NATIONAL INFRASTRUCTURE ADVISORY COUNCIL

QUARTERLY BUSINESS MEETING AGENDA

June 30, 2015
1:30 PM – 4:30 PM EDT
The First Floor Auditorium
2451 Crystal Drive, Arlington, VA 22202

I.	**OPENING OF MEETING**	*Nancy J. Wong*, Designated Federal Officer (DFO), National Infrastructure Advisory Council (NIAC), Department of Homeland Security (DHS)
II.	**ROLL CALL OF MEMBERS**	*Nancy J. Wong*, DFO, NIAC, DHS
III.	**OPENING REMARKS AND INTRODUCTION**	*Constance H. Lau*, NIAC Chair *Alice C. Hill, Senior* Director, Resilience Policy, National Security Council *Caitlin Durkovich*, Assistant Secretary for Infrastructure Protection, DHS
IV.	**APPROVAL OF MARCH 2015 MINUTES**	*Constance H. Lau*, NIAC Chair
V.	**GOVERNMENT PROGRESS REPORT ON 2012 INTELLIGENCE INFORMATION SHARING RECOMMENDATIONS**	*Elena Kim-Mitchell, Director of the Private Sector Office, Office of the Director of National Intelligence*
VI.	**WORKING GROUP PRESENTATION AND RECOMMENDATIONS ON TRANSPORTATION RESILIENCE STUDY**	*Dr. Beverly Scott, Working Group Co-Chair* *Mr. Jack Baylis, Working Group Co-Chair* *Mr. Glenn Gerstell, Working Group Co-Chair*

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VII.	**PUBLIC COMMENT: TOPICS LIMITED TO AGENDA TOPICS AND PREVIOUSLY ISSUED NATIONAL INFRASTRUCTURE ADVISORY COUNCIL STUDIES AND RECOMMENDATIONS**	*Nancy J. Wong,* DFO, NIAC, DHS
VIII.	**DISCUSSION AND DELIBERATION ON RECOMMENDATIONS FOR THE TRANSPORTATION RESILIENCE REPORT**	*Constance H. Lau,* NIAC Chair *Vincent White,* Senior Policy Advisor, Department of Transportation *Don Thompson,* Director of the Cross Modal Division, Transportation Security Administration *Captain Andrew Tucci,* U.S. Coast Guard
IX.	**GOVERNMENT PRESENTATION ON CLIMATE IMPACTS TO INFRASTRUCTURE SYSTEMS**	*Alice C. Hill,* Senior Director for Resilience Policy, National Security Council
X.	**DISCUSSION AND RECOMMENDATIONS ON SCOPE OF CLIMATE IMPACT TOPIC OF STUDY**	*Constance H. Lau,* NIAC Chair
XI.	**DISCUSSION OF ADDITIONAL ADMINISTRATION-IDENTIFIED TASKINGS FOR COMING YEAR**	*Stephanie Morrison,* Director, Critical Infrastructure Policy, National Security Council
XII.	**CLOSING REMARKS**	*Constance H. Lau,* NIAC Chair *Alice C. Hill,* Senior Director, Resilience Policy, National Security Council *Caitlin Durkovich,* Assistant Secretary for Infrastructure Protection, DHS

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XIII. ADJOURNMENT *Constance H. Lau,* NIAC Chair

NIAC MEMBERS PRESENT IN ARLINGTON:
Mr. Jack Baylis; General Albert Edmonds (ret), Mr. Glenn Gerstell, Ms. Peg Grayson, Ms. Constance Lau, Dr. Beverly Scott, Mr. Michael Wallace

NIAC MEMBERS ATTENDING VIA CONFERENCE CALL:
Mr. James Reid

MEMBERS ABSENT:
Mr. David Bronczek, Mr. David Grain, Mr. Philip Heasley, Mr. James Murren, Mr. James Nicholson, Mr. Bruce Rohde

SUNSTANTIVE POINTS OF CONTACT PRESENT IN ARLINGTON:
Mr. Richard Houck POC for Ms. Constance Lau

SUBSTANTIVE POINTS OF CONTACT OBSERVING VIA CONFERENCE CALL:
Mr. William Chen, POC for Mr. David Grain, Mr. Ted Basta, POC for Dr. Beverly Scott, Ms. Joan Gehrke, POC for Mr. James Nicholson

OTHER DIGNATARIES PRESENT:
Ms. Caitlin Durkovich, IP, DHS; Ms. Alice Hill, NSC; Ms. Stephanie Morrison, NSC; Mr. Eric Letvin, NSC; Ms. Elena Kim-Mitchell, ODNI; Mr. Don Thompson, TSA; Mr. Vincent White, DOT; Captain Andrew Tucci, USCG; Ms. Nancy Wong, DFO, NIAC, DHS

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I., II. OPENING OF MEETING, ROLL CALL

Nancy J. Wong, Designated Federal Officer (DFO), National Infrastructure Advisory Council (NIAC), Department of Homeland Security (DHS)

Ms. Wong opened the meeting and called the roll. Upon completion of the roll call, she turned the meeting over to Ms. Constance Lau, NIAC Chair to preside over the rest of the meeting.

III. OPENING REMARKS AND INTRODUCTION

Constance H. Lau, NIAC Chair

Alice C. Hill, Senior Director, Resilience Policy, National Security Council

Caitlin Durkovich, Assistant Secretary for Infrastructure Protection, DHS

Ms. Lau extended her welcome to everyone who had come to attend the summer quarterly business meeting. She said that one of the major topics would be deliberations on the Transportation Working Group report. Dr. Scott and Mr. Gerstell would deliver the report. She welcomed Mr. Thompson (TSA), Captain Tucci (USCG), and Mr. White (DOT), who would participate in the discussion on the Transportation Resilience study. She also welcomed Ms. Durkovich (DHS), and Ms. Hill (NSC). She then invited Ms. Hill to make opening remarks.

Ms. Hill said that she is the new Senior Director of Resilience Policy for the National Security Council (NSC) staff. She said the staff has responsibility for infrastructure protection and the NIAC's work is very important to the NSC's work to better understand how they can be most effective in ensuring that infrastructure exhibits security and resiliency that is needed by the nation. She observed that the range of threats is diverse; the risks are increasing and infrastructure aging. Consequently, it is important to get very serious about choices made and the NIAC's recommendations can provide guidance to ensure the choices made by the Administration were wise. She said she appreciated the NIAC's hard work. She noted that she did not realize that the NIAC has been in operation for over ten years and had provided 26 reports to date. She said it was an extraordinary amount of work and she was grateful for the members' service. She said she had a chance to read the Transportation Sector Resilience report and was excited to see it was consonant with what she had herself observed about the state of the infrastructure. She said she saw there is a lot of work ahead with the recommendations, and thanked the Council for the very thoughtful product. In addition, the NSC has received the

NIAC's report on *Executive Collaboration for the Nation's Strategic Infrastructure* and they will get back to the NIAC if they have any requests for further information.

Ms. Hill said that the NSC has done some restructuring. Eric Letvin, present in the meeting, is the Director for Hazard Mitigation and Risk Reduction Policy. Stephanie Morrison is the Director for Critical Infrastructure. She came to NSC from the United States Coast Guard (USCG) and has extensive experience working for state and local entities, protecting assets across the nation. The NSC is constantly reaching out to the NIAC and other groups and Ms. Hill observed that the work of the NIAC represented an extraordinary commitment by its members which was deeply valued by the NSC. She noted that the NSC representatives were looking forward to the discussion, learning more about the transportation report and discussing further how to build resilience to climate change later in the meeting.

Assistant Secretary Durkovich said that all the members deserve thanks for their commitment and sustainment of this important council. She acknowledged the Council's body of work as well as the fact that they all had impressive day jobs. The fact that the members carve out time to provide world class recommendations in a very dynamic risk environment is highly valued. The Transportation Report is the third NIAC report delivered in nine months. The report tasked to the Council was to look at Transportation Sector resilience, a tasking that was complex and multifaceted but the members rose to the occasion, collecting a vast amount of data, leveraging work that was already done, as well as seeking out new ideas and work. The draft report was a culmination of more than a year of data collection, research and analysis, looking at potential transportation disruption, looking at the ports of Los Angeles and Long Beach as a case study. She commented that those ports were important not just to economic prosperity but also national security. She stated that she had read the report and said that it was impressive that they reached out to so many people. They conducted 40 interviews, producing over 200 pages of information. Ms. Durkovich said the report was exciting and she was looking forward to hearing the presentation. She commented that she would also like to acknowledge the CEO engagement report which was briefed at the last NIAC meeting. Work continues on the Strategic Infrastructure Executive Council with the White House and critical sectors on the implementation of that report. She thinks given the very dynamic risk environment, the ability to bring senior leaders from the private and public sectors together to address some of these problems was very important to advance the mission. She looked forward to working with the NIAC to think about how to implement the recommendations of that report in the smartest fashion possible.

Ms. Lau thanked Ms. Durkovich and said she acknowledged that everything evolves and changes. The members have reflected on the recommendations and studies NIAC has done over the years. The members acknowledge that some of the recommendations made in the past have to be adjusted and changed as things evolve and change. She then moved to the approval of the minutes.

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IV.	**APPROVAL OF MARCH 2015 MINUTES**	*Constance H. Lau*, NIAC Chair

Ms. Lau moved to the approval of the minutes from the March 2015 meeting and asked if the members had any changes or comments. If not, she said they would stand as circulated. There were no changes or comments expressed by the members.

V.	**GOVERNMENT PROGRESS REPORT ON 2012 INTELLIGENCE INFORMATION SHARING RECOMMENDATIONS**	*Elena Kim-Mitchell, Director of the Private Sector Office, Office of the Director of National Intelligence (ODNI)*

Continuing the theme of addressing past recommendations, Ms. Lau turned the meeting over to Ms. Elena Kim-Mitchell to report to the NIAC on actions that have been taken from its 2012 report on intelligence information sharing. Many of the members that were present in the meeting and on the phone were very much involved in this particular study.

