Climate Safe Infrastructure Working Group

Meeting 4
University of California-Davis
Institute of Transportation Studies, 1605 Tilia Street, Suite 100
Davis, California 95616

Wednesday, April 11, 2018
10am – 4pm
AB 2800 (Quirk): Purpose

Examine how to integrate scientific data concerning projected climate change impacts into state infrastructure engineering, including oversight, investment, design, and construction.
AB 2800 (Quirk): Scope of Assessment and Recommendations

The working group shall consider and investigate, at a minimum, the following issues:

(1) The current informational and institutional barriers to integrating projected climate change impacts into state infrastructure design.

(2) The critical information that engineers responsible for infrastructure design and construction need to address climate change impacts.

(3) How to select an appropriate engineering design for a range of future climate scenarios as related to infrastructure planning and investment.
AB 2800 (Quirk):
Additional Scope of Recommendations

(A) Integrating scientific knowledge of projected climate change impacts into state infrastructure design.

(B) Addressing critical information gaps identified by the working group.

(C) A platform or process to facilitate communication between climate scientists and infrastructure engineers.
Project Timeline

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<th>January</th>
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<th>March</th>
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- Mtg #1
- Mtg #2
- Mtg #3
- Mtg #4
- Mtg #5

- Global Climate Action Summit
  San Francisco
  9/12-14

- Focus & Bound
- Deliberate
- Deliberate
- Deliberate
- Draft Report
- Review & Revise
- Finalize Report
- Deliver Report
- Outreach

- Report due to Legislature
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<tr>
<th>Mtg</th>
<th>Dates</th>
<th>Locations</th>
<th>Topics and Tasks</th>
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<tr>
<td>1</td>
<td>1/18</td>
<td>Sacramento</td>
<td>Determine project goals; WG structure and process</td>
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<tr>
<td>2</td>
<td>2/12</td>
<td>Los Angeles</td>
<td>Identify relevant infrastructure, sector-specific infrastructure standards, climate-sensitivity, information needs</td>
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<td>3</td>
<td>3/13</td>
<td>San Francisco</td>
<td>Linking forward-looking climate science and impacts information with standards, codes, certifications throughout infrastructure life cycle, identify barriers to information use and potential ways to overcome them</td>
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<td>4</td>
<td>4/11</td>
<td>Sacramento</td>
<td>Considering more than climate changes (land use, demographics, economy, mitigation, disasters) and cross-sector interdependencies in infrastructure design</td>
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<td>5</td>
<td>5/9</td>
<td>San Diego</td>
<td>Governance of setting/changing design standards; non-standard strategies to ensure climate-safe infrastructure; deliberation of draft report; agree on refinement needs</td>
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<tr>
<td>6</td>
<td>6/20</td>
<td>Sacramento</td>
<td>Agree on final report revisions; delivery and outreach/promotion; project debrief</td>
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Meeting Dates, Locations, Topics & Tasks
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<th>Engagement during WGs work</th>
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<tr>
<td>Define WG goals</td>
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<td>Identify relevant infrastructure, sector-specific standards, and climate info needs</td>
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<td>Link climate science to infrastructure design/implementation/O&amp;M &amp; Barriers</td>
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<td>Identify cross-sector interdependencies</td>
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<td>Consider governance &amp; implementation</td>
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<td>Report to Legislature &amp; SGC</td>
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<td>Continue post-release outreach</td>
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**Measuring Progress**

Water Resources Adaptation to Climate Change Workgroup of the Advisory Committee on Water Information

3rd CAF

AAAS 2019?
The Arc of Our Work to Date

- Goal setting
- Rules of engagement

Meeting 1
- Identify, prioritize climate-sensitive infrastructure;
- Agree on definitions
- Prioritize relevant standards, codes, guidelines;
- Identify information needs

Meeting 2
- Connect engineers’ information needs with climate science;
- Identify barriers to information use, solutions
- Work through concrete examples

Meeting 3
- Consider comprehensive approaches to climate-safe infrastructure that integrate...
  - Land use change
  - GHG mitigation
  - Disaster preparedness
  - Interdependencies

Meeting 4
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Tasks for Meeting #4:

• **Task 1**: Take stock of the information and Insights gathered to date vis-à-vis project needs and goals

• **Task 2**: Fill gaps identified previously by CSIWG members and through the stock-take

• **Task 3**: Revisit and refine substantive goals of project

• **Task 4**: Co-develop outline of project report to legislature and Strategic Growth Council
Elements of the Final Product

A Set of Project Findings

• The infrastructure considered in the work of the WG
• Opportunities for state to affect how and where infrastructure is built
• Opportunities for integrating science into infrastructure design
• Critical information needs of infrastructure engineers to address CC impacts.
• Critical information gaps
• Informational and institutional barriers to integrating projected climate change impacts into state infrastructure design
• Ways to select an appropriate engineering design for a range of future climate scenarios as related to infrastructure planning and investment.

