Internal Carbon Pricing Proposal

Spencer Johnson, Linden Merrill, Omar van Reenen

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Summary

This proposal sheds light on a new strategy for the State University of New York at Oswego (SUNY Oswego) to reach carbon neutrality by 2050, or sooner, through the use of internal carbon pricing (ICP). Definitions of carbon pricing, along with successful applications in both the education and business sectors are highlighted. Colleges and universities educate the future decision-makers of society and house some of the country's most intelligent members, making them an important place to implement carbon pricing. Piloting these methods at a university level will benefit the campus and community, with the hopes that other institutions will do the same. Working from these examples and knowledge of the intricacies of campus procedures, this proposal explores a direct application of various ICP strategies at SUNY Oswego. Implementing ICP may help accelerate a university or government's efforts in the reduction of their greenhouse gas (GHG) emissions, thereby helping institutions steadfastly reach their commitments to sustainable best-practices. It is important to note that although these ICP methods can be used on their own, the results will be maximized with a combination of strategies.

Background

As anthropogenic forces that expedite climate change continue, humanity is starting to see its detrimental impacts. There are consequences of the rising level of atmospheric carbon dioxide including biodiversity loss, public health crises, an increase in the magnitudes of natural disasters, and major revenue loss.[1] Globally, nationally, and locally, actions are being taken to mitigate such damage.

SUNY Oswego is "committed [in] being a leader in sustainability, improving the environment and developing a deeper awareness of environmental and technological developments."[2] The university cultivates a student body of environmental stewards who understand the climate emergency at hand. In Oswego's pursuit of implementing sustainable best-practices that alleviate the effects of GHGs, President Deborah F. Stanely signed the *American College and University Presidents' Climate Commitment* (ACUPCC) to "demonstrate both regional and national sustainability leadership by modeling our campus as an example of ways society can reduce their carbon footprint."[3] Since 2007, Oswego's signatory membership to the ACUPCC set a resounding mandate for SUNY Oswego to become carbon neutral by 2050.

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[1]O.Hoegh-Guldberg, et al. "Impacts of 1.5°C of Global Warming on Natural and Human Systems." *Intergovernmental Panel on Climate Change*. Accessed April 16, 2020. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter3_Low_Res.pdf

[2]"Sustainability," *SUNY Oswego*, accessed April 10, 2020, https://www.oswego.edu/sustainability/.

[3] "Our Commitment to Sustainability," *SUNY Oswego*, accessed April 10, 2020, https://www.oswego.edu/sustainability/our-commitment-sustainability.

As a result, SUNY Oswego has taken major strides to reduce GHG emissions and improve campus sustainability. Recent and noteworthy examples include a net-zero conscious construction of the Richard S. Shineman Center, eco-friendly changes in dining services, and the Leave Green Program. The renovations of the Shineman Center were designed to meet LEED (Leadership in Energy and Environmental Design) Gold standards, partially through the installation of the largest geothermal HVAC (Heating, Ventilation, & Air Conditioning) system in the state, emphasizing its significance as an energy-efficient building. The building's 240 geothermal wells provide a renewable source of heating and cooling that will "reduce the building's energy cost by 12 percent annually and GHG emissions by 33 percent."[4] The Shineman Center is one of the first structural steps towards obtaining the campus's ACUPCC commitment to reduce SUNY Oswego's carbon footprint.

In addition, due to growing climate change advocacy on campus, in March 2019, the Student Association (SA) held a Sustainability Referendum where 52 percent of students voted to remove single-use plastic cups in dining halls. This remarkable vote, evident in the high student voter turnout for a non-mandatory fee election, removed 325,000 plastic cups and saved 123,310.5 kWh of energy per semester.[5] Auxiliary Services, the department in charge of dining services, answered the students' call for better sustainable practices and moved to drastically reduce single-use plastics (cups, bags, straws, and condiment cups) in dining halls, hosted a larger number of "zero-waste" on-campus events, and implemented a discount for reusable mugs.[6]

The 2012 Climate Action Plan drafted by SUNY Oswego gave bold strategies towards the goal of carbon neutrality. While lake-sourced geothermal energy was once a vision to reduce the majority of GHG emissions, SUNY Oswego has since shifted its focus of reaching carbon neutrality by electrifying via solar energy. The campus is also looking to build upon the success of Shineman's geothermal HVAC system by implementing more similar constructions on campus. Although some of the strategies have changed since the Climate Action Plan was published, the mission to reduce GHG emissions remains the same.