Ms. Kim-Mitchell said it was an honor and pleasure to talk about some of the things her office has been working on as a result of the 2012 study on intelligence sharing. She said she was aware that at the last meeting, Ms. Tonya Schreiber shared with the group what the National Protection and Programs Directorate (NPPD) had done to address the recommendations of the report. Ms. Kim-Mitchell said she would expand on some of the items Ms. Schreiber had briefed in the previous meeting. She said that the 2012 NIAC report was very foundational to the work within ODNI to implement intelligence sharing initiatives with the owners and operators of critical infrastructure. Ms. Kim-Mitchell noted that she started her tenure with the ODNI at the end of 2012 and that the NIAC report was a key driver of her efforts. The national security tie to critical infrastructure protection was why the ODNI needed to support this very important community. She thanked the Council for the thoughtful work that went into the recommendations and findings, particularly the sector case studies.

She said she would address five issues raised in the report in her remarks, and what ODNI is doing in response. The first was the NIAC finding that infrastructure protection dissemination of threat information was not getting the priority that it needed. She stated that she was pleased to tell the NIAC that the priority within the ODNI and intelligence community (IC) has been raised in several ways since the report. First, the ODNI, in partnership with DHS, initiated two pilot studies, in the Aviation Sub-Sector and in the Critical Manufacturing Sector, to improve threat information to owners and operators in those sectors. As a result of those pilots, the Director of National Intelligence directed that the National Intelligence Council do a baseline intelligence community assessment (ICA) on threats to critical infrastructure. An ICA is the second highest level intelligence product that includes all pertinent organizations within the (IC). The Director's

decision reflects the priority he gives to this issue. The ICA will be done in the next year and will include appendices that will highlight threats to each sector and subsector to the extent possible. She said normally the customers for intelligence products are the policy community. In this case, the private sector owners and operators are the ones who will use that information to take mitigating actions. Therefore, the effort will include the development of a parallel unclassified product which can be distributed to owners and operators. A dedicated program manager has been designated to spearhead the entire effort, another reflection of the seriousness of this undertaking, reporting to the National Intelligence Manager for the Western Hemisphere. Further, critical infrastructure is now associated with homeland security in the IC and reflected as a priority in strategic documents concerning the homeland. This bodes well for continued understanding and support to the Federal agencies that disseminate information to owners and operators, primarily DHS and the FBI.

The second area of progress was the education of the IC. The NIAC report rightly pointed out that the IC does not understand the needs and requirements of the critical infrastructure community because it is a non-traditional consumer of intelligence. Several steps were underway to help the IC to better understand critical sectors' needs. First, the ODNI has been working with the Sector Specific Agencies (SSAs) and Sector Coordinating Councils (SCCs) to better understand the critical information needs of the various sectors. This effort will help determine whether the IC has information but was unaware of its relevance, or whether the IC does not have the information in the first place. The ODNI has also facilitated sessions with SSA/SCC representatives and IC analysts to give them an opportunity to better understand threats to their sectors. This will sensitize analysts to information potentially useful to critical infrastructure sectors. The ODNI facilitated one session with the Food and Agriculture Sector and hopes to do at least three or four more by the end of the year.

Further, collaboration sites have been established for each sector and, in some cases, subsectors (especially in transportation). The idea is to help SSAs to reach out to people with expertise in the IC and provide a forum to collaborate. For example, the Ebola crisis precipitated a great deal of interaction and collaboration on health issues.

The 2012 NIAC report talked about leveraging the private sector more for its expertise and understanding. The ODNI has been improving analytic outreach to private sector in this regard. A baseline study on private sector engagement with the IC found that generally speaking, private sector engagement is highly robust. She observed that the perspective and context that the private sector brought to intelligence issues was highly valued. This was especially true in areas where the private sector has particular expertise, such as in research and development in cyber security, and in innovative and new technologies. There are some narrow areas where the Snowden disclosures have hampered collaboration. However, by and large, private sector engagement by the IC was strong. Also, to improve knowledge and understanding, ODNI has been looking for opportunities to bring industry analysts to work side-by-side with government analysts to help them understand what is important, shape analytic pieces, as well as put it in a language that is relevant to a particular sector. While this has been a challenge, several organizations have been open to the idea. For example, TSA has worked with the Aviation SCC to identify industry

analysts to work with TSA's analytic function. TSA ended up with more interest than expected because industry saw the value of being able to help shape what was produced. There is a private sector analyst in the Defense Security Service who is performing a similar role. There is an organization within the National Counterterrorism Center (NCTC) that is focused on shaping information to be more useful to state and local governments And they are examining the feasibility of bringing in a private sector person---recognizing it would be a challenge for one private sector person to represent all critical sector interests.

The fourth area of the NIAC report talked about fusion centers and how they can improve their outreach and interaction to critical infrastructure owners and operators. She stated the ODNI has been helping the National Fusion Center Association on this issue by supporting its subcommittee efforts focused specifically on support to the private sector with an emphasis on critical infrastructure owners and operators. On the Homeland Security Information Network (HSIN) system, they have created a portal of best practices, training resources and other types of information that fusion centers can share with their respective critical infrastructure. The Program Manager of the Information Sharing environment (PM-ISE) has contributed resources to help them stand up the capability. Fusion centers also have been expanding their outreach to the critical sectors. She also noted that the PM-ISE has made information sharing with the critical sectors a priority in its information sharing implementation plan. Improving threat information flow to the critical infrastructure owners and operators is one of twelve priority actions outlined in the plan. ODNI has been participating in an effort led by DHS and the FBI to develop an information sharing framework that describes how information flows to private sector owners and operators. The private sector is often confused about which government organization to turn to, especially in the cyber area. The framework will outline who does what, who is connected to whom and help describe how the government is organized to help understand how threat information is reaching this community vital to our national security.

Concluding her remarks, Ms. Kim-Mitchell asked if there were any questions or suggestions for focus areas for future work. Hearing none, Ms. Lau thanked Ms. Kim-Mitchell for the very thorough briefing. She stated that the Council was pleased to hear there were so many actions on the recommendations that have been taken to implement the recommendations from the 2012 study. She said they have all come a long way and it is music to the Council's ears that the government is improving coordination to interact more effectively with the private sector. The issue comes up often in the NIAC recommendations. Ms. Lau said Ms. Kim-Mitchell alluded to the value proposition. She observed that there is little doubt that the potential for intelligence sharing is something the private sector values and creates "hooks" to bring private sector to the table. She commented that the NIAC was happy to hear that the ODNI has been increasing the ways in which that information can be shared with the private sector. Ms. Lau concluded that she thinks it was great ODNI was not allowing the classification of information to get in the way of sharing the results of the ICA. This issue is a commonly stated issue to the NIAC. She commented that it was good to hear that ODNI was looking at sharing information and analysis at both the classified and unclassified level so it can be broadly shared. She said that she was sure the Council will have more to say in this area in future reports because the threat changes

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every day, particularly with cyber. She expressed the Council's appreciation for Ms. Kim-Mitchell's report update.

VI.	**WORKING GROUP PRESENTATION AND RECOMMENDATIONS ON TRANSPORTATION RESILIENCE STUDY**	*Dr. Beverly Scott, Working Group Co-Chair* *Mr. Jack Baylis, Working Group Co-Chair* *Mr. Glenn Gerstell, Working Group Co-Chair*

Ms. Lau said they would now move on to the major item on the agenda, the Transportation Resilience Report, which would be the third report to be delivered by the NIAC in nine months. She asked Dr. Scott, co-chair of the Transportation Working Group, to begin the working group briefing.

Dr. Scott thanked the Council members for the opportunity to present the report, including findings and recommendations for full Council approval. She said she would be sharing the presentation duties with Mr. Gerstell. She also acknowledged Mr. Baylis, the third working group co-chair, as well as the other working group members: Ms. Grayson, Ms. Lau and Mr. Nicholson for their tremendous contributions and insights. In addition, she thanked the extremely dedicated Study Group that was co-chaired by Mr. Basta and Mr. Houck which provided invaluable support. She also thanked the numerous subject matter experts for their insights and perspectives to the working group, including some who were able to come to the meeting. Lastly she thanked NIAC Designated Federal Officer (DFO) Ms. Wong and lead consultant Mr. Eisenhauer and their respective teams for their hard work. She said collectively, the group believed that this vitally important and timely report on Transportation Sector resilience provided meaningful and actionable recommendations that would be foundational to help advance and improve resilience throughout the Transportation Sector.

Dr. Scott said first she would provide some background information and then she would move on to the findings and recommendations, then they will take questions. The working group was charged with three tasks. One was to apply the NIAC recommended framework on resilience goals that was established in 2010 using the Electricity Sector as the case study. Dr. Scott noted that a major breakthrough from the NIAC's 2013 work was the identification of four critical lifeline sectors. The second task was to identify and analyze the important Transportation Sector issues and focus on potential opportunities and actions that can be taken by the Federal government to address them. The Transportation Sector faces many potential risks across modes

and regions which made the study very challenging. The working group decided to focus their study on issues of national scope and significance. During the study they drew upon a vast array of information sources. Particularly helpful were the perspectives and insights that were gained from the 44 interviews. The interviewees included national leaders in transportation, public and private sector experts, educational experts on infrastructure resilience and an array of leadership and government at all levels. All of those individuals were listed in the report. The Working Group reviewed, with assistance from NIAC staff, consultants and the Study Group, 300 documents. The working group found it to be extremely sobering that more events were occurring in the sector that reflected the challenges and the complexity of the sector, including natural disasters, emergency conditions, etc. The working group could barely keep up with the news reports. Dr. Scott lived the reality in Massachusetts during the time of the study, with 111 inches of snow. These real-life events demonstrated how critically important the study was. She emphasized she could not overstate the wealth of information that was collected and incorporated into the report, the complexity of the identified sector issues, and the reality that despite everything the working group looked at, there was probably another study that the working group did not have the time to see. With that said, she said that the working group members were extremely comfortable that their facts and analyses were solidly anchored.

Dr. Scott said she would next discuss some of the challenges. The slide deck summarized some of the facts and figures in order to highlight the magnitude and complexity of the nation's transportation infrastructure. The national transportation assets exceed $7 trillion. It is a mix of assets representing tremendous national investment. Half of those assets are publicly owned, 30% privately owned, 19% is consumer-owned vehicles. Ownership and operations are extremely complicated. The diversity and complexity in terms of regulatory frameworks, statutory frameworks, government, administration, etc. was so very different from the comparative homogeneity of the electricity sector study previously completed by the NIAC. The working group found that there have been many reports issued by the American Society of Civil Engineers, The National Chamber of Commerce, etc. as well as several other presidential commissions. The common clarion cry in terms of issues the sector is facing is underinvestment and the aging of U.S. infrastructure. These risk assessments do not even look at emerging risks. These are the types of issues that the Working Group saw across the transportation infrastructure.