A Set of Recommendations

• Policy recommendations of how to encourage forward-looking infrastructure planning and design
• Procedural recommendations to affect climate-safe infrastructure development process (from planning, design, approval, construction to monitoring)
• Principles to guide infrastructure development, maintenance, repair to build equitable, climate-resilient infrastructure
• Available tools and information sources to use
• Recommendations on how to lower/overcome barriers to information use
• Research recommendations to fill information gaps
• Recommendations on capacity building/professional development
The **infrastructure considered** in the work of the WG

**Work so far...**
- Defined resilience, infrastructure, climate-safe
- Decided infrastructure requires a systems focus
- Completed template for identifying all relevant infrastructure & associated standards

**Work still to do...**
- All CSIWG members refine/approve definitions
- Mtg. 4 will focus on cross-sectoral discussions
- Have all homework
  - Need input on telecommunication

**Principles** to guide infrastructure development, maintenance, repair to build equitable, climate-resilient infrastructure
Opportunities for integrating science and future-CC info into infrastructure design

• Work so far...
  • Main focus so far!
  • Identified relevant standards and current exposure
  • Identified relevant standards and future-climate exposure
  • Reviewed opportunities of CC integration across design cycle

• Work still to do...
  • Need telecommunication information
  • Mtg 4 – focus on integrating other forward-looking science (e.g. impacts science & other drivers of change)
  • Clarify decision-making processes

• Available tools and information sources to use
• Research recommendations to fill information gaps
• Policy recommendations of how to encourage forward-looking infrastructure planning and design
• Procedural recommendations to affect climate-safe infrastructure development process
• Principles to guide infrastructure development, maintenance, repair
Critical Information Gaps

• Work so far...
  • Identification of information needs, comparison to what is possible
  • Continuing discussion on “which number to use”
  • Reconciliation of uncertainty/costs/trade-offs in decision-making

• Work still to do...
  • Short of getting to “one number” – what process can we use? > deeper exploration of adaptive design
  • Mtg. 4 – discuss economics behind adaptation/engineering design

• Research recommendations to fill information gaps
• Recommendations on capacity building/professional development
Ways to select an appropriate engineering design

• Work so far...
  • Mtg 3 - developed case studies for transportation and energy/buildings
  • Mtg 3 – looked at full design cycle and opportunities for selecting engineering design
  • Identified more approaches to explore:
    • Performance based standards
    • Adaptive design and management
    • Voluntary measures

• Work still to do...
  • Need to develop case studies for water and telecommunication
  • Need to look at LC design for water and telecommunication
  • Mtg. 5 – focus on these other approaches... ?

• Policy recommendations of how to encourage forward-looking infrastructure planning and design
• Procedural recommendations to affect climate-safe infrastructure development process
• Principles to guide infrastructure development, maintenance, repair
• Recommendations on capacity building/professional development
Opportunities for state to affect how and where infrastructure is built

• Work so far...
  • Declared that there are many ways to go above/beyond minimum standards, but relatively vague on specifics
  • CSIWG comments on need for policy change

• Work still to do...
  • Mtg 4 - Discussion on how AB2800 can support and advance state goals
  • Webinar 5 focus on national/international standard setting
  • Mtg. 5 - focus on governance
  • What policy recommendations do we want to propose? If at all?

• **Policy recommendations** of how to encourage forward-looking infrastructure planning and design
• **Procedural recommendations** to affect climate-safe infrastructure development process
• **Principles** to guide infrastructure development, maintenance, repair to build equitable, climate-resilient infrastructure
• **Recommendations on how to lower/overcome barriers** to information use
### Elements of the Final Product

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Integrating Land Use Change and Ecological Data in Planning and Implementation

James (Jim) Thorne, Ph.D.
UC-Davis
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Integrating Social, Demographic & Economic Data in Infrastructure Planning & Design

Kyle Meng, Ph.D.
UC-Santa Barbara
CSIWG Member
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Integrating Disaster Management & Long-Term Infrastructure Planning

Speaker: Nicole-Meyer-Morse, Ph.D.
California Office of Emergency Services
Opportunity for Public Comment
Lunch

12:00-1:00pm
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Integrating Across Interdependent Infrastructure Sectors

Juliette Finzi Hart
USGS

Susi Moser
Susanne Moser
Research & Consulting
A Contribution to California’s Fourth Climate Change Assessment

Topic: Teleconnected/long-distance and cascading climate change impacts on electric grid and interconnected/interdependent lifelines

- Water/Wastewater
- Transportation
- Communication
- Fuel
- Emergency management
- Public health & health services
- (Food)

Focus: L.A. region

(Currently in peer-review)
How Can the State Help Solve These Problems?  
(Policy, Guidelines, Standards etc.)

Challenge #1: Building Back Better After Disaster

• After disasters, need to “get back up and running” as quickly as possible
• Recovery funding conditions require “building back to exact pre-disaster condition” unless local codes allow it > missed opportunity for climate adaptation
• To “build back better” may also involve lengthy permitting process > social and economically unacceptable delay in return to functionality
• How to enable adaptation after disaster?
How Can the State Help Solve These Problems? (Policy, Guidelines, Standards etc.)

