

## REQUEST FOR PROPOSAL

### University of Michigan Request for Proposals

# Collaborative Research in Energy Science, Technology, and Policy on The Seventy Percent Solution

**Announcement:** The Office of the Vice President for Research, in cooperation with the Michigan Memorial Phoenix Energy Institute (MMPEI), announces a competition for funds to support interdisciplinary research on The Seventy Percent Solution.

**Purpose:** Declining US oil production; reliance on unstable governments for the majority of US oil; rapidly expanding world energy demand; escalating greenhouse gas production; and the prospect of a climate change crisis. We have entered the era of the energy challenge and the University of Michigan has made a commitment to respond. The United States consumes a significant portion of the world's energy and as a result, is a major contributor to the production of greenhouse gasses affecting global climate. Based on current IPCC estimates, a 50-85% reduction in greenhouse gas emissions world-wide is required to stabilize global temperatures over the next few decades. In the US, forty percent of greenhouse gas production results from electric power generation, and an additional thirty percent arises from transportation. The prospect of severe climate change due to manmade greenhouse gas production is perhaps the most serious long-term threat facing mankind today. Hence, if a transition could be made to carbon-free transportation and electric power generation, a 70% reduction in America's greenhouse gas production could be realized.

Such a dramatic reduction in green-house gases can be achieved by replacing coal-generated electricity with renewable energy sources, such as solar, and by replacing gasoline-powered vehicles with electric vehicles. Nuclear energy and other renewables could also contribute to this vision. Together, they describe the technological goal of powering our cities and transportation systems without relying heavily on fossil fuels. Yet such a solution to the energy problem is only partly technological. Energy is a complex system that poses a difficult challenge by virtue of its inter-linkage of science, technology, public policy, economics, social acceptance, business practice, regulation, etc. The overarching challenge is to understand the complex and multidimensional interplay between the various parts of the energy system with the objective of developing a rational approach to realizing truly dramatic technological advances. In order to avoid unintended consequences, we must understand how our technical and policy choices regarding energy will lead to changes in our economy, society, and environment.

Determining the technological, policy, societal, and other changes necessary to realize this dramatic improvement in greenhouse gas emissions constitutes the energy vision we are calling the "Seventy Percent Solution." The University of Michigan, with its breadth of expertise in technology, public policy, social science and business is uniquely well positioned to undertake

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and lead an effort to develop technical solutions and help guide their adoption to make the Seventy Percent Solution a reality.

**Request for Proposals:** MMPEI and OVPR are soliciting project proposals to develop a better understanding of the interplay between the various parts of the energy system so that the Seventy Percent Solution can be realized. Project proposals are invited from faculty-led interdisciplinary teams that outline a comprehensive approach and the steps to be taken to flesh out the concept in the space of one year. *The expected outcome from these funded efforts will be a comprehensive, well-grounded plan detailing a large-scale, multi-year effort to create the understanding and infrastructure necessary to achieve the Seventy Percent Solution.*

Different disciplines will approach this opportunity in different ways. Various approaches may be taken to develop a deeper and perhaps, more quantitative understanding of the interactions between the various parts of the energy system. The following examples provide a range of approaches that may be taken, but these are by no means the only options.

### Example approach 1:

Sometimes a “better understanding” of a complex problem comes from thinking “outside-the-box,” or outside standing scientific and scholarly paradigms. Seeing the “energy problem” from social science perspectives is itself “outside the box.” This call for proposals is an opportunity for historians and other humanists, social scientists, policy analysts, health experts, legal scholars and others not only to join but to convene the energy conversation on their terms. One way to get started is to submit a “planning grant” for an organized, sustained, and focused exploratory multi-disciplinary conversation, perhaps over a one-year interval that “problem finds.” That is, beginning with a set of two or three core proposers of a starting point for the conversation, in the form of a preliminary problem focus on some shared “vision” of the energy challenge, others are subsequently invited strategically into this “seminar.” One product of this evolving problem refinement process could be a “collaboratory,” a set of colleagues dedicated to an increasingly more tractable “problem space,” willing to absorb what is already known, commissioning work to fill in knowledge gaps, and drafting white papers and/or proposals that advance both basic knowledge and create potential new “practical” approaches—perhaps small-scale pilot tests of interventions to change the status quo—in policy and human and institutional behavior.