The first charge for the Working Group was to test and validate the framework of establishing resilience goals developed in the Council's 2010 study on electricity and nuclear sectors. Unlike those sectors which are very homogenous, the transportation sector is very diverse and complex. However, the bottom line is that even though there is no cookie cutter approach, the basic tenets from that model held. Dr. Scott said the working group believed that the overall NIAC goals setting framework was valid and certainly applicable to the transportation sector. The working group believed that the Council would find similar applicability for the other lifeline sectors as well. Applying the framework's core elements was useful, such as baseline resilience in the sector. The study group of the working group applied a high impact stress scenario to identify the gaps and ability of the sector to maintain critical functionality and services, and identify resilience goals to address those gaps and seams. The working group found that all of NIAC resilience goals framework was applicable to the transportation sector. The Working Group

developed a robust set of findings based on extensive research and analysis. The working group spent a lot of time to get the findings down to the heart of the issues. The working group narrowed it down to three major groups of findings. First, there is not a good handle on the risk to transportation systems during a national disruption. Second, an effective job of operationalizing resilience in the sector has not been done. Dr. Scott clarified that this means putting policies into practice. Third, transportation infrastructure has been chronically under-invested and there is a gap in baking in resilience. She noted that she would only touch on these items during her remarks, and encouraged the audience to read the full report. She observed that the report was one of the best pieces of work for readers to digest on the status of resilience in the transportation sector.

She observed that the working group found that many owners and operators do not know the risks to their systems. They do not have visibility to risks outside of their particular system. The working group also found that certain risks such as cyber, extreme weather, rising sea levels, aging infrastructure, work force challenges, etc. were not understood at all across the board. For example, critical infrastructure and cyber systems are becoming more tightly interconnected and supply chains are becoming more efficient. She observed that everyone is looking at the issues and trying to follow the script to do the best thing for themselves. However, individual institutions might not be looking at necessary redundancies for the system, i.e. only "looking at the me and not understanding the we". Furthermore the working group found the data, modeling and exercises that are needed to help inform this analysis simply was not robust enough. There are models and data that exist, but they are no way at a granular enough level to be useful, particularly for predictive regional modeling. Predictive modeling could have seen the severe disruption of the liquid fuel supply chain in New York and New Jersey during Super Storm Sandy. This data came from Metropolitan Transit Authority (MTA) and New Jersey Transit. They knew the impact after-the-fact. However, if there had been better predictive capabilities on the front end, the outcome could have been better.

The Working Group also found that on the subject of operationalizing resilience, the White House has put national resilience policies in place such as Presidential Policy Directive (PPD) 21 on critical infrastructure security and resilience and Executive Order (EO) 13636 for improving critical infrastructure cyber security. These policies have not been fully integrated into national transportation plans that address the risk at the local, state, regional and national levels. The working group also found that there was no structured senior level engagement between public and private transportation sector partners that could provide leadership to help operationalize resilience. There appeared to be little fledgling models out there that could be seen from the data collection, but to say that there is structured engagement that takes place in the public and private sector would be inaccurate. On the Federal side, the working group found that operationalizing resilience in a consistent manner was further complicated because of the fact that the transportation responsibilities are split among several organizations including DOT, USCG, TSA, and the U.S. Army Corp of Engineers.

The third finding is investing in resilience infrastructure. She said the working group found that there were enough reports on the major problems resulting from the lack of investment in

infrastructure at all levels. She said that the working group members challenged themselves to not just jump to the conclusion that the sector's resilience gaps resulted from a lack of investment in transportation infrastructure. However, just about every single expert the working group talked to said that it is difficult to get space for the issue of resilience because people are already "choking on a horse and elephant" in they already have to deal with the $7 trillion in assets that are out there today. Dr. Scott concluded that therefore, when resilience is "added" into the equation; there is not enough capacity to deal with it. However, she observed that related to investments, there is one positive note that has been predominantly driven at the private sector level and that is freight. Over a decade they invested $5 billion. This investment seems to have paid off tremendously, while many things have not been occurring elsewhere for sector resilience. The issue that concerned the Working Group the most was the fact there was no national consensus on the need to invest in resilient infrastructure. Members of the working group felt that one of the key aspects for addressing resilience was the complexity of the sector. The working group found that there was not a champion who can make the case for greater investment for resilience purposes. There are a lot of well-meaning people, but no one has all the resources to market the charge and handle the responsibility to move forward, to manage the resources and make the case for resilience. The working group also found that Federal investment decisions are often siloed and uncoordinated, often due in part to legal restraints in Federal authority. Finally, Dr. Scott noted that one of the challenges for making the case for investment was the uncertainty about emerging risks and their costs. This tied back to the lack of robust tools, data, and modeling to help quantify the risks and costs.

Given the complexity and diversity of the Transportation Sector and many of the challenges it faces, Dr. Scott observed that it is hardly surprising that resilience is in such a nascent state of development in the sector. The simple reality is that there are enormous challenges faced by the DOT and its partner agencies and they have worked extremely hard to juggle the multiple roles of funder, owner, operator, guider and regulator of the nation's transportation infrastructure. She said the Working Group also recognized that there were many promising efforts that were already underway. Programs do exist. The focus is currently in terms of asset management and the work that has taken place in DOT's program MAP 21, the National Strategic Plan, and The Beyond Traffic initiative. The innovations, lessons learned, and best practices that evolved out of Sandy and some of the programs that are being seen now such as catastrophic insurance and disaster relief projects represent tremendous work. The Working Group supported and acknowledged the efforts of DOT and its partner agencies, and would like to advance the directions that they are taking. At this point, Dr. Scott asked Mr. Gerstell to provide remarks for his part of the presentation.

Mr. Gerstell said he had two quick points to make. The first is to reiterate Dr. Scott's words of appreciation and gratitude to so many people and outside experts who were part of the study. He also thanked Ms. Lau and Dr. Scott for their leadership on this project. His second point was to recommend that the audience read the appendices of the report because they contain a very useful compilation of studies that have been done in this area, a list of experts, a list of other documentation, and other recommendations and analyses. The sheer fact that this report has been put together in a very useable format is in itself valuable. However he said that what he hoped

was of real value were the recommendations themselves. He said it would come as no surprise to know that the working group faced some challenges in coming up with recommendations because of the many complexities. One complexity was that the sector was split between public and private ownership. Another complexity was that the sector was dispersed among Federal, state, regional and local levels. In addition, the sector consisted of many modes of transportation, such as surface, rail, air, etc. the working group had no shortage of recommendations. In the first draft of the report, the working group had 17 recommendations. They realized that this was far too many and whittled it down to about 11. At the next meeting it got very tough to bring it down to just a few. The guiding principle for the working group to get it down to three was its focus on things that the President and Federal agencies could do to make a difference since recommended action by the Federal government is NIAC's focus. The working group narrowed its focus to issues of national importance as appropriate for making recommendation to the President. Secondly, the working group decided it would make the most sense to tie the final recommendations to its three overarching findings.

The first finding was that transportation risks are not well understood. A response to that was to identify the need for a baseline foundational vision for the current status of transportation infrastructure and recommend an analysis that would blaze a path forward. The recommendation is to conduct a quadrennial review of transportation infrastructure to baseline current risks and establish a comprehensive and persuasive Federal vision for Transportation Sector resilience. The second finding was that there were gaps in leadership coordination and analytic tools. There did not appear to be a clear understanding or vision. The obvious recommendation is that it was important to develop the analytic tools, models and exercises to better understand and plan for emerging risks and transportation infrastructure. Thirdly, there was seen to be a chronic under-investment in infrastructure and the inability to monetize resilience. This gap led to a recommendation of operationalizing resilience by increasing funding, and implementing effective Federal practices, procedures and procurement processes. These three overarching recommendations did have a number of sub-recommendations. He commented that while these recommendations may sound blindingly obvious, the working group believed summarizing three powerful recommendations made it more addressable for the people they are addressing, including the President, but they would also start a public dialogue on this very important topic.

The first recommendation was that the President should direct the Secretary of Transportation and the Domestic Policy Council, working with the Secretary of Homeland Security to conduct a quadrennial review in 18 months to assess risks and prioritize a path forward for the national transportation infrastructure. The working group believed this will establish a foundational vision for the resilience of the U.S. transportation system. The working group's hope was that the sheer process of doing this would force a multiplicity of Federal agencies as well as owners and operators to collect data and be responsive which will achieve value. Sometimes the process itself has value and the working group believed that would be the case here. Most importantly, Mr. Gerstell stated he wanted to address the need for the quadrennial review (QR) to articulate the business case for investment in resilient risk mitigation measures. The working group heard from a number of experts about the cost and consequences of doing nothing. Sometimes by doing nothing in a particular area and not achieving resilience is not analyzed for what it means.

It is important that the QR performs an analysis of the opportunity costs of not making an investment and thereby articulating the business case for baking in resilience.

The second recommendation was that improved tools and standards to mitigate risks need to be organized and created. This recommendation maps to the findings that risks were ill-understood in the sector. To support the QR and its updates the President should direct the Secretary of Transportation in coordination with the Secretary of Homeland Security to fund the development of regional, national and cross-modal transportation system models, using the best available data sets to simulate transportation disruption scenarios, that will in turn, help further identify intermodal and cross-sector risks and evaluate mitigation options. The tools and ability do not currently exist to foresee the full consequences of disruptions. Required data is also missing to assess what it means when something does not have adequate levels of resilience. Mr. Gerstell commented that it could be seen after the fact what the costs were, but at the planning, investment, and decision making stage, the tools do not exist to make appropriate and required decisions. The Federal government has a critical role with the private sector to develop those required tools. In addition, the Working Group thinks the Sector Specific Agencies (SSAs) for transportation should coordinate to fully implement EO13636 by issuing cyber specific risk management guidelines for the transportation sector.

