CALL FOR RESEARCH PROPOSALS

Overview

Each year, the Kleinman Center for Energy Policy awards grants ranging from $5,000 to $15,000 to support new research or supplement existing research in energy and climate policy.

This year, we are seeking requests for proposals from Penn faculty, postdocs, and doctoral students for research projects in the areas of energy and climate policy that can leverage research at Penn and support the advancement of our mission. Preference will be given to research on the following topics:

1. Effect of COVID-19 on Energy Transition
2. Net Zero Policies and Offsets
3. Natural Gas Connection Bans
4. Expediting Renewable Energy Infrastructure Approval
5. Sustainable Finance
6. Internet of Things and Data Center Energy Usage
7. Economic and Climate Damage from Wildfires
8. Transportation
9. Rare Earth Supply Chains
10. Energy Access in the Developing World

Note: Appendix A has an expanded description of each topic.

Expected Outcomes

Grant money may be used from July 1, 2020 through June 30, 2021. The grantee will prepare a short policy digest (3,000 words maximum) based on the research that the grant is supporting towards the end of the grant period or upon completion of the research. All policy digests must adhere to our review process and guidelines. Final digests will be published on our website and in print. All peer-reviewed publications resulting from this research must include a Kleinman Center acknowledgement. We will link to these publications from our site.

Please note, while policy digests may cover the same topic and findings as a future referred journal article, they should be written for a different audience and should not be submitted to the Kleinman Center with the intention of republishing.

Requirements

To apply, applicants must develop a two-page proposal that includes:

1. Problem Statement and Impact
2. Proposed Work and Method
3. Timeline
4. Requested Funds
5. Policy Digest Suggested Title

Please note, Ph.D. students must also include a note of support from their supervisor.

Deadline

Applications must be sent to Angela Pachon at apacho@upenn.edu by Friday, May 29th, 2020.

Eligibility
Our grant program is open to Penn faculty, postdocs, and Ph.D. students and researchers in the areas of energy and climate policy. Energy science and energy technology development projects are not eligible.

APPENDIX A

2020-2021 Topics

The Kleinman Center is seeking proposals in the following topics. Questions for each topic are included as illustrative examples of issues within each topic.

1. Effect of COVID-19 Pandemic in Energy Transition

The COVID-19 pandemic has affected the global economy in unprecedented ways. In the energy sector, industrial and commercial electricity demand have decreased due to lower economic activity. Social distancing measures have resulted in a decline in demand for transportation and for fuels. At the same time, oil prices have reached a historic low level due to the reduced demand and a global oversupply.

The fiscal stimulus to boost economic growth could play an important role accelerating the energy transition through government funding of clean energy infrastructure and technologies. At the same time, low oil prices could provide incentives for private investors to fund this transition, considering the low returns of oil and gas projects. But the upcoming recession, a possible bailout to fossil fuel industries, and the oversupply of cheap oil could also intensify and prolong the dependency on fossil fuels.

Potential Questions: What are the effects of approved stimulus packages around the world in the energy transition? What are the long-term effects of COVID-19 for GHG emissions? How do disruptions in the economy and global supply chains affect clean energy technologies and enforcement of environmental regulations? Can clean energy projects attract the private investors exiting the fossil fuel sector? Can the demand for oil and coal rebound to pre-pandemic levels? Can carbon markets survive the drastic decrease of emissions driven by the slowdown of the economy?

2. Net Zero Policies and Offsets

According to a report by the World Economic Forum more than 300 corporations, 67 countries and numerous cities around the world have pledged to achieve net zero emissions as early as 2030. These pledges are positive news for the fight against climate change. There is an ongoing debate, however, as to whether the reliance on negative emissions is an effective way to achieve climate targets.

Potential Questions: Does offsetting minimize efforts to reduce emissions? What policies are these corporations implementing? What are the most effective options to offset emissions? Who certifies the effective offsetting of those emissions? Should the suppliers of offsetting solutions be regulated?

The Kleinman Center has acquired the Carbon Disclosure Project database and would like to support creative research based on the analysis of this data.

3. Natural Gas Connection Bans

To meet climate targets, municipalities in California, Washington, and Massachusetts have banned natural-gas hookups in most new construction. Meanwhile, lawmakers in Arizona have passed legislation to prevent gas connection bans, and Oklahoma, Missouri, Minnesota, Tennessee, and Mississippi have introduced similar bills. While these bans could be game
changers for the adoption of existing carbon-free technologies in buildings like heat pumps, they may boost the demand for electricity with the risk of increasing coal or gas fired generation.

**Potential Questions:** Are these bans effective? Do states have legal jurisdiction to prevent municipalities to approve these bans? What are the welfare benefits of these bans? Can they accelerate the penetration of renewable energy? By increasing electricity demand, how likely are these bans to increase the demand of coal and gas for electricity production?

4. **Expediting Renewable Energy Infrastructure Approval**

The process of approval for energy infrastructure in the United States is lengthy and costly. According to the Alliance for Clean Energy, it currently takes five to ten years to get a renewable energy project built. These timelines are problematic for states to meet climate targets. To overcome this challenge, New York State has recently passed legislation to improve and streamline the siting approval process for large-scale renewable energy projects. But for local communities, the fast-tracking of these permits limits the power of municipalities to object to projects that could have substantial health, environmental, and economic impacts for the communities.

