Energy Reporting and Carbon Pricing at Duke University

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Objectives

- Duke Commitment to Carbon Neutrality and Climate Action
- Carbon Emission Reductions on Duke’s Campus
- Influence Capital Investment Decisions Impacting sustainability decisions in new construction and energy projects on campus
- Influence End User Behavior Targeting the behavioral aspect of energy usage and communicating energy usage

Background

Why Carbon Policy?

- Carbon-emitting entities can reduce emissions and internalize the social cost of carbon. Carbon policies can:
  - Impact decision-making processes
  - Reduce emissions through energy-related capital investment
  - Provide energy-related research opportunities

Why Duke?

- Duke is committed to being carbon-neutral by 2024. Coupled with offsets and energy efficiency, a carbon policy can move the university closer to this goal. Institutions that have or are planning to implement carbon incentivizing policies include:
  - Universities: Yale, Princeton, UC Berkeley
  - Corporations: Microsoft, British Petroleum (BP)

Energy at Duke

All utilities are managed by the Duke Utilities & Engineering Services (DUES) group within the Facilities Management Department. DUES is responsible for utility billing and administrative services, planning, operation, maintenance, and expansion of the University's infrastructure from the point of generation to the point of delivery. Three major utilities at Duke include:

- Electricity: Purchased from Duke Energy, mainly responsible for energy consumption from lighting, electric appliances, and other equipment on campus.
- Steam: Generated from two campus plants, responsible for space heating on campus.
- Chilled Water: From Central Chilled Water System, responsible for space cooling on campus.

Policy Evaluation

Our policy evaluation includes two primary questions:
1. Should our proposed policy collect revenue, or should collected money be distributed back to taxpayers in a revenue-neutral model?
2. What policy design is the most effective: a cap-and-trade, a tax, or a hybrid?

For both decision processes, we are evaluating based on 6 main criteria:

Evaluation Criteria | Purpose
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Implementation | What are the political and institutional roadblocks that favor one option over another?
Feasibility | What sort of policy has the largest likelihood of quickly driving down on-campus emissions?
Emissions Reduction | What policy design option best positions Duke to continue serving as a climate and sustainability leader among higher education institutions?
Research and Institutional Value | How can Duke students be a part of the proposed policy, through administration of the program and related research projects?
Long-Term Feasibility | A carbon policy is one part of Duke’s larger push towards climate neutrality. What policy design has the best chance of long-term success?
Behavioral Incentives | What design scheme is most likely to influence behavioral changes on campus? Changes may include different processes for approving energy-efficiency retrofits or new building construction.

Obstacles

Lack of uniformity among energy billing processes for different departments

Significant variation exists between who pays for energy and how it is monitored amongst buildings. Three major utilities at Duke include:

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Lessons Learned

Need to clarify energy billing process

The current energy billing process is quite complicated, involving various software platforms and dozens of employees. Different departments also have different processes in place for paying their bills.

Importance of stakeholder buy-in

Building stakeholder buy-in is vital for the longevity of a carbon charge program. All departments must have a place at the table because all will be impacted by a carbon policy.

Need to influence decision-making for capital investments

The current capital investment decision-making process, such as construction of new buildings and energy efficiency retrofits, does not account for a social cost of carbon.

Need to supply end-users with usage information

Currently, departments are not aware of specific energy consumption data because it is nested alongside various other services into one “Facilities” fee. Educating stakeholders about their actual energy consumption is a crucial first step to motivating change and obtaining buy-in.

Moving Forward

Streamline energy billing process

The energy billing process at Duke should be simplified to allow for a carbon charge to be levied as part of a carbon policy. One component of this is to introduce carbon charge as a line item in the energy bills departments receive.

Conduct pilot study

A pilot study will help departments with the transition to a carbon charge program. Benefits include:

- Allowing administrators to identify areas of excellence and improvements necessary
- Opportunity for departments and end-users to give feedback before actual implementation

Form management committee to ensure continuity of project

There is a need for a specialized management committee to serve the administration and communications aspects of a carbon pricing program. This committee will also help retain program expertise.

Implement shadow pricing

Given that current capital investment projects do not take into account a social cost of carbon, a shadow pricing scheme should be implemented so that potential carbon emissions are taken into account when making decisions.

Distribute departmental energy reports to heads of departments

To give end-users a better idea of their energy consumption pattern, there is a need to design a departmental energy report which will be distributed to the heads of various departments to influence usage. A sample of the energy report is attached.