



KLEINMAN CENTER for ENERGY POLICY

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The Kleinman Center is seeking one or more proposals from Penn faculty for up to \$50,000 over six months (May 1-October 31) to support research on the question below, with up \$200,000 additional funds available to support a second phase of empirical research over the following 12-24 months (beginning November 1).

What is the optimal pathway for the Philadelphia region to reduce greenhouse gas emissions?

Since the IPCC AR4 in 2007, many governments have adopted a policy goal of an 80% reduction in GHG emissions by the year 2050. The U.S. has stated this goal in national policy and in multi-national agreements with the G7 and the UNFCCC, and it has been adopted by 16 U.S. states [<http://goo.gl/hxCvkz>] and 37 U.S. cities [<http://goo.gl/DSMxWN>].

The pathway for reducing GHG emissions is the crux of virtually every energy policy debate right now in the Philadelphia region and indeed in cities and regions around the world. For simplicity, we characterize these debates using three commonly stated positions in the Philadelphia region. First, some argue that the region should focus on leveraging Marcellus and Utica shale gas and that the GHG emissions reduction pathway should track the reductions possible while pursuing that leverage. Second, others argue that the region should focus on exploiting clean energy technologies and should avoid any investment in natural gas resources, viewing them as an avoidable delay in the pathway for reducing GHG emissions. And third, still others argue that a transition requires a portfolio of mutually reinforcing energy resources and investments that will both reach GHG emissions reduction goals and exploit the shale gas resources for the economic benefit of the region. Each of these views is a response to the over-arching question stated in this RFP: What is the regionally optimal pathway for the Philadelphia region to reduce GHG emissions?

To explore this question in ways that would facilitate comparison to other research on national and regional policies, this RFP explicitly removes one dimension of the national policy goal: proposals should maintain the 80% reduction target but allow the target year to vary on the basis of regionally specific net benefits. Should that reduction happen in Philadelphia over ten years or fifty in order to maximize the net social benefits to the region? Relaxing the 2050 target rests on two rationales.

Rationale #1: regional contributions to national goals

It is very unlikely that the efficient solution for meeting the national goal of reducing GHG emissions by 80% by 2050 is that every metropolitan region, every county, every city, every neighborhood, and every economic sector meets that same goal. It is more likely the efficient national pathway toward that goal will consist of an aggregation of regional pathways that vary above and below the goal to maximize regional net benefits based on local endowments and policy instruments.

Rationale #2: regional mobilization in support of national goals

At the Paris COP21, 185 nations made pledges (known as Intended Nationally Determined Contributions or INDCs) to take actions calculated to reduce greenhouse gas emissions by a stated amount between 2015 and 2030. These pledging parties represent more than 95% of global GHG emissions [(<http://goo.gl/6PWhzm>)]. Over 50 percent of the actions embedded in the INDCs rely on local and other subnational governments [<http://goo.gl/3pS1EC>].

When cities and regions are left with discretion and responsibility for achieving goals through local action, they need a basis for action that recognizes their local conditions and how these conditions influence local net benefits. City and regional decision makers must mobilize local actors with assurances that proposed policies are in the best interest of the region. Determining whether given policy goals are technically and economically feasible is instructive [<http://goo.gl/W7TrSp>] but does not necessarily mean that pursuing such feasible goals is optimal, efficient, or even possible in any meaningful sense.

Requirements

The Kleinman Center seeks submissions to this RFP from one or more teams with a variety of disciplinary perspectives. One approach to answering our question is to estimate a pathway of energy GHG reductions that maximizes net benefits under a regional social welfare function. However, the specification and measurement challenges of this approach are significant and probably one reason why regional policy debates remain in deep dispute about an optimal pathway of energy transition. So we are open to a variety of research approaches to our question. We seek “only” the best possible answer to the question with the resources being offered.

To facilitate comparisons the proposed method should allow an estimate of (1) the reduction under the optimal pathway for the region achieved in 2050 and (2) the year that an 80% reduction would be achieved under the optimal pathway for the region. The proposed method should estimate the optimal pathway under a variety of scenarios and assumptions regarding technology innovation, market conditions (including various social discount rates), and legal/regulatory mandates.

The six-month research phase being supported under this RFP must produce three related deliverables:

- (1) Review of related research into city and regional analysis, goal-setting, and scenario-building on GHG emissions reduction and decarbonization policies.
- (2) Specification of the costs and benefits to various stakeholders from alternative reduction pathways, including considerations of economic (e.g., long-term employment and earnings opportunities), environmental (e.g., air and water pollution impacts on local public health), and equity impacts (e.g., the distribution of benefits and costs among local residents). We welcome but do not require a method for aggregating these costs and benefits to compare alternative pathways.
- (3) Design of an empirical approach to estimating an optimal regional rate of GHG reduction based on these costs and benefits. The proposal should identify data limitations and explicate the assumptions imposed by those constraints. The definition of the region is flexible in order to accommodate the data and methods available.

Proposals and Review

Eligible proposals will be submitted by standing faculty from one or more Penn schools. Penn student involvement is encouraged. Participation by non-Penn faculty is allowed.

By March 1st, interested faculty members must notify the Kleinman Center of their interest by sending an **email** to mahughes@upenn.edu

By March 15th, the Kleinman Center will host a pre-proposal meeting for all faculty interested in submitting a proposal. The date is to be determined but **attendance is required**. At this meeting, we will answer questions about the RFP. But we also hope to identify possible collaborations among faculty. Depending upon the level of faculty interest in this funding opportunity, a collaborative working group might well emerge from this meeting rather than multiple competing proposals.

By April 15, proposals of no more than 10 pages are due via email to mahughes@upenn.edu. Proposals must include:

- Names and contact information for faculty team, including paragraph bios for any non-Penn faculty.
- A statement of the problem
- A proposed approach to generating the three deliverables in not more than six months
- A one-page budget justification for the requested funds.

Submitters will be notified by May 1st.

Upon submission of the three deliverables above, the grantees will be invited to submit a request for a second round of funding for up to \$200,000 to support empirical research to estimate the best possible answer to the question, what is the optimal pathway of GHG emissions reduction in the Philadelphia region to achieve an 80% reduction?