Recommendation 3 maps to the finding that there is significant under-investment in resilience. Mr. Gerstell stated that there was a need to operationalize resilience. The recommendation was that the President should direct the Secretary of Transportation working with the White House and the Secretary of Homeland Security to operationalize national resilience policies throughout all department programs and activities, by specifically translating them into guidance for practice and procedures, funding criteria, and procurement practices to help cultivate a "culture of resilience". He said they have heard that term from a number of subject matter experts that creating a culture of resilience similar to a culture of safety would take many decades. He observed that it is now time to create a culture of resilience. The Federal government could lead in this area by facilitating executive level cross-modal coordination and making sure Federal programs reflect the case for resilience investment. He noted that the report had a number of specific sub-recommendations as well. He said he would highlight two of them. One is to require a resiliency impact statement, similar to an environmental impact statement, though not nearly as complicated, as a pre-requisite for funding of major capital investment projects. This would require a simple change at the Federal level before Federal dollars are spent on a major capital investment project in the Transportation Sector. Someone would need to come up with an assessment of the level of resilience of the particular project or the absence of resilience and whether or not that is cost effective. The sheer act of going through that exercise will be valuable. The other sub-recommendation he stated was that DOT should work with the General Services Administration (GSA) to generally conduct a survey of public procurement practices for all federally funded transportation projects to ensure that resilience was incorporated as appropriate.

He concluded his presentation by saying that there were many more sub-recommendations and noted that the document is publicly available for those to read more in depth beyond the three

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core recommendations and findings. He said that the working group felt that limiting the main points to three would make the recommendations and report more robust, powerful and persuasive. Dr. Scott thanked Mr. Gerstell and said that continuing with the theme of "three", she would like to continue with three thoughts on how to move forward. The first is that urgent action is needed now to secure public funding and invest in resilient transportation infrastructure. All of the continuing resolutions have caused a gap in addressing the issue of transportation resilience. The second is that transportation resilience would require a long term systemic approach, and resilience had to be embedded into assets, organizations, operating principles, etc. The whole culture needed to be involved. Resilience could not just be focused on during a disaster. Resilience needed to be looked at as part of the whole life cycle. Third, resilience could not be seen as a "flavor of the month". There needed to be a sustained, high commitment level from government, industry, as well as from the general public. This initiative could not be something the Federal government can just do by itself. Dr. Scott said that she felt that as a whole, this issue was a high mountain to climb. However, she observed that any time the country puts the "national will" into owning something, it gets there. She referenced the Americans with Disabilities Act (ADA) of 1990 and how people talked about universal access, accessible transportation, facilities, infrastructure, etc. and thought it was impossible. Now 25 years later, there has been a tremendous change, in terms of "yes we can". Dr. Scott felt the country is at "one of those moments", where there are tremendous challenges, but also great opportunities in terms of being able to make the investment and reinvestment decisions that are absolutely critical to overall quality of life, economic competitiveness, security, etc. as well as an investment in the future. She noted that the country needed to be smart with investment and reinvestment decisions. The challenge was great, but so were the opportunities. She closed saying that it had been a great privilege to work on the report. She thanked those in attendance for the opportunity to present the findings and recommendations.

VII. PUBLIC COMMENT: TOPICS LIMITED TO AGENDA TOPICS AND PREVIOUSLY ISSUED NATIONAL INFRASTRUCTURE ADVISORY COUNCIL STUDIES AND RECOMMENDATIONS

Nancy J. Wong, DFO, NIAC, DHS

Upon Chair Lau's query for public comment, Ms. Wong stated that there were no registered requests for public comment.

VIII. DISCUSSION AND DELIBERATION ON RECOMMENDATIONS FOR THE TRANSPORTATION RESILIENCE REPORT

Constance H. Lau, NIAC Chair

Vincent White, Senior Policy Advisor, Department of Transportation

Don Thompson, Director of the Cross Modal

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Division, Transportation Security Administration

Captain Andrew Tucci, U.S. Coast Guard

Ms. Lau said they would now open it up to the members and guests for questions, requests for clarification and comments on why these recommendations were made, noting there was no lack of recommendations on this study. She then invited Mr. White of the Department of Transportation if he had any comments.

Mr. White thanked the Council for all of their hard work. He said Secretary Foxx and Undersecretary Rogoff wanted to come but were unable to. He said they, in the Department, had an opportunity to digest the report. He said the Working Group really honed in on the line of sight on key issues, consistent with where their agency's thinking is heading towards and where some of their internal frustrations were. He said he cut his teeth with Hurricane coordination. He thinks one item that is strongly reflective of his own experience was political will. The summary in the draft report on the need to quantify results, and put them in a metric that is digestible by all parties was appreciated. He especially appreciated that the group acknowledged the Beyond Traffic report because DOT has tried to find the intersection of impacts of climate change, resilience, investment etc. He said the agency has also talked about dollars and cents and the challenges of arriving at where they put a smaller pot of funds. Regarding "political will", he found that in the aftermath of Hurricane Katrina, there was an ability to get the authorization to address the disaster in the Gulf region. However, during Hurricane Sandy, it took a lot more time to find the political will and in the end it amounted to "trading votes" to push the assistance out. It was no surprise that there was political support in the Gulf for authorizing funds for Sandy. He said it was a fact that when they release the funds, the dollars needed to be spent smartly. Dollars will continue to be limited. He felt that the bright side of all this experience was that DOT has done its part in setting up an emergency relief program under Federal Transit Administration (FTA). The program was established at lightning pace. The impact of the storm aftermath brought back questions of how to organize to address such disasters. He commented that the working group really hit on the key need for building a business case for investment. Everyone understood the "dollar and cents" impact in the context of Sandy. It came down to the loss of GDP that came out of that region and how paralyzed the region became, which in turn also paralyzed other parts of the nation. He believed that the report hitting on that point was very important.

Dr. Scott said that the public will issue was addressed on page 34, recommendation 3.2 of the report. She said that part of the answer is CEO engagement, where the Secretary of Transportation and Secretary of Homeland Security should facilitate the implementation of an active cross-modal transportation sector coordinating council as a senior executive body. CEOS should be at the table. She said that action should follow with heightening awareness through communication with the National Governors Association, National League of Cities, and

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subsequently understanding that once they come together, it is not just an internal conversation, but together putting the business case together, doing resource allocation at the table, and taking this information to the partners that are critical to making the business case. The only way to move the politics is to have the general public help to move the politics. This means communication with "real people" and not just everyone "inside the beltway". CEOs are absolutely critical to getting everyone together, collecting good data from the analytics, and getting the work done. Ms. Lau said that the council has noticed all the interdependencies of the lifeline sectors. This was seen in Sandy, where the Energy Sector was paralyzed due to lack of fuel deliveries. Therefore, one of the recommendations was because of the extent other sectors were so dependent on transportation, one can make a case, an overall national case for the lifeline sectors to work together, realize the importance of collaborating, and pulling together the efforts to focus on the most important pieces to bring them to completion. Dr. Scott also pointed out that the working group recognized the USCG represented an area which has implemented senior level engagement; the briefing by Captain Tucci was among the very best on that topic she has heard from the subject matter expert interviews. She said things were happening---they just need to be scaled up. At that point, Ms. Lau invited Captain Tucci to make comments.

Captain Tucci opened his remarks by commenting that the Council has done a great service to the nation with this very valuable report, for which he was appreciative. He thought of a few points that merited further comments. He said in regards to the NIAC's focus on public-private collaboration, one area the USCG has done some good work was with the marine transportation recovery planning, which he presented previously to the NIAC. For those who were not familiar with the concept, he said that it grew out of Hurricane Katrina's impact on the New Orleans area. The experience there was not just rescuing people but figuring out how to get back to business, working collaboratively with the community. What started out as planning for salvage actions in a port area grew quickly to a much more nuanced and complex overall recovery planning. There was great collaboration at the local level. Just as the NIAC report stated, the transportation system is not national; it is regional. Much of the work to enhance resilience needed to be done at the regional level. The USCG has had success working at the regional level with Federal, state, and local government and with heavy private sector involvement. The USCG has not had to do a lot of selling for recovery planning. When the USCG presented their recovery plans, exercises, etc., particularly for the poorer communities, it was not a hard sell because the business community recognized the activity to be in their best interest. Related to such an activity was interdependencies. Many people thought that the USCG was just about marine transportation, but it was really about integrated transportation and energy. Captain Tucci expressed his appreciation that the report called out the synergies and challenges of the way the government was structured. He stated that it could be stove piped, where it is all about highway, or rail, etc. He re-affirmed that the NIAC's report has done a great service by pointing out interdependencies and that the inter-agency stove-pipes need to be bridged. He thought that the report did point out that the USCG can and did work across agencies to make the whole transportation and energy system more resilient, which was excellent. Finally, he wanted to make a few observations about cyber risk issues. The USCG has been working with the marine industry with cyber risk management guidelines. Cyber risks were seen as a resilience issue as well as security and other operational aspects. Much of the work has been focused on how to

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recover operations after an attack has taken place. He stated that he believed predictive modeling could be very useful on the cyber front. He said he had a number of contacts in the academic and business community on cyber and he would reach out to them and discuss predictive modeling in an area such as Houston or Los Angeles where there is much cyber dependence and cascading economic consequences. In closing, he thanked the NIAC again for their work.

Dr. Scott said that working across agencies was reflected on page 25, recommendation 3.2 on the Committee on Marine Transportation Systems. She said Captain Tucci's example was the best case that they found for cross modal collaboration, so they had wanted to highlight it. She reiterated that the working group found that there were great things happening across the sector, but its great complexity created barriers. Ms. Lau clarified that Captain Tucci had provided several briefings to the Working Group. She said they talked quite a bit about the collaboration model that Captain Tucci and the USCG described. However, as they made their findings and recommendations, they felt very uncomfortable with what they found in the data taken as a whole. The reason was that the example provided was primarily at the marine level and the working group was not finding it across all of transportation. That was a key missing piece. She said when they reviewed the case study at Los Angeles/Long Beach (LA/LB) provided by their study group, there were many modes that needed to coordinate with each other and there were very strong coordinating councils at the modal level, but nothing that brought together all of transportation. All three agencies will have to work together to make that happen.

Dr. Scott then asked if any of the other working group members wanted to make a comment before the members heard from Mr. Thompson from TSA. Ms. Grayson said that from many of the subject matter interviews, it came to light that the country has become very good and efficient at responding and reacting. When something happened such as a natural disaster or terrorist attack, everyone came together and worked together to respond to the immediate requirement. She said what seemed to be missing was the political will to understand the cost of doing nothing to design in resilience as part of the requirement for funding. There was also a lack of will for support and collaboration between both the public and private sectors. Building in resilience was the component that was going to reduce long term costs associated with not building in resilience.