Of particular importance to businesses, organizations, and schools are the loss of economic security brought by climate change. The previously stated implications of climate change will lead to an increase in the price of key resources, such as water and energy, and will also cause millions of dollars of damage repair (IPCC, 2014). In the long-run, this is not cost-efficient. To better combat and avoid these financial burdens, a price can be added to carbon emissions in both large and small-scale operations to proactively reduce economic and social

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[4]Timothy F. Braun, and Lisa M. Glidden, *Understanding Energy and Energy Policy* (London: Zed Books, 2014), 312-315.

[5] Peter Humphreys, "Plastic Cup Referendum Voted On, Passes," *The Oswegonian*, March 15, 2019, https://www.oswegonian.com/2019/03/15/plastic-cup-referendum-voted-on-passes/.

[6] "Teamwork Leads to Reduced Plastic Use on Campus," *SUNY Oswego*, November 13, 2018, https://www.oswego.edu/news/story/teamwork-leads-reduced-plastic-use-campus.

losses.[7] This pricing can be achieved through various mechanisms and models which will be explained in this proposal.

The benefits of these models are more visible when properly applied to SUNY Oswego's campus. Methods and proposals in varying contexts for the application of ICP to better the campus and the community it serves are described below.

Introduction to Internal Carbon Pricing

ICP is a strategy to drive down carbon emissions and help reach goals of net-zero emissions. Carbon pricing recognizes the implicit cost to society that is created from carbon emissions. This strategy is used not only to raise funds for GHG reducing projects but also to encourage low carbon behavior. There are a variety of methods and models that incorporate ICP. This proposal will go into detail about two of the main methods and explain three main examples that would fit well on campus. ICP strategies are being used in a variety of ways at universities such as Swarthmore, Yale, Stanford, and Arizona State University. According to the World Bank "as of 2017, 42 countries and 25 subnational jurisdictions (cities, states, and regions), already have carbon pricing initiatives, with more planning to implement carbon pricing in the future."[8] There are many successful businesses that incorporate the use of internal carbon. The World Bank also notes that "Over 1,300 companies—including more than 100 Fortune Global 500 companies with total annual revenue of about $7 trillion— reported to CDP in 2017 that they are currently using an internal price on carbon or plan to do so within the next two years."[9] Carbon pricing also gains support from both sides of the aisle, demonstrating its versatility in the political realm.[10]

Proxy Pricing

Proxy, or shadow, pricing is a decision-making tool that gives organizations a way to incorporate the social cost of carbon into capital building and renovation projects. Proxy pricing considers three costs when making purchasing decisions: initial financial cost, life-cycle cost, and the social cost of carbon. The initial financial cost is the cost incurred to initially design, purchase materials, and add any labor incurred to install the capital project. The second cost to

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[7]S.R Shakya, S. Kumar and R.M. Shrestha, "Co-benefits of a Carbon Tax in Nepal," *Mitigation and Adaptation Strategies for Global Change*, 2012. 77-101. doi:10.1007/s11027-011-9310-.
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[8]"What is Carbon Pricing?" *World Bank*, accessed April 12, 2020.
https://carbonpricingdashboard.worldbank.org/what-carbon-pricing
[9]Ibid.
[10]A. Baker et al., "The Concserrrvattive Case for Climate Dividen," *Climate Leadership Council*, 2017, https://www.clcouncil.org/media/2017/03/The-Conservative-Case-for-Carbon-Dividends.pdf

consider is the life cycle cost of the project. This includes the labor and material that go into the maintenance along with the consumption of energy(whether electric or fuel), and the cost incurred at the end of the useful life to decommission the capital asset. Lastly, the social cost of carbon is defined as the economic damage that one metric ton of carbon emits in one year.[11] While sometimes difficult to quantify, this is an important cost because it is the price that society is faced with the burden of.