**Potential Questions:** Should different rules apply to renewable energy assets? How can the approval process be designed to prevent NIMBYism against renewables?

5. **Sustainable Finance**

A recent Kleinman Center Digest found that sustainable finance was the fastest growing investment sector in 2019 with over $460 million in new issues. Most of that came in the form of green bonds, where the proceeds must be used for projects that generate environmental returns. But the fastest growing sub-sector came in the form of green loans, which have variable interest rates linked to the borrower’s performance on measurable environmental impacts. This activity has been spurred by the development of new guidelines for green financing that set project standards for green or sustainable performance and give investors confidence in the environmental returns of their investments.

**Potential Questions:** What existing instruments facilitate the transition of fossil-fueled energy and industrial assets to cleaner operations? What is the potential market size for these instruments and under what conditions do brown-to-green versus green financing instruments provide more efficient outcomes? What are the barriers and constraints restricting the use of transition financing (such as definitions, guidelines, and verification)? What are the advantages and disadvantages of these mechanisms compared to other alternatives to price carbon (like carbon taxes, carbon markets) to raise capital to support green investments?

6. **Internet of Things and Data Center Energy Usage**

The number of Internet of Things (IoT) devices is projected to increase above 30 billion in 2020. On the one hand, these devices have applications in monitoring load on the energy grid and optimizing energy usage, for example using AI (smart grids). On the other hand, they may require significant amounts of data center infrastructure and energy, despite their remarkable historical energy efficiency progress, considering an ever growing demand. Today this sector currently uses about 1% of global electricity.

**Potential Questions:** What are the implications for electricity supply of this fast-growing technology? Should data centers be regulated to ensure they meet security and energy efficiency standards? How can the energy efficiency of data centers be improved?

7. **Economic and Climate Damage from Wildfires**
As climate-change associated wildfires continue to increase in amount and intensity, there have been far reaching impacts. In addition to the obvious damage caused by the fires themselves to people and property, they exacerbate climate change through permanent forest destruction and contribute to rising pollution from smoke. To protect dry landscapes from power lines that could overheat and spark deadly fires, some utility companies have begun implementing planned blackouts that affect millions of people. During these massive blackouts, people’s livelihoods and health are jeopardized and billions of dollars in economic activity can be lost.

**Potential Questions:** How effective have the blackouts been in preventing wildfires and is their use justified? What other mitigation strategies can be implemented? What is the economic impact of alternatives such as burying electrical lines? Should governments regulate larger infrastructure changes to protect utilities from further liability? What are the long-term economic and ecological damages from displacement and loss of ecosystems and property? Is wildfire smoke becoming a significant source of air pollution?

8. **Transportation**

According to the U.S. Energy Information Administration, vehicle transportation is responsible for the majority of energy usage in the entire transportation sector. Yet the Trump administration has issued the final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule lowering average fuel economy and carbon dioxide standards for their 2021 to 2026 models. Meanwhile in China, the government cut back EV incentive programs at the end of 2019—while the industry is slowly recovering from this change in policy and the effects of COVID-19.

A moderate and more overlooked percentage of GHG emissions is attributed to maritime transportation of goods. Eighty percent of global merchandise is transported using maritime or fluvial freight. While aviation transportation is responsible for 2.5% of global CO2 emissions. Despite this low share of emissions, these sectors are expected to grow in the coming decades.

**Potential Questions:** What are the prospects for the global penetration of electric vehicles in the next years? Will this sector be able to recover from a possible recession? What regulations can be implemented in the maritime and aviation sectors to decrease greenhouse gas emissions and improve energy efficiency? What renewable fuels and technologies are possible in these sectors?

9. **Rare Earth Supply Chains**

Rare earth minerals are essential components for many renewable energy technologies like wind turbines and some electric cars and photovoltaics. However, over 80% of the mining and refinement of these metals is controlled solely by China. Despite these metals not actually being very rare, the refinement process is expensive, energy intensive, and has been performed without environmental safeguards leading to dangerously polluted mining areas.

**Potential Questions:** What alternative renewable technologies are being developed to reduce our reliance on a single-source resource? What are the environmental effects of the current mining and refinement process and how can they be improved? What policies can be implemented to ensure a steady supply chain that is less prone to problems from U.S.-China trade relations?

10. **Energy Access in the Developing World**

According to the IEA the number of people without access to electricity fell from 980 million in 2017 to 860 million in 2018. Yet the lack of electricity access in sub-Saharan Africa remains acute with 60% of the population in rural areas still deprived of the service. While investments in off-grid energy access have rapidly accelerated since 2014, over $100 billion per year for the next ten years is required to bridge the gap to achieve universal access.
Potential Questions: What policies would help improve access to developing countries and what are the largest roadblocks toward improving energy access? What factors affect how people make decisions about household energy use? What policies or initiatives have been most successful in ensuring affordability of clean and energy-efficient technologies? What are the most valuable lessons from India, a country that sprinted to provide universal access to electricity by 2018? What innovative financial products could facilitate access to clean technologies from low-income households?