Ms. Lau then turned to Mr. Thompson. He said that he appreciated the work the NIAC had done and looked forward to digesting what was in the report. He reported that TSA was undergoing a change in leadership. He said he believed the NIAC's report and many others will be considered to inform the way ahead under the new Administrator. He said TSA took the responsibilities as an SSA co-chair alongside colleagues at DOT and USCG very seriously. They looked forward to expanding that responsibility in applying some of the recommendations and helping to respond to other recommendations the NIAC had made. He said as a primarily counter-terrorism organization, TSA felt that they are a credible federal partner in helping agencies to address that aspect of resilience. He observed that TSA was often in a support role, where their capabilities and authorities could contribute and complement the other agencies. He also thanked Ms. Kim-Mitchell on her acknowledgement of how TSA has improved its intelligence and information sharing and looked forward to continuing to build on their progress. He then asked Dr. Scott

about the "fledgling construct" that she mentioned as facilitating the private-public government industry interaction and if she could clarify or expand more on that the topic. Dr. Scott said that she was referring to the work the USCG had done. When the Working Group received the briefing from the USCG the model presented was described as taking place by the USCG. Ms. Lau asked if Mr. Wallace could contribute to the answer to the question because the question relates to a recommendation that came out of the Council's study that was delivered in March on CEO engagement.

Mr. Wallace thanked Ms. Lau and said he had four comments. First he wanted to point out a phrase that first came from Admiral Allen during Hurricane Katrina, and then became part of the GridEx exercise in the Electricity Sub-Sector from two years ago. He said that in that exercise, thirty executives, and an equivalent number of very high ranking government officials participated. Mr. Wallace facilitated a scenario where they broke the grid and things became pretty bad in the exercise. Part of the discussion became "who is in charge?" Admiral Allen said they had to get over the "who is in charge". Instead they needed to focus on "unity of effort", a phrase that has been resonating in the electricity sector. It meant public-private partnership. The exercise members expanded it to include a "unity of messaging". However, when discussing public-private partnership, a third leg to the stool was missing and that was Congress, "the power of the purse". He noted that the NIAC was a body that advised the President, not Congress. However, since this NIAC report is fact based and analytical, plus the NIAC is politically impartial, credible and experienced, the report ought to stand as a body of information that appropriate members of Congress and committees should listen to it. The electricity-nuclear study which the NIAC delivered in 2010 could be teamed with this report, and possibly the CEO report as well to maybe get some understanding that there are issues here that need to be addressed in a unity of effort context. He said if the country remains politically divisive, it is not going to make it. There has to be a time when all this comes together. Mr. Wallace said in the CEO report, they embedded such a need in one of its recommendations, by saying "the Administration should get to Congress". He suggested that DHS could bring the body of these reports to talk to the right people on the Hill. He commented that the report was great and five times better than the CEO report in terms of fact-based analysis. He stated that he considered the report outstanding.

He said all of the points had mentioned were building to the second point he wanted to get to, the Strategic Infrastructure Executive Council (SIEC). In forming this council, the Council members walked away from the notion of "lifeline sectors" because energy was just too big and oil was not strategic to the issues they were worried about. The Council extracted out electricity because in all of the interviews the Council held, people did not ask about the Oil Sub-Sector, and only a few times was the Natural Gas Sub-Sector mentioned, but everyone talked about the Electricity Sub-Sector. Transportation was included, as well as Financial Services, which was not technically a lifeline sector. Water was left in. They were not sure if it fit, but it also seemed illogical to take it out. Communications was also left in the report. The Council took energy and pulled out what was most important and workable for the new collaboration. Transportation was so huge that perhaps identifying a specific mode and working farther with that is a way to make the recommendations a little bit more actionable.

Mr. Wallace said the March report talked a lot about the role of CEOs and getting the executives in the private sector to come together with executives in the Federal government in order to focus on the highest level issues. The number one recommendation in the CEO report was to draw together the public sector leads from the SSAs for the various agencies of the Transportation, Communication, Water, Financial Services and Electricity sectors and have them start identifying the common national priorities. The third recommendation in the CEO report said to get the CEOs organized and have them bring forward the private sector priorities. The SIEC was intended to focus on the consolidated private and public sector priorities relevant to those sectors, because everything cannot be done at once. He expressed further his thought that the way this report's discussion was going, that participation in the SIEC by this sector may not be all of transportation, but perhaps just participation by the freight rail mode because of dependency risks among the critical infrastructure.

Mr. Wallace said his final point was that there was a potential for the Transportation Resilience study to recognize the CEO study as a venue for cross sector coordination and collaboration, given its recommended structure, processes for putting in place, and people for participation. It could provide a venue for the transportation report to get common priorities identified and practical next steps moved forward. He said that he has been part of NIAC studies since 2007 and its recommendations were really maturing, which is why the Council has gotten to this notion of an SIEC. He observed that he recognized it will not be easy to put together; people on both sides are questioning the reasoning for the SIEC. He said he hoped they are coming to understand exactly what the reasons were, but it was coming together in a very mature way. He felt Congress needed to be brought in, and support a priority approach into what they decide to do, to take it one step at a time and gradually bring in more aspects as needed. He said whether the transportation study can recognize the CEO study as a link to be incorporated into the final report was just an idea on his part. However, he did not think it was appropriate to consider it as a separate recommendation. Ms. Lau said that while the working group was working on the transportation study, the members had a white board session in which it was pointed out that some of the aspects of CEO engagement they were talking about, had been addressed by the CEO study that Mr. Wallace led. She thought that making an amendment to the report was a consideration the full Council may want to discuss. She said she would table that idea for now and invited General Edmonds to speak.

General Edmonds said he thought the study was a great report; it covered a lot. He said he had a couple of suggestions. On slide 8, there was an inventory of stuff. During Hurricane Katrina, they had an inventory of all the buses in the area and those who took buses north were saved due to preplanning. There were chemicals and fuel in the area during the storm because of preplanning as well. He felt that the Transportation Working Group has opened a window to look at regionalization, of actions taken in specific regions. He said he went to a meeting the day before where the participants discussed the sea level rising. Sometimes rail would not be operating, but trucks and buses would be. He said that some activities should be regionalized and determine what would work for the region for issues such as tide water. For example, during Sandy, the Navy ships all went out to sea and then came back after the storm. There was a

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maritime segment that is important to move stuff around. During Katina, a lot of trucks with water and fuel were driven towards New Orleans to wait until the storm died down. In terms of the buses, since New Orleans was below sea level, the city needed to bus the people out immediately instead of waiting until the dikes were broken. There was a good opportunity to move people, products and services if the inventory was there. FEMA had part of this responsibility. He thought this study and its three recommendations could be a catalyst that ties everything together.

Upon a query from the DFO, at this point, Ms. Lau noted that the Council was combining questions and comments for clarification. Ms. Wong asked the Chair to announce when the discussion moved into deliberations for the record. General Edmonds remarked that the working group had done a good job and that the report had opened many windows that would move transportation into the same framework and structure as previous studies. Ms. Lau thanked General Edmonds. She observed that Mr. Gerstell had previously pointed out that Mr. Wallace might be interested in the top of page 10, where the CEO study and SIEC was referenced in the report. Dr. Scott also pointed out that the working group focused on freight as their case study. She said it was not that passenger transportation was not important, but there have been many instances of dependencies on freight rail, so the working group decided to concentrate on freight. The working group felt there was greater opportunity to contribute, particularly with the National Freight Plan in progress. The latter was required under MAP-21; the work was underway but there has been a big extension because that work has not concluded yet. Page 32 of the NIAC report calls out that the development of the National Freight Strategic Plan can be used as an opportunity to begin pulling out resilience metrics, intermodal considerations etc. because the timing was right to do so. She said the Council could also write a more robust piece on CEO engagement in the report. Mr. White commented that the other document he referenced baked in resilience is the Beyond Traffic study. It is in a draft form now and open for public comment. He added that there were entire sections devoted to freight, climate change, resilience, etc. He thought that pointing to the NIAC document will let them resonate off one another. DOT was looking to lock the vault on comments around September.

Ms. Lau said before they move to deliberations, she would like to give Ms. Hill and Ms. Durkovich the opportunity to comment or ask the Working Group questions. She said in particular, Ms. Hill may want to address Mr. White's comment on political will and the importance of having leadership from the White House. Ms. Hill said the report was extremely thoughtful and a huge amount of work had gone into it. The report recognized the same challenges the NSC saw. There was a common understanding of the need but the path forward was not entirely clear. The NIAC and NSC both share an approach to work with modeling and data. All of these issues come up in the framework of climate change, and there are similar challenges. The report touched on interdependencies between the sectors. When one fails there are often cascading effects. She thinks in some instances the same challenges could be found in other sectors. The NSC is maturing their thought process. They are concerned about what to do and what the choices are. She said one thing that was becoming clear was that choices were being made every day. The choices incur the risk of not being good ones. That is the message that is most starkly illustrated by climate change. This is true for any action on infrastructure,

particularly building, renovating, and/or rehabilitating infrastructure. She asked, "Are we building sufficient capacity and resilience for it to withstand what we know is coming?" She stated that she had a team working on this. She noted, for example, that Mr. Letvin was working on the flood standard. It established an elevation standard across the nation, which will also apply to transportation efforts. The standard would apply when institutions are investing using Federal dollars. The Administration was looking at other hazards across the nation to build resilience that way. But, it still needed determination of how to facilitate coordination among the sectors.