Swarthmore College has successfully implemented shadow pricing in building design and construction, noting that a life cycle cost analysis is a core element of any major construction or renovation project design. From experience, Swarthmore states, "decisions that merit consideration include the building exterior envelope, piping & plumbing, HVAC systems, lighting systems, and electrical power distribution systems."[12] While evaluating factors such as the prices at other institutions, best estimates of social damages, and what it would take for Swarthmore to reach its carbon neutrality goals, the shadow price Swarthmore settled on a starting at $100 per metric ton of carbon dioxide equivalent emissions.[13] Just performing the analysis shows a commitment to sustainability on campus.

Shadow pricing will help make decisions on the most efficient ways to heat and cool buildings, what types of lighting to use, and the best system for plumbing by quantifying both the short term and long term carbon costs of these decisions. Presently, there exists an opportunity to pilot shadow pricing. The current Omara Information Center, located on Route 104 between Sheldon Ave and Gregory Street is slated to become the new Office of Sustainability. Proxy pricing can be utilized for certain design decisions such as mechanisms of heating. It is important to consider the options of natural gas boiler, propane, and electric and completely weigh the decision. By using a life cycle cost analysis and incorporating the cost of carbon along the way, the true cost of each option is determined. Although the use of propane may yield a lower initial cost, electric could prove the be the least expensive when the true cost is calculated. This true cost that is shown through the lifetime of the options guides the college in making the most cost-effective decisions.

Another example where proxy pricing has strong potential are renovations to dorms on the east campus. When renovating the dorms and determining the types of windows to install, it would be beneficial to look beyond the upfront price of the window. A cost-conscious institution may opt for the lower-priced windows only to end up paying more for heating costs in the long term. Not only would the less-efficient windows cost more in heating, but they would also have a higher cost of carbon. A shadow price is an added estimate of the lifecycle carbon emissions of each option multiplied by a social cost per ton figure. Because the emissions associated with the

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[11]"The Social Cost of Carbon," *Carbon Brief,* last modified February 14, 2017, 8:00 a.m. https://www.carbonbrief.org/qa-social-cost-carbon.

[12]Kyle Richmond-Crosset, Raven Graf and Aurora Winslade, "Developing Swarthmore College's Shadow Price on Carbon," *Swarthmore College*, September 2019, https://secondnature.org/wp-content/uploads/Swarthmore-Shadow-Price-Pilot-Policy-.pdf.

[13]Ibid.

less efficient windows are so much greater than they are for the energy-efficient ones, the result of the proxy pricing analysis would likely tip the balance in favor of energy efficiency. This might not always be the case and is why it is valuable to use this tool.[14]

It is important to note that major projects already perform a life cycle cost analysis of the projects that they undertake. This Life Cycle Cost Analysis (LCCA) takes into account the first two costs described, the initial and life cycle costs. Oswego's current LCCA is only missing the last piece regarding the social cost of carbon. Through the understanding of the tools that have been designed by Smith College and Harvard University, Oswego can implement a policy to incorporate proxy pricing on all new construction and renovation projects on campus to ensure the campus is making the most environmentally-responsible and informed decision.