### Example approach 2:

While a few UM social and policy scientists work on energy-related research, many others work on social and societal problems that are indirectly related to energy issues. We mention a few: consumer and behavioral decisions, discounting the future, spread of innovation, tragedy of the commons, international relations of oil-producing nations, political economy of South, East and Southeast Asia. Proposals may be for *new* projects that apply the researchers’ expertise directly to energy concerns. Interdisciplinary teams of researchers are especially encouraged. They may also be for support for teams of social science and engineering/physical science faculty who commit to working together on energy issues.

### Example approach 3:

A better understanding of the energy system may be developed through modeling. A proposal could take the form of a planning grant to outline a model of the energy economy. In order to

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avoid the pitfalls of other “megamodel” programs, the model could be built in a *modular* style, using an *open source* environment, and following a *Wikipedia*-like approach for user validation and advancement. Relationships between the various entities that comprise the energy system could be constructed in pieces that could be verified independently and assembled as they mature. Another approach is via scenario evaluation in which a suite of scenarios are developed that represent responses to specific actions and the consequences of these actions can be traced through the social system. This framework can also be developed in an open-source fashion, integrating the best available existing models from economics, behavioral and other communities, and will be made available and accessible to the outside world for extension and improvement.

The principal deliverable of this opportunity will be the production of a *plan defining a large-scale, multi-year effort to create the understanding and infrastructure necessary to achieve the Seventy Percent Solution*. We expect that the large-scale effort to advance the Seventy Percent Solution will be created by an interdisciplinary team of researchers. As a first step in assembling this team, we are soliciting project proposals from researchers across the campus that describe how they would approach such an objective. Successful applicants will be asked to coordinate their efforts.

**Eligibility:** Continuing Instructional Faculty, Research Scientists, Librarians, Curators, and Archivists with a minimum 50% appointment may apply.

**Level of Support and Cost Sharing:** A total of \$300,000 is available and we expect to support up to three, one-year grants. OVPR and MMPEI will provide up to 3/4 of the total budget. The remaining 1/4 of the total budget should be supported through cost sharing provided by the academic unit or research center of the participating investigators.

**Application Deadlines and Award Schedule:** Deadlines for proposal submission are June 30<sup>th</sup> and awards will be announced by August 1st for a start date of September 1<sup>st</sup>. Pre-application inquiries are welcome.

**Qualifying Proposals:** To qualify for review, proposals must include at least one principal investigator and at least two co-investigators from at least two different academic units. Preference will be given to proposals that maximize interdisciplinarity. The proposal budget may include support for a doctoral student and/or post-doctoral researchers, and it may include tuition and research supplies. Faculty salary will only be considered for individuals whose *only* funded appointment is as a research faculty member, or for summer salary of teaching faculty members. Travel to technical meetings may be included in the budget.

**Proposal Submissions:** Five collated sets of the proposal should be submitted to the Faculty Grants and Awards Program, Office of the VP for Research, 4080 Fleming 1340, using the ESTP form downloadable from [http://www.research.umich.edu/funding/um\\_sources/ovpr.html](http://www.research.umich.edu/funding/um_sources/ovpr.html), proposals must include:

- Completed cover pages (2) with required signatures
- Abstract of proposed research plan
- Technical narrative of proposed research (not to exceed 10 single-spaced pages)

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- Budget with calculations to arrive at the final project cost
- Budget justification
- Project schedule with milestones
- Biosketches of collaborating faculty; transcript and CV of doctoral student
- Plan of collaboration

OVPR requires the signatures of the investigators and their department or unit heads and the dean or director of the units for the department that would administer an award. In schools and colleges with research associate deans, they may sign in this space. Signatures are also required for all cost sharing/matching fund sources. Applications will not be processed unless all appropriate signatures are obtained.

**Point of Contact:** Associate Vice President for Research Steven Ceccio, [ceccio@umich.edu](mailto:ceccio@umich.edu)

**Review Process and Evaluation Criteria:** Submitted proposals will be screened by OVPR and MMPEI to determine if they meet the basic requirements of the program (see Qualifying Proposals). Each qualifying proposal will be evaluated and scored by a peer-review panel consisting of at least three senior faculty members with appropriate expertise. The panel members will score the proposals in the following categories:

- Scientific quality of research proposal
- Potential to produce long term interdisciplinary collaboration
- Potential of project to lead to a major research effort
- Degree of interdisciplinarity
- Faculty commitment to project
- School/college commitment to project
- Relevance of faculty background experience and interest
- Breadth of academic departments represented by successful proposals

Awards will be made based on a ranking of the proposals using scores assigned during the review process.

**Confidentiality:** Submitted proposals will be treated as confidential documents.