Ms. Durkovich said she wanted to express her gratitude for the amount of work, interviews, analysis etc. undertaken by the Council. The wealth of information that is out there came together for a remarkable report. The Council could probably substitute other key sectors and find the same findings and recommendations. She said she has a question, an observation and another question. The first is, when the Working Group compared this study to the 2010 energy/nuclear report, she was curious if the ownership of the sector influenced or drove the understanding of risk or the resilience of the sector. The Energy and the Nuclear Sector is mostly privately owned. However, 50% of transportation is owned by the public sector. Does that change the resilience and understanding of risk? Ultimately, does that ownership affect the political will and the ability to make those needed investments because you have a CEO at the head who has to answer to his/her investors and/or shareholders? She said the difference became even more evident to her when one of the members made the comment about freight rail investments, which is largely a privately owned transportation system. Ms. Durkovich has listened to the Association of American Railroads (AAR) talk about resilience of that particular sub-sector and all the investments that have made, all the time. Her second thought was more of an observation on interdependencies. She said one of the Office of Infrastructure Protection (IP)'s cornerstone programs was regional resilience assessment projects. The program looks regularly at a key industry, system or region. Ports are one area where it has spent a lot of time examining, in particular, the nexus of transportation and energy. She said what struck her was "When we come out of major events, such as Katrina or Sandy, there is a need to continue to examine some of the strategic and economic importance of some of these transportation hubs and systems and recognize that whether ports are in NY, NJ, FL, GA, HI, etc., fuel and oil are flowing into these ports. When you have some type of catastrophic event, whether it is cyber, a natural hazard, etc., how do we understand what those impacts will be to the overall resilience and economy of the state? Reinvesting and modernizing those infrastructures ensure we understand the strategic and economic importance of that particular transportation and makes sure we are not just looking at it in hindsight from an incident that has affected one particular region, but that we are carrying the lessons learned and action across the entire country, making sure we account for future plans." Her third question, which she felt was the most important was related to looking at operational resilience and at investment and policy tools: "Did you at all look at the infrastructure resilience guidelines that we published as part of the Hurricane Sandy task force?" She said the guidelines really called for seven guiding principles for making Federal investment in new infrastructures that Federal agencies needed to account for when they made those investments that ranged from comprehensive analysis, regional resilience, sustainable innovative solutions, long term efficacy, etc. She said she thought that some value was found in

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the principles during the rebuilding of certain projects coming out of Hurricane Sandy. She asked the NIAC if there was a longer term viability for these infrastructure resilience guidelines that IP ought to look at instituting beyond just Sandy recovery and making them into a set of guidelines that are applicable to all Federal investments into infrastructure.

Dr. Scott said she would first address Ms. Durkovich's first point of "Is there a difference in public or private?" She said there absolutely was a difference. Dr. Scott came from the public sector and during the study wondered if there were different models at work and concluded that there were. Public sector was largely where gaps in leadership were found. It was a different business model and it did complicate the Transportation Sector study. Critical stakeholders are more than those sitting around the board table but include those critical constituencies in the public sector and the general public. The value proposition was much more challenging because public sector ownership is so much more complex. Ms. Lau added that there were many more audiences the public sector has to communicate to, which is why the report mentioned the National Governors Association to reach the publicly owned infrastructure audience.

Dr. Scott said the working group did take a look at the infrastructure resilience guidelines and they felt very positively about it, but she suggested breaking them down in terms of the public procurement process. The process needs to be absolutely dissected and understood to get down to the point of "how to" applying those principles. She said it is one thing to talk about in general principle things like best value principle, but she asked, "How do you actually do that when every single rule and law on the infrastructure investments would be going to lowest bid, especially on a local level?" She said without asset management in place they cannot begin to talk about 360 life cycle analyses and failure analyses which were absolutely critical and foundational for implementation. They found that what IP's guidelines did for Sandy was the best that was out there, but it needed to be taken down to a granular level and into "how tos". A procurement officer expertise was needed. Ms. Durkovich said that she might have missed where the guidelines were in the report, but if they were not there, she would like them to consider it.

At this point, Ms. Lau ended the questions and comments segment of the agenda and moved to deliberations by the Council.

Mr. Wallace referenced Mr. Gerstell's point and said he was aware of the reference to the CEO report. He said his comment was a little more direct on whether or not this report created a recommendation that referenced the SIEC vehicle for carrying forward some of these recommendations. He said that it was a thought to the report authors to put on the table. He did not want to offer a specific modification on the recommendations. Mr. Gerstell said he appreciated Mr. Wallace's point. He referenced page 10, where it said the Council strongly reaffirms the recommendations in the CEO report. He said he had no objection if Mr. Wallace wanted to make an amendment to suggest the recommendation explicitly incorporated a reference to the CEO report as a path forward. Mr. Wallace clarified that he was just putting the idea on the table. He said it was not a vested interest issue and it was good for the cause. Mr. Gerstell said he thinks it is great and it can be incorporated into recommendation 3. Ms. Lau said recommendation 3.2 already talked about cross-modal action being taken on by the

Transportation SCC and the cross-sector coordination language was could reference to the SIEC. Mr. Gerstell agreed.

Mr. Gerstell said he had a small suggestion that was almost editorial: In recommendation 1 where the report talked about the proposed quadrennial review, he suggested that in the second bullet on Page 32, that the report reference the United Kingdom's (UK) National Infrastructure 2014 Plan as an example of a type of country-wide infrastructure assessment that would be appropriate. Not everything would be applicable, but it gave a sense of the scope of the national plan. He said obviously the UK is a smaller and a much more homogenous country, but it was an illustrative example. He proposed they add a sentence to the report in the second bullet point suggesting the UK's National Infrastructure 2014 Plan be reviewed in this context. Mr. Baylis said he liked that idea and that the UK would a great model to look at. The UK privatized Water which turned out not to be a good thing. General Edmonds said they also privatized the IRS. Mr. Baylis acknowledged that they did and that their mistakes could be learned from.

General Edmonds said he had a comment about government will. Congress in the present budget has some projects for public-private partnerships. It worked very well for infrastructure. Several places have taken the power production off the military bases to create joint projects through public-private partnerships. Congress funded some of those partnerships with the Federal government. If the NIAC wanted to get Congress involved, the NIAC might want to look at where they could come up with some public-private partnerships that can lend themselves to congressional support and move this whole process of infrastructure forward. Ms. Wong asked if his remark was a recommendation or an amendment. General Edmonds said it is part of his deliberation. He stated that the CEO Working Group talked about it in the previous report, and the Transportation Working Group might want to consider that subject. Ms. Wong said that the full Council is going to consider the final amendments in this session and asked if there was specific language he wanted to add? General Edmonds said when the situation presents itself, consider public-private partnership on those infrastructure projects that would help get these recommendations going. Dr. Scott said she suggested that it go into the section that gives examples. Ms. Lau clarified, page 34, recommendation 3.1 would be the location.

Dr. Scott said it should be obvious that when they say there is a need for increased investment in infrastructure, of course they mean all the tools, research and development, etc. "The obvious is not always obvious. Part of the issue is because the funding for research and development in transportation has gone down. The Transportation Research Board (TRB) is down to $3 million a year." She noted that the Working Group emphasized analytics, modeling, tools, university centers, etc. She did not think it had to be a separate recommendation, but she was looking at all of the pieces that were under the quadrennial review including critical research and development needs. Regarding the second bullet on page 32, she did not think that it needed to be a separate bullet, but she said the part on investment and infrastructure must call out research and development "so everyone understands you cannot go make bricks without hay and look at all the analytics they need and not be prepared to fund them." Ms. Lau asked if that comment represented an additional recommendation under section 3. Dr. Scott said she thought it tucked into the context of the quadrennial review. She was looking at bullet 2: Assessing the current

condition of transportation infrastructure including identification and quantification of research and development needs. She said all of that action came up and as part of the quadrennial list of privatization as well as some idea of what the cost would be to get the analytic foundational work done to support and make the case. Ms. Wong clarified if that was specific language Dr. Scott would like to insert. Dr. Scott said yes.

Ms. Lau then asked if Ms. Kim-Mitchell had any comments or questions. Ms. Kim-Mitchell commented that the military was an important stakeholder in the transportation system. They rely on the transportation system for an incredible amount of logistics and movement. She felt working with the military and making them aware of these needs would give the NIAC report and recommendations a strong partner on Capitol Hill, as well as addressing the urgency of the issue.

Ms. Lau then asked if there were any other comments. Hearing none, Ms. Lau informed Ms. Wong that she had noted four amendments:

1) Page 35, Recommendation 3.2: Reference to adding cross-sector coordination through the SIEC
2) Page 32, Bullet 3: Add the UK National Infrastructure 2014 Plan to the examples.
3) Page 34, Recommendation 3: Add to the example of congressional funding of public-private partnership as a way to obtain funding to build those partnerships.
4) Page 32 Bullet 2: Include the identification and quantification of research and development needs.

Ms. Lau then asked for a motion to approve the report as amended. Mr. Baylis so moved. Mr. Gerstell seconded. Ms. Lau asked all in favor to say "Aye!" Every member in the room and on the phone said "Aye". She then asked if any opposed. There were no oppositions. Ms. Lau said that the report was approved with those amendments. She then thanked the Members.

IX. GOVERNMENT PRESENTATION ON CLIMATE IMPACTS TO INFRASTRUCTURE SYSTEMS

Alice Hill, Senior Director for Resilience Policy, National Security Council (NSC)

Ms. Lau next introduced Ms. Alice Hill of the National Security Council (NSC) staff. Ms. Hill said she would talk to the NIAC about what the NSC sees as a need and give examples. She said essentially the NIAC has been talking about transportation resilience, as well as resilience to all disruptions and shocks. The uniqueness in the climate field was that the entire infrastructure has been built to historic norms. Throughout the nation examples are being seen of where that assumption is causing failures. She noted that the NSC is ultimately hoping for was assistance from the Council on how they can best communicate these risks and incorporate these risks in future planning for investments. The Council has talked a lot about Super Storm Sandy and while

no particular event can be tied to climate change, trends can be seen. The NSC knows that among the trends that are predicted are more intense storms, perhaps with greater frequency. She then referenced a picture of Super Storm Sandy from the space station. The hurricane was so large it was visible there. It hit numerous states and was the largest recorded storm with devastating impacts though it was technically not a hurricane when it initially hit. While the storm was approaching, there were preparations underway, including preparations to infrastructure across New York City, as well as the adjoining states. Referencing an image in the slides, she said that the New York Stock Exchange was closed for two days for the first time since 1888. Goldman Sachs prepared with 25,000 sandbags. As the storm was approaching Mayor Bloomberg warned about an 11 foot storm surge. 370,000 people were evacuated, more than 76 evacuation centers were opened, and some medical centers canceled all their surgeries. The electricity company, Consolidated Edison (Con-Ed) put up flood barriers including sandbags. Then Sandy hit and a number of factors increased the ferocity of the storm. In terms of the storm surge, it was a full moon, and arrived at 8:00 pm at high tide. The way the storm surge collided with the wind caused it to exceed predictions by three feet.