Carbon Levy

A carbon levy is a charge that is imposed to curb unsustainable behavior and raise funds to be distributed into a specific fund. Examples include a green fund or an emergency crisis fund for the campus. By creating a carbon levy, consumers will be more apt to reduce the behavior contributing to GHG emissions. The carbon levy installs a fee that makes GHG-intensive behaviors more costly to the consumer. This carbon charge brings awareness to the behavior and is meant to incentivize low carbon behavior. This alone will help reduce the overall GHG emissions on the campus. Since behavior change will not be instantaneous, funds will be collected while working to curb the behavior. These funds will be used to invest in GHG reducing projects as well as educational and engagement projects. A green fund will also be established to create a bank of resources that can be used in times of crisis. Although there are many ways a carbon levy could be utilized, there are a few models that would fit Oswego's campus well.

Improvement of Campus Purchases

The Student Association (SA) funds all of the campus's clubs and organizations on campus. A large sum of this funding goes towards apparel, giveaways, and club sports equipment. It would be beneficial for a sustainable-purchasing committee to oversee club purchases to ensure that they are making environmentally and socially ethical decisions with their funds.

Specific conditionals could be added, such as requiring club sports teams to purchase uniforms produced in the United States and made out of organic materials. If clubs do not abide by this, then there could be a carbon tax added on to the purchase. There is also a large volume

[14]Nathaniel Graf and Brett Pasinella, "Carbon Pricing as a Climate Action Tool: Experiences from Swarthmore College," *Second Nature,* May 11, 2017, https://secondnature.org/2017/05/11/carbon-pricing-climate-action-tool-experiences-swarthmore-college/

of purchases that fall into similar categories, such as hundreds of pop-sockets or poor quality water bottles. Organizations would be asked to buy less of a good-quality product than more of a poor-quality product that is often disposed of after a few uses.

Lastly, clubs could be encouraged to hold more of their events that are catered by Auxiliary Services to be zero-waste events by adding a price on to events that have disposable products.

Opt-In Carbon Levy Models

Opt-in carbon levies are another viable strategy of ICP that should be implemented on campus to reach carbon neutrality. Some examples of opt-in carbon levies are seen in the airline industry. Airlines like British Airways, Delta, United, and Jet Blue are just a few airlines that give the consumers the option to offset the carbon emissions associated with their flight.[15] Opt-in carbon levies are a way for the individuals of the campus to take responsibility and offset a portion of their GHG emissions and feel good while doing it. The types of emissions that these types of levies would target are considered scope 3 emissions, which are often the hardest for universities to account for. The use of these opt-in carbon levies would not only help to combat these scope 3 emissions but would also give ways for the campus to better track the emissions. Opt-in carbon levies also provide a vast area for research across a wide range of disciplines at universities. Provided below are three different opportunities for faculty, staff, and students to opt-in and help combat climate change. By opting-in, the member of the campus community pays a recommended fee that would go into a green fund for their behavior that contributes to GHG emissions. Parking, air travel, and mini-fridges/space heaters are three areas where opt-in carbon levies could be instituted.

<u>Parking</u>

Daily transportation is a large factor in GHG emissions on the individual level but also each person's commute contributes to the emissions of the campus. Through the use of a recommended fee, the members of the campus community would be able to offset the emissions associated with their commute to the campus. Using a carbon calculator, campus members would input information about their vehicle and distance of commute. The calculator would then give an amount of GHG emissions estimated to be associated with the travel. This value is then multiplied by the current social cost per metric ton of carbon to find their cost of carbon to find the fee that would offset their commute. The member could also choose to be more aggressive and use the calculator to find all of the GHG emissions associated with their ground travel, essentially offsetting their entire ground travel for the year.

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[15]Jessica Puckett, "How to Purchase Carbon Offsets for Your Next Flight," *Condo Next Traveller*, October 2019, https://www.cntraveler.com/story/how-to-purchase-carbon-offsets-for-your-next-flight.

This parking carbon levy, although optional for faculty and staff, could be mandatory for students. In this case, a flat charge of $6 and $12 per semester and academic year, respectively, would be assessed on each parking pass. As an incentive to purchase Ride & Shuttle - Lot 7 parking passes, no charge would be assessed for those permits.

