined by using data from building energy meters and applying emissions factors to convert energy consumption from different sources (electricity, natural gas, steam, and chilled water) into metric tons of carbon dioxide equivalents (MTCDE). Yale uses a social cost of carbon of \$40 per MTCDE to calculate carbon charges.\*

**Primary parties involved** President Peter Salovey approved the exploration of a carbon charge, created a task force to study internal carbon pricing, invited deans and their buildings to participate, and communicated the university's vision and progress within and outside of Yale.

Provost Ben Polak oversaw the final development and implementation of the charge and housed the program in his office.

The **Presidential Carbon Charge Task Force, convened by President Salovey**, was a group of faculty, staff, and students that examined whether instituting an internal carbon-pricing mechanism would be effective and feasible.

The Carbon Charge **Steering Committee** was a group of administrators and staff responsible for overseeing and facilitating efforts to design and implement a pilot project during the 2015–2016 academic year.

Students, inspired by professor Bill Nordhaus, developed a white paper on the prospect of an internal carbon price at Yale and submitted it to professor Dan Esty, who encouraged them to send it to President Salovey, which they did.

Lead administrators, facilities personnel, and building managers presently support the charge by communicating its relevance to the communities in their buildings and incorporating the charge into building policy, behavior, and investment decisions.

The carbon charge **staff** is responsible for design, implementation, communication, analysis, and evaluation.

**Timeline** Effort start date: April 2014.

**Implementation date** *Pilot*: Dec 2015–May 2016; *Analysis and planning*: Fiscal year 2016–17; *First year of implementation*: Fiscal year 2017–18.

**Scope** The charge applies to operational energy consumption in more than 250 buildings owned by Yale University. Roughly an equal number of Yale buildings are excluded from the charge because they do not produce energy consumption data, they are outside the university's control, they are too small, or their

\*Unless otherwise noted, the information in this document was drawn primarily from the Yale Carbon Charge website: <https://carbon.yale.edu>.

ownership is sufficiently complex that it has been difficult to assign responsibility. The charge nonetheless covers about 70% of Yale's building-related energy consumption. The charge does not apply to travel or purchasing.

**Determining a carbon price** Yale's carbon charge uses a social cost of carbon of \$40/MTCDE. This figure is based on U.S. government estimates established under President Obama's Administration.

**Development process** In 2014, Yale convened an Earth Day summit with Sterling Professor of Economics William Nordhaus, Hillhouse Professor of Environmental Law and Policy Dan Esty, students from the School of Forestry & Environmental Studies, and staff from the Office of Sustainability. The group discussed potential solutions to climate change; the event concluded with thoughts on how Yale might use its campus as a test bed for carbon pricing.

Later that spring, a group of students wrote a white paper on an internal carbon price at Yale, which they sent to President Salovey. He supported their recommendation and formed a task force, chaired by Nordhaus, to study the idea.

After meeting for six months and consulting with academic and industry experts, as well as the Yale community, the task force recommended that Yale phase in a campus-wide internal carbon charge, beginning with a pilot program in the 2015–2016 academic year. The pilot included 20 buildings and tested four approaches to carbon pricing. Results of the pilot suggested it would be both feasible and effective to implement internal carbon pricing across Yale.

**Approval process** After the pilot program showed the feasibility of internal carbon pricing at Yale, Provost Polak fostered a campus-wide implementation of the charge. The provost and the carbon charge staff reached out to deans and unit heads overseeing participating buildings to ask for their support and President Salovey announced the policy in a campus-wide email on 4/17/2017.

**Sources/uses of funds** The charge is revenue neutral at the university level, meaning 100% of collected carbon charges are returned to those charged. But the charge is not revenue neutral by department or building: if a building does better than the average of all buildings, it benefits financially. If it does less well than the average, it contributes financially. The net amount each unit pays is relatively small, but the marginal incentive to reduce emissions is nearly \$40 per metric tonne of carbon dioxide.

At the operational level, each school or other major administrative unit responsible for buildings has two new lines in its budget starting in fiscal year 2018: one for carbon charges; and a second to enable a share of university-wide carbon charges to be returned. Using Yale's FY2011–15 emissions as a baseline, if a building does worse in the current period than the rest of Yale, its charge will be greater than its return and it will end up contributing funds to the carbon charge pool. If a building does better than Yale, its return will be greater than its charge and it will end up receiving funds from the carbon charge pool. Collectively, all charges and returns sum to zero.

### **Other key implementation/context notes**

- Internal carbon pricing shows potential for reducing carbon emissions at universities.
- Though the design of a carbon pricing scheme is important, many variations can work.
- An effective carbon pricing scheme conveys clear information and incentives.
- Resulting emissions reductions can be cost effective.
- Carbon pricing benefits from experimentation.