Many of the buildings were not prepared for a storm surge of 14 feet. As a result of the storm surge, 43 million gallons of sea water went into the Brooklyn Battery Tunnels. There was a lot of flooding underneath Manhattan as well. The storm surge went over a 12 foot wall around Con-Ed causing Manhattan to plunge into darkness. As a result many high rises were without power. Con-Ed also proactively turned off the power in some areas. There were massive outages throughout the region. Over 8.7 million people suffered power outages. A week after the event, over one million were still without power. However, one of the aspects that was not anticipated was that the generators were located in basements. Another aspect that had not been thought was that Intensive Care Units were sometimes as high as 18 floors. 6,700 patients had to be evacuated down stairwells in the darkness because of flooded generators. However, if the generators were located high, power needed fuel to be delivered to those high places. The Department of Health and Human Services took this issue on and issued guidelines to help hospitals and health care facilities be resilient to these types of events. The cascading events, due to the lack of power and the flooding, were devastating.

Seven subway stations were flooded as a result of Sandy. Ms. Hill next showed a picture of South Ferry Subway Station. This station had just opened in 2009 at a cost of $545 million. That station had built its openings to 11 feet, which was the projected 100 year flood plain. The storm surge came in and it was flooded to a depth of almost eighty feet by salt water. Preliminary repair estimates were $600 million. She said we are making major investments in our infrastructure, but not building them to sufficiently withstand catastrophic events. Furthermore, “if we did not know a Sandy was coming, we are certainly on notice that another Sandy could happen now and hopefully we are not waiting to notice event by event, but are incorporating new considerations” into future planning.

She observed that there simply was not understanding of the fuel distribution system and how power was dependent on delivery of fuel. In the slide, she showed Goldman Sach’s headquarters and how they successfully weathered the flooding. They were ready to have people come back to

work, but the big issue was getting people there. This issue ties into the transportation resilience study by the NIAC. The subway was out, the buses were out and fuel was unavailable. The building was fully operational but no one was able to work there. This showed how dependent the sectors are on each other, and how we have based infrastructure choices on historical norms. Much of the country's infrastructure dates from 50 to 100 years ago, but in Washington, in some instances it dates to the Civil War. Therefore by not incorporating the projected impacts of climate change, meant "we are putting the investments that we do make in our infrastructure at great risk for not being able to withstand what we know is coming, and most importantly what is already occurring".

Ms. Hill continued her presentation. In 2014, as part of the President's national climate action plan, he issued the National Climate Assessment that took a regional approach to climate risk across the nation. It stated unequivocally that climate change, which was once an issue for the distant future, has moved strongly to the present. This was a consensus document from over 300 scientists. It looked at the risks regionally as well as at our national infrastructure and our ability to carry on our way of life. Since 2014, the National Oceanic and Atmospherical Administration (NOAA) and the National Aeronautics and Space Administration (NASA) announced that it was the hottest global year on record and we continue to see extreme events occurring, both internationally and domestically. The estimates of impacts were not decreasing; the scientific reports indicated the impacts were accelerating. She said we were currently seeing a historic drought in California, which is the seventh largest economy in the world. California has suffered three different droughts covering nine of the past fifteen years. This was the most serious drought that they have experienced. On April 15th, the California Department of Water Resources checked the snowpack in the northern Sierra Nevada Mountains, which provided spring runoff and supplied water to much of the state. It was the first time in 75 years of measurement that there was not any spring snowpack. It was not even measureable. It was not available to feed the reservoir. Meanwhile, Lake Mead, which provides water to 20 million people in the Los Angeles area, fell to its lowest level since the 1930s. There have been serious challenges with drought and drought is exacerbated by climate change as there is more heat, evaporation etc.

Historically, the number of billion dollar disaster events that have occurred across the United States was seen as increasing. Climate change was not the sole reason for that increase; there are a number of reasons including where the population has located itself. There has been significant growth in cost of natural disasters. In the last decade the country has incurred over $300 billion in direct cost due to extreme weather and fire alone. The transportation infrastructure has seen serious impact by climate change. During Hurricane Irene, eight inches of rain fell in six hours. She said she does not think the term extreme precipitation really captured what happened. It meant a massive amount of water. While some do not appreciate the term, an emergency manager called it a "rain bomb". It was essentially so much rain falling at once that it could not be handled. During Irene, Vermont had over 500 roads damaged and 200 bridges wiped out. The flooding there was described as "epic". More recently, there was epic flooding in Texas, with a massive amount of rain falling at once and no infrastructure to handle that rain which caused the rest of the infrastructure to suffer. Particularly on the east coast, trains followed the river valleys and there were challenges with the amount of water being experienced on the railroads.

Water infrastructure was also impacted. A lot of waste-water and water treatment centers were near other water sources, in and around the coast, or near rivers. She referenced a picture of a waste-water treatment plant in 2008. This treatment plant received millions of dollars of renovation. They planned to the 100 year flood level. Shortly thereafter, 14 inches of rain fell; the river rose two feet higher than the berm that had just been completed. The water treatment plant was flooded which caused waste to enter the rivers. This also happened in Sandy where massive amounts of wastewater entered the harbor and contaminated the water.

There were also similar challenges with energy infrastructure. In the summer of 2012, there were very high temperatures. When there is heat, there is more demand for electricity, particularly air conditioning. There would be more trouble transmitting that air conditioning and generating it. For hydro-powered energy, the rivers could be running lower. With nuclear-generated energy, the intake cooling water being drawn would be too warm and not useable which would cause towers to shut down. In the west, energy infrastructure would be at great risk from wildfires. In California, they used to talk about a "wildfire season". Now firefighters call it a "wildfire year". Wildfires are more intense and are essentially burning year round. The wildfires affect our electricity system since the transmission towers would be at risk. She referenced a picture from 2013, which showed a ring of fire. It was California's third-largest wildfire and it burned over a quarter million acres. In addition to threatening power lines, the ash also threatened the reservoir which supplied most of the water to San Francisco. After fires those reservoirs in the mountains would be at great risk from the run off that occurred, and the erosion would pollute those reservoirs.

She said that President Obama had been messaging about the serious threat to our homeland security, economy, infrastructure, and the safety and health of the American people posed by climate change. One of the prudent areas for investment was assessing and addressing the risks of climate change to the infrastructure sectors, because all of the infrastructures have been designed to last for a long time. Climate change impacts will be accelerating even if we cut our emissions to zero; we will still experience the impacts of climate change. She reaffirmed that we needed to find a way to better incorporate those risks into planning for both current infrastructure and future infrastructure. One of the reasons why the White House wanted to work with the NIAC on this issue was to find the best ways to accomplish that. The question asked was "what can we do now to be more resilient to future risk?" That future risk includes extreme weather, sea level rise, and other climate risks that we have never seen in the past before. She concluded by welcoming questions from the NIAC.

Ms. Lau asked if there were any questions from the Council and informed them that their preparatory folders have a proposed scope for a study to be done by the NIAC on climate change. There were no questions for Ms. Hill and the Chair moved to the discussion session on the new tasking.

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X.	**DISCUSSION AND RECOMMENDATIONS ON SCOPE OF CLIMATE IMPACT TOPIC OF STUDY**	*Constance H. Lau,* NIAC Chair
XI.	**DISCUSSION AND DELIBERATION OF ADDITIONAL ADMINISTRATION-IDENTIFIED TASKINGS**	*Stephanie Morrison,* Director, Critical Infrastructure Policy, National Security Council *Eric Letvin,* Director, Hazard Mitigation and Risk Reduction Policy, National Security Council

Ms. Stephanie Morrison thanked the Council for giving her the opportunity to speak with them and said she would like to have a short discussion on scoping, in terms of addressing two important topics for the next study. The first would be a potential study on climate impact on critical infrastructure. She asked if the Council had any questions on how they would scope this on regional resilience, interactions with Federal departments and agencies, and how they would increase the resilience of infrastructure systems impacted by climate and extreme weather events.

Dr. Scott said that she felt "how to best communicate risk" from the perspective of the NIAC would add the greatest value. She said that such a focus would build off some of the work already done by the Council, such as strengthening public will, communication, investment, etc. She said the NIAC has done some similar work requirements for research and development, where The Council developed over a 60-90 day period of time some actionable recommendations and approaches.

Mr. Letvin said there had been a lot of discussion about design for climate change impacts and how it affected infrastructure. The National Climate Association delivered a report which the Federal government thought did a very good job of showing the future trends. Its report broke those trends down regionally. There was a whole section of the report on infrastructure. The challenge to consider was how to downscale the suggestions in the report and make them actionable. The American Society of Civil Engineers (ASCE) released a report on this particular issue a few weeks before the NIAC meeting. They tackled the issue by trying to look at the design of a piece of infrastructure and asked "what does that mean for us?" The report applied to existing infrastructure as well as consideration for new projects. Ms. Hill mentioned the flood standard, but all these other changes in the urban interface, more intense storms on the east coast, etc., led the government to ask what did this report actually mean for the private sector and all of those who design and retrofit infrastructure. The ASCE report might consider examining or reviewing in a study. It was

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30 pages. It attempts to tackle some of the implications. He added he thought that the government had a pretty good understanding of the hazards and how those will change over time but he wondered what that meant for the nation's infrastructure. Last year the Federal government spent $96 billion on infrastructure. $43 billion was spent on new infrastructure. This was direct Federal spending. He asked, "How do we best spend that money going back to resiliency in the transportation report, and how do we consider future hazards that we know will be faced with climate change without looking at historic models. How should government look for it and what does it mean for design?" He observed that there was lot to tackle and there were no answers for all of them. He said he thinks that the nation needed to continue to make progress otherwise in 20 years people will be rebuilding things impacted by another disaster after investing the $43 billion on new infrastructure. The goal should be "one and done". Ms. Lau said if the threat was known, resilience could just be incorporated to the design. Mr. Letvin said it could be, but the current building codes and standards are based on historical trends. An example was wind. Our wind maps are based on looking at anemometers across the country and coming up with trends. If something was built in Charleston, SC, it would be built to manage 120 miles per hour wind, but the question would be "was that the appropriate wind velocity based on future climate?" Present building codes and standards were built for life safety and a limited degree of resilience. The question was how do they look o best incorporate resilience. Some resilience could be achieved by building to code, but the codes have been based on historical trends not future trends, which raised the issue being discussed. He stated that better maps and better codes to design and retrofit infrastructure were needed.