Air travel

Air travel is another act that emits egregious amounts of GHGs into the atmosphere. By implementing an optional fee on air travel, SUNY Oswego can work to combat the emissions involved with the flight. Colleges like Arizona State University, UCLA, and the University of Maryland are some schools that have successfully implemented a mandatory carbon charge on all air travel that takes place for the campus.[16] The fees at these universities range from $5 - $40 per trip and some of the pricing models are designed to increase the price over years. A fee of $10 and $20 per trip for domestic and international flights respectively could be put in place. It is also advised that the price rises with inflation and adds 2.5% at the beginning of each fiscal year. This rate increase is to account for not only the time value of money but the increasing urgency to act as well.

Mini-fridges / space heaters

Faculty and staff are invited to pay a recommended fee to have a minifridge or space heater in their office. Students living in the dorms are also invited to pay an additional fee, meant to offset the GHG, for renting a minifridge. Many refrigerators contain chemicals like chlorofluorocarbons which are known to cause significant damage to the ozone layer. This fee is recommended to start at $10 per appliance per semester. This fee would also be recommended to have an increase of 2.5% at the beginning of each fiscal year for the same reasons mentioned above. The hope of initiating an optional charge to have refrigerators is that the number of refrigerators on campus will be reduced. This alone will make a significant impact on global warming. By reducing the number of refrigerators there will be fewer CFCs and other ozone-depleting gasses to properly dispose of at the end of their useful life.

All of these opt-in carbon levies are strategies to help promote environmental awareness and help guide conscious decisions. These strategies also help by raising funds for GHG reducing projects on campus which will make a significant impact on reducing the carbon footprint of the campus and contributing towards the goal of carbon neutrality. Ideally, these opt-in fees would also promote less air travel, a greener commute, and help to eliminate extra minifridges and space heaters.

This strategy is a great first step in introducing ICP to individuals. It gives them the control to choose and more satisfaction when they contribute towards combating climate change. This opt-in method is also a way to promote how the campus members make donations to better

[16]Alex Barron, "Internal Carbon Pricing For Colleges and Universities," *Smith College,* October 2019. https://hub-media.aashe.org/uploads/1445_Barron_1607.pdf

Oswego's local campus and global environment. Hopefully, opting-in becomes the norm for faculty, staff, and students alike.

The Green Fund

The Green Fund would be an account established to house the revenues collected from a carbon levy. This Green Fund would be used for GHG reducing projects on campus as well as educational programs on the importance of reducing your carbon footprint. A portion of these funds should go towards the designation of Tree Campus USA and planting trees on campus. This would not only enhance the campus's aesthetic but also sequester carbon from the atmosphere. Funds could also be used for large scale GHG reducing projects such as solar panel installation. Funds collected from the commuter carbon charge could be earmarked for green travel projects on campus. It is important to note that these funds could also have the flexibility to be used in times of crisis in the community.

Carbon Pricing and the Clean Energy Roadmap

In her State of the University System address of 2018, Chancellor Kristina M. Johnson amplified Governor Andrew Cuomo's clean energy vision for New York State (NYS). In conjunction with the Governor's Executive Orders 88 and 166, as well as NYS's membership to the US Climate Alliance, Chancellor Johnson presented SUNY's Clean Energy Roadmap. This aggressive and bold roadmap is SUNY's mandate to work towards leading the state in reducing GHG emissions while being an example for universities and organizations across the country in clean energy. As the largest public university system in the world, SUNY thus acknowledges its responsibility to invest in clean technologies and energy efficiency. Furthermore, this makes SUNY Oswego's 2007 ACUPCC commitment even more paramount as it positioned the campus to work towards reducing its carbon footprint well ahead of the Chancellor's call to action.

