NTC Program Progress Performance Report (PPPR) Information Form

For P.I.'s Use

On a semi-annual basis the NTC sponsored P.I. must report Program Progress Performance Report (PPPR) using the format specified in this PPPR Information Form. The form must be submitted electronically to the corresponding NTC Associate Director by 3/10/2015.

Cover Period: 10/1/2014 – 3/10/2015

NTC Funded Project Information (Round/Year 2, 2014-2015)	
University Name	Arizona State University
Project Title	Long-distance Transportation Infrastructure in a Climate-constrained Future
Principal Investigator	Mikhail Chester
PI Contact Information	mchester@asu.edu

The form includes the following six parts:

- Part I – Accomplishments: What was done? What was learned?
- Part II – Products: What has the program produced?
- Part III – Participants & Collaborating Organizations: Who has been involved?
- Part IV – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?
- Part V – Changes/Problems

Supplementary documents/materials can be attached to this form with the submission.

Part I – Accomplishments: What was done? What was learned?	
The information provided in this section allows the OST-R grants official to assess whether satisfactory progress has been made during the reporting period.	
Reporting Period	**10/1/2014 – 3/10/2015**
1. What are the major goals of the program?	The National UTC aims to promote strategic transportation policies, investment, and decisions that bring lasting and equitable economic benefits to the U.S. and its citizens. The Center is concerned with the integrated operations and planning of all modes serving the nation's passenger and freight transportation system, including the institutional issues associated with their management and investments. A balanced multi-modal approach will be used that considers freight and passenger travel mobility, reliability, and sustainability, as well as system operations during periods of both recurring and non-recurring incidents, including response to major emergencies. The modes in this theme include highway, transit, rail, and inter-modal interfaces including ports, terminals and airports. In particular, the center focuses on research, education, and technology transfer activities that can lead to (1) Freight efficiency for domestic shipping and for our international land, air, and sea ports; (2) Highway congestion mitigation with multi-modal strategies; and (3) Smart investments in intercity passenger travel facilities such as high speed rail. Major center activities are as following: • **Advanced & Applied Research Promoting Economic Competitiveness:** Our research activities are multimodal/intermodal and multidisciplinary in scope, with the aims of addressing nationally and regionally significant transportation issues pertinent to economic competitiveness and providing practice-ready solutions. • **Education, Workforce Development, Technology Transfer, & Diversity** The consortium is committed to providing high-quality transportation education and workforce development programs for a broad and diverse audience. Center's efforts will support the development of a critical transportation knowledge base and a transportation workforce that is prepared to design, deploy, operate, and maintain the complex transportation systems of the future.

2. What was accomplished under these goals?	We have developed a framework for linking perturbations to electricity generation capacity to electric rail modes, in particular, high-speed rail in California. Through this work we are able to show how climatological and hydrological changes can impact electricity supply ultimately creating interruptions in energy supply to high-speed rail in the California corridor.
3. How have the results been disseminated?	We are still in the process of conducting the research but are starting to document our results in technical reports and publications.
4. What do you plan to do during the next reporting period to accomplish the goals? (10/1/2014 – 3/10/2015)	During the next reporting period we plan on refining the research by expanding the findings to include other electric rail systems and the implications for electricity-consuming transportation systems in general.

Part II – Products: What has the program produced?	
Publications are the characteristic product of research projects funded by the UTC Program. OST-R may evaluate what the publications demonstrate about the excellence and significance of the research and the efficacy with which the results are being communicated to colleagues, potential users, and the public, not the number of publications. Many research projects (though not all) develop significant products other than publications. OST-R may assess and report both publications and other products to Congress, communities of interest, and the public.	
Reporting Period	**10/1/2014 – 3/10/2015**
1. Journal publications:	In progress.
2. Books or other non-periodical, one-time publications	Matthew Bartos and Mikhail Chester, 2014, "Methodology for Estimating Electricity Generation Vulnerability to Climate Change Using a Physically-based Modelling System", Arizona State University Report No. ASU-CESEM-2014-WPS-002. Publication is in progress.
3. Other publications, conference papers and presentations	
4. Website(s) or other Internet site(s)	
5. Technologies or techniques	
6. Outreach activities	
7. Courses and workshops	
8. Inventions, patent applications, and/or licenses	
9. Other products	We are creating a geospatial model of the US West to identify

	power generation facilities that are vulnerable to climate change (either from extreme heat or stream flow change). We have also created a dataset of extreme heat forecasts for the US West. We plan on sharing these through a project website.

Part III – Participants & Collaborating Organizations: Who has been involved?	
OST-R needs to know who has worked on the project to gauge and report performance in promoting partnerships and collaborations.	
Reporting Period	**10/1/2014 – 3/10/2015**
1. What organizations have been involved as partners?	We have established partnerships with Valley Metro in Phoenix and Los Angeles Metro.
2. Have other collaborators or contacts been involved?	Not yet but we are now starting to involve them.

Part IV – Impact: What is the impact of the program? How has it contributed to transportation education, research and technology transfer?	
DOT uses this information to assess how the research and education programs: • **increase the body of knowledge and techniques;** • **enlarge the pool of people trained to develop that knowledge and techniques or** • **put it to use; and,** • **improve the physical, institutional, and information resources that enable those people to get their training and perform their functions.**	
Reporting Period	**10/1/2014 – 3/10/2015**
1. What is the impact on the development of the principal discipline(s) of the program?	We anticipate that our findings will help lay the initial groundwork for how transportation infrastructure providers and operators should think about a climate constrained future.
2. What is the impact on other disciplines?	We feel that our results have broad applicability and will be relevant to many disciplines outside of engineering. This includes planning, operations research, and even public health.
3. What is the impact on the development of transportation workforce development?	We plan to implement findings from the research as a module in several graduate courses to help train the next generation workforce. This will include how transportation infrastructure are susceptible to climate change and strategies for reducing the vulnerabilities.
4. What is the impact on physical, institutional, and information	

resources at the university or other partner institutions?	
5. What is the impact on technology transfer?	Through several climate change impacts on infrastructure projects we have engaged with a variety of local infrastructure managers and are meeting with them roughly twice per year to disseminate the knowledge from our research.
6. What is the impact on society beyond science and technology?	It is anticipated that the research results will have broad implications on how transportation technologies will be developed. The research will show infrastructure managers how extreme heat and water can make their systems vulnerable and we anticipate that over the coming decades this information will help guide responses to the creation of new science or the improvement of technology to maintain reliability.
7. Additional impacts	

Part V – Changes/Problems	
If not previously reported in writing to OST-R through other mechanisms, provide the following additional information or state, "Nothing to Report, if applicable:	
Reporting Period	**10/1/2014 – 3/10/2015**
1. Changes in approach and reasons for change	Nothing to report.
2. Actual or anticipated problems or delays and actions or plans to resolve them	Nothing to report.
3. Changes that have a significant impact on expenditures	Nothing to report.
4. Significant changes in use or care of human subjects, vertebrate animals, and/or biohazards	Nothing to report.
5. Change of primary performance site location from that originally proposed	Nothing to report.