Dr. Scott observed that building resilience was a journey and one should not get into an "analysis paralysis". She said the government needed to look at what can be done today at the local, regional, state and Federal levels. She re-affirmed that better models, etc. were needed. She felt that elements already exist but what was needed was pulling them together and making them actionable/usable. The requirement was like making tool kits. Ms. Morrison observed that the focus on communication was sound and helpful. She said from where she sits, she is not sure if the owners and operators of infrastructure recognize the threats that were seen through reading a consensus document that said 300 scientists say a risk was being incurred. She expressed concern that they were not incorporating the risk into their planning and really taking into account that a storm like Sandy could occur and they need to choose how high they should build future infrastructure. She asked the Council members "How do we get the audience that you are trying to address and we are trying to address, to care so that they make these choices?" She commented that the government had a lot of data; it may not be seen as relevant for preparing to make the choices. She had not seen that the choices being made now are taking into consideration these long term threats that are unlike what has been seen in the past. The owners and operators have assumed the weather and the climate that has been seen historically will continue. Scientific data collected, however, shows a very different picture than the historical one.

Ms. Durkovich asked if this issue was a case where incentives might be helpful. This issue had been looked at with other policies such as cyber security where owners and operators

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did not want to move to a regulatory regime but continued to discuss how to incentivize the private sector to adopt security. She asked, "How do you incentivize the private sector to retrofit not to the code, which is the baseline, but to the plus one? What is the leading practice, the best practice and to come full circle?" She said if a structure were built based on the codes during the Civil War, the reason that it could still operate was because it was over-engineered. There was no 100 year standard. It was not about best value and how they could build something in the least expensive way. It was built the best way they could at the time. The question now was how to incent the private sector owners to make investments to build to what the world will look like 100-150 years from now. General Edmonds said he thought addressing interdependencies will help. In the case of workers in New York, workers with power, a decent computer and internet service would still be able to communicate and do transactions. He said he often thought about all the floods in some places and droughts in others. Fuel can be pumped all over the country; he asked why the same could not be done with water. Building pipelines for freshwater would create jobs. It might cost money, but he felt private-public partnership could make it happen. He joked that if Americans were given profit incentives for doing this, there would be pipelines all the way to the Mohave Desert. He said American ingenuity was the nation's strength. He said that the US built de-salinization plants in the Middle East, but he could not understand why the same could not be done for the Pacific Ocean. He said thinking out of the box was needed to solve this problem. The solutions will not happen through studies. He suggested fresh water pipelines be placed right beside the natural gas pipelines that were currently being proposed so water does not have to be trucked in, it can come from nature.

Dr. Scott said the Council certainly would not have all the answers and believed that it would be in the making of the case for action. She noted that even though California has had financial problems, they have pushed themselves to do seismic retrofits. She said she would like to do a review and look at some communities where they have broken through the public psyche, the "public will" issue. She believed that the issue was very much about making the case and an effective approach to communicating it.

Ms. Morrison summarized the discussion: the Administration was looking at a fairly short study on potential ways to convince owners and operators on the importance of climate change to critical infrastructure resilience and taking a look at best practices to do that. She then asked if there were any other comments. Captain Tucci commented that the USCG was writing a climate resilience action plan. It will look mostly at the USCG's own at risk infrastructure, but it also will look at public infrastructure. He offered to share it when it was ready in a month or two.

Upon Ms. Lau's query to Mr. Wallace for comments, he said when he built power plants, substations, transmission lines, etc., the senior executive judgements that are made about investments are not rear view mirror looking because they cannot afford to be wrong. Public entity owned infrastructure, such as dams, bridges, waterworks, etc. would not be as intensely focused on shareholders. This focus motivates private sector to build nuclear plants to a "tenth to the minus 6", to minimize a probability of an accident. Determination decision

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is made on the objective and then the planning continues on to "even when that happens, what do we do for resilience?" For resilience, if the Federal government as a matter of policy wants 10^{-6}, it would never get funded by the private sector. If the Federal government wants to put an incentive in place, that would be an entirely different debate. Second, he said that the National Academy of Sciences or the National Academy of Engineering had to have been looking at these matters with a more focused professional approach. He thought that would be a better place to go for advice on this topic than the NIAC. He commented that he was not sure what the NIAC could tell the President that was going to bring forth any more insights than what the White House probably already identified internally. Thirdly, he pointed out the NIAC had become a very small group of members and there was only so much they can do with the size of the present membership. The studies could be more along the themes the Council had been building on for the past decade on cyber, physical, regional resilience, public-private partnership and collaboration. He thought this topic would be a significant redirection. Ms. Morrison said she appreciated such comments. Ms. Lau re-affirmed that one of the Council members' primary concerns was what advice could NIAC provide that will advance the purposes the Administration sought. She said as far as a major research study, referencing Captain Tucci previous comment, a lot of work was already going on in the climate change area. The issue that the NIAC has surfaced several times in previous reports was the need to develop a value proposition and to communicate it. She reiterated the question, "How do you create a value proposition where you get investment?" She said they have learned from the transportation study the point Ms. Durkovich brought up earlier; the value proposition was very different for privately owned vs state and locally owned.

Ms. Lau asked Ms. Wong what action if any they needed to take, or if they were just providing input. Ms. Wong said at this point they were providing input on an individual basis because there was no specific tasking on the table. Ms. Wong said it sounded like the government was receiving some substantive input. Ms. Morrison agreed.

Ms. Lau then asked Mr. Gerstell for comments. He said he yielded to nobody in concern and worry about climate change and wanting to make sure the Federal government properly addressed it in conjunction with the private sector. He had no lack of enthusiasm for the topic, but he observed that he was having trouble figuring out what NIAC could say about the topic. He said the Council members are not in the position to do the original research. Simply using NIAC as a "bully pulpit" to say more public-private collaboration was needed could be done. There might be some utility for the Council to say it again, but what it can say would be pretty marginal. He commented that he had been trying to envision that if the Council did get a tasking what it could do on the topic, including making recommendations that would be meaningful and add value. He said on most of these studies when the Council starts, the members have some idea of what the deliverables, approach and end game might look like, but for this topic, he was having trouble imagining what they could say that would be really meaningful, novel and helpful. He said there was no question the members wanted to help the White House.

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Ms. Morrison noted that from her perspective as a potential recipient, there could be a sector analysis of resilience and regional planning requirement deliverables. There could be a discussion of how other sectors look at issues of resilience. Granted that there may be a time where there will soon be a change of Administrations, but she thought if the NIAC put its talents and its deep thinking to looking at how does the Federal government assist the owners and operators of infrastructure, either private or public, to address all risks but in particular this risk of climate change, the advice would be useful. She noted that climate change was a threat that was going to hit virtually every sector of the United States and our global supply chains. She said the NIAC could advise how the Federal government could tackle this problem. She assured the members that there was no master blueprint. This topic might fit into the work the NIAC normally does, but she would like the members to be aware that the White House does see a need and value for the Council to address this topic. She indicated that she did not think the owners and operators of infrastructure were engaging on this issue and the White House could use the NIAC's advice on how to help those owners and operators seriously engage and get them the meaningful information they need. In addition, the White House did not have the answers on how to help regions plan in a meaningful way for the cascading effects of climate change. How should the Federal government better organize itself to address a cross cutting threat like cyber was also a question they did not have the answer for.

Ms. Grayson thanked Ms. Morrison for her comments and referred back to one of the previous comments of how they could take transportation out of the transportation report and the report could apply to many other lifeline sectors, or all of the sectors. She said she wanted to suggest or ask about the possibility of looking specifically at water as a tremendous invaluable resource that is impacted by climate change. She asked if the Council could focus the study on water sector resilience while addressing climate change as a major risk to that resilience. Ms. Morrison said that Dr. Holdren, the President's science adviser, would say that climate change is basically about too much water or not enough water. Water was key to many infrastructure sectors such as energy, wastewater treatment plants, etc. Certainly that focus would be helpful. Ms. Grayson said that many times when the NIAC has done a study, such as their study on pandemics, the wastewater aspect comes to light. In large cities such as New York, disease could come from the inability to handle wastewater. There could be a study just on that aspect of the issue which could be quite beneficial. Ms. Morrison agreed.

Ms. Lau said she thought that they have completed the discussion for this agenda item. Ms. Wong said yes, and that the members had provided a lot of input. She also said that Ms. Grayson's suggestion on the next topic, water, is a recommendation that perhaps the water study could incorporate very specific concepts that were discussed related to climate change applied to that one sector. Ms. Wong said the task may be to see what they can learn from applying those concepts to this one sector. Ms. Morrison said that is some great input. Ms. Lau asked Ms. Wong if there is anything more they need to do on this topic, noting that they have had a discussion previously that water would be the fourth in the series of critical lifeline infrastructure studies by the NIAC. Ms. Lau said they were expecting there might be

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a tasking on water and perhaps some of the issues of climate change may be incorporated into that water study since water is so important to the climate change discussion. She asked if they needed to take any action, or just wait to receive the formal tasking. Ms. Wong referenced the water resilience study in the slides and reaffirmed the tasking the White House had approved. It will be written up based on any additional comment or clarification from the members provided in this meeting. She referred any additional comments on the tasking to Ms. Morrison, representing the White House. Ms. Morrison responded that she would revisit the language of the tasking after this discussion, and incorporate some of the input received.

XII. CLOSING REMARKS

Alice C. Hill, Senior Director for Resilience Policy, National Security Council

Caitlin Durkovich, Assistant Secretary for Infrastructure Protection, DHS

Ms. Lau asked Ms. Durkovich if she had any closing remarks. In the interest of time, Ms. Durkovich just thanked the Council members for their work. Ms. Hill also said she wanted to thank the NIAC. Ms. Lau said that the Council does enjoy itself though it is does very serious work. She thanked Ms. Hill and Ms. Durkovich and their staffs for attending. She said their participation really made a difference for what NIAC accomplished as a Council. She also thanked the representatives from the Transportation Sector agencies and noted that they had a big task ahead of them.

XIII. ADJOURNMENT

Constance H. Lau, NIAC Chair

Ms. Lau adjourned the meeting.

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