Although SUNY Oswego may have invested in clean energy initiatives well in advance, there is still more work to do. Currently, SUNY Oswego aims to be carbon neutral by 2050, where Governor Cuomo has called for GHG emissions to be reduced by 40 percent by 2030 and reach 100 percent renewable energy by 2040. His targets are to set NYS on track to ultimately reduce energy consumption 185 trillion Btu by 2025. Thus, SUNY Oswego is 10 to 20 years off-target and must implement more initiatives that will bridge the gap. To mitigate this vigorous goal, Chancellor Johson's roadmap acts as a blueprint with resources for campuses to obtain 'green' energy security by investing in renewable sources, increasing efficiency and combating the climate catastrophe. Provisions like a 'SUNY Fund' creates incentives to finance campuses for work that result in energy cost savings. This is subsidized from capital investment in NYS and through partnerships with state stakeholders. Already, SUNY has reduced its carbon footprint by 250,000 metric tons and saved $19 million in energy costs between 1990-2017.

When campuses tap into this fund, SUNY will be well on track to increase these numbers and reach the Chancellor's green energy security targets.[17]

Most importantly, since the fund is largely available for long-term projects that develop new building efficiency standards and energy management best practices, carbon pricing garners solutions to present-day mechanisms needed for GHG reduction. Coupled with energy-efficient capital projects like solar power, carbon pricing can help SUNY Oswego achieve emissions and carbon neutrality sooner than 2050. The Clean Energy Roadmap challenges campuses to enshrine the following goals with their sustainability efforts:

1. Achieve environmental sustainability;
2. Develop clean energy master plans;
3. Establish a network of community resilience;
4. Lead with net-zero buildings;
5. Retrofit existing buildings;
6. Establish a clean energy network consisting of research, innovation, partnership, and education;
7. Attract start-up activities in NY;
8. Enhance workforce development.

These goals push SUNY campuses to leverage its academic and research capabilities to center around the development of clean energy technologies and solutions. Therefore, ICP is an important aspect of these solutions which provides a 'net-zero' approach the roadmap seeks. The incorporation of the social cost of carbon dioxide emissions is a mandatory precursor people should keep in mind when working on any new technologies and solutions that mitigate GHG emissions.

Conclusion Carbon Pricing and Climate Advocacy

Ultimately, ICP provides many mechanisms to achieving SUNY Oswego's goal of a net-zero campus. Proxy pricing is a model that can be implemented almost immediately. Conversations must be had in the early stages of renovation and design projects. By posing the question of implementation and running a thorough analysis, SUNY Oswego can make the most educated decision for long-lasting capital projects. The carbon levy models highlighted above can and should be put into place as soon as possible. Policies can be put in place for the start of the new school year that utilizes these models; climate change-fighting policies must not be put off any longer.

While proxy pricing does not assess a physical charge, carbon levies do. When placing a charge onto campus members, it is important to note the different social (groups) classes that an

[17]State University of New York, *Clean Energy Roadmap* (Albany, NY: Office of the Chancellor, 2019) https://www.nypa.gov/-/media/nypa/documents/document-library/cleanenergy/suny-clean-energy-roadmap.pdf.

ICP policy might affect the most. ICP is meant to shift the burden of climate change away from those whose actions emit less GHG emissions and onto those who contribute the most. In placing ICP on campus, the cost will be spread over the entire campus as opposed to targeting a specific group.

Although just a few key models have been highlighted that can be utilized via ICP, there are many other opportunities. It is important to continue to modify strategies to combat climate change as new information and technologies arise. ICP is a strategy that when implemented can be modified as behaviors shift and technologies move forward. There are very few risks with piloting these strategies and a plethora of opportunities to become a leader in ICP amongst higher education. ICP models can accelerate a university or government's efforts in the reduction of their greenhouse gas emissions; SUNY Oswego should maintain its headstart in carbon footprint reduction amongst SUNYcampuses and begin to leverage its academic and research capabilities to center around the development of clean energy technologies and solutions. Therefore, IPC is an important aspect of these solutions which provides a net-zero approach that the Clean Energy Roadmap seeks. The incorporation of the social cost of carbon dioxide emissions is a mandatory precursor that should keep in mind when working on any new technologies and solutions that mitigate GHG emissions.

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