Challenge #2: Detrimental Post-Disaster Waivers

- Waivers in emergency situations can speed up recovery (see use of waivers in preparing for L.A. Olympics; EPA waivers after Harvey and Irma in Florida)
- But frequently waivers have significant negative impacts on the environment (e.g., toxics) or on people (e.g., environmental justice)
- How can waivers be made “environment – safe”, “people – safe” and climate-safe?
Challenge #3: Common Sequences of Extreme Events

• Lifeline managers expect (and build their infrastructure) to have to withstand one kind of extreme, but in California they often come in typical sequences (each of which is expected to worsen with climate change)
• Place-based multi-hazard assessments exist, but don’t usually consider climate change
• Concatenated events constitute a climate science frontier
• How can infrastructure be designed and (re)built to withstand complex risks
Challenge #4: Interconnections and Interdependencies

- No lifeline can properly function for any length of time without services from other lifelines.
- There is no overarching authority guiding or overseeing the development, long-term planning or day-to-day operations of the integrated system.
  - Land-use choices can undermine water delivery and emergency management functionality.
  - Sectoral changes in communication affect the capacity of emergency preparedness etc.
- What are examples of one sector wishing to adapt to climate change and another’s standards, procedures etc. presented a barrier? How were these overcome?
How Can the State Help Solve These Problems? (Policy, Guidelines, Standards etc.)

Challenge #5: Lack of Communication

- Finding #1: All sectors are dependent on functional communication infrastructure
- Finding #2: Across lifeline sectors, communication is generally poor
- Finding #3: The communication sector is notoriously difficult to engage
- Observation: The communication sector is not represented in the CSIWG, yet communication infrastructure is essential
- How to fill the “communication gaps” in each of these senses?
Rotating Break-Out Groups

Challenge #1: Building Back Better After Disaster

Challenge #2: Detrimental Post-Disaster Waivers

Challenge #3: Common Sequences of Extreme Events

Challenge #4: Interconnections and Interdependencies

Challenge #5: Lack of Communication
Opportunity for Public Comment
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Going Beyond Existing State Infrastructure Guidance

Louise Bedsworth, Ph.D.
Governor’s Office
Office of Planning and Research
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Co-Development of the Report Outline: A Starting Point for Deliberation

Section 1: Introduction
• Charge
• Purpose
• Objectives
• Process

Section 2: Climate Change and Infrastructure – the Challenge
• Climate is changing: Potential threats, challenges and opportunities
• Infrastructure status: Challenge & opportunities

Section 3: Changing Infrastructure Standards
• Integration challenge of climate science & infrastructure planning
• Which, why, how

Section 4: Non-Standard-Based Approaches to Achieving Climate Safety
• Systemic, flexible, adaptive approaches
• Cross-sector alignment
• Integration of other forward-looking info
• Using opportunities for building back better

Section 5: Informational, Institutional and Other Barriers

Section 6: Recommendations to the Assembly & SGC

Appendices
Co-Development of the Report Outline

• Based on agreed outline:
  • Initial section annotation by each WG member
  • Further development in break-out groups by report sections
  • Report back and discussion
Opportunity for Public Comment
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<td>11:30-12:00pm</td>
<td>Integrating Disaster Preparedness and Long-Term Planning</td>
</tr>
<tr>
<td>12:00-1:00pm</td>
<td>Lunch</td>
</tr>
<tr>
<td>1:00-2:00pm</td>
<td>S. Moser &amp; J. Hart: Integrating Across Infrastructure Sectors</td>
</tr>
<tr>
<td>2:00-2:30pm</td>
<td>L. Bedsworth: Going Beyond Existing State Infrastructure Guidance</td>
</tr>
<tr>
<td>2:30-3:45pm</td>
<td>Co-Development of the Report Outline</td>
</tr>
<tr>
<td>3:45-4:00pm</td>
<td>Wrap-up: Review, Next Steps</td>
</tr>
<tr>
<td>4:00</td>
<td>Adjourn</td>
</tr>
</tbody>
</table>
Review of the Day

- Integrating Land Use – Integrating Mitigation & Adaptation
- Integrating Social, Demographic and Economic Data
- Integrating Disaster Preparedness and Long-term Planning
- Integrating Across Inter-dependent Infrastructure Sectors
- Going Beyond Existing Guidance
- Report Outline
- NEXT STEPS
Introduction

Climate science

Transportation

Water

Green Infrastructure

Governance

Presentations, Recordings and Q&A Available at: http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/
Next Webinar: April 18

Energizing the Future: Infrastructure Challenges and Opportunities in the ENERGY Sector

Nancy Ander
CA Dept. of General Services

Kristin Heinemeier, Ph.D.
Realized Energy

Guido Franco, Ph.D.
California Energy Commission
Next Steps

We Will
• Continue webinar series
• Prepare meeting summary notes
• Prepare Meeting #5 (San Diego)
• Send annotated draft to WG
  • [to be added over the course of the CSIWG meeting]
•

You Will
• Send in travel receipts
• Make travel arrangements for May meeting (San Diego)
• Attend and contribute to Webinar series
• Complete writing assignments within 2 weeks
  • [to be added over the course of the CSIWG meeting]
Be in touch!

• To sign up to the Climate-Safe Infrastructure listserv...
• To stay up to date on CSIWG developments...
• To ask questions or send comments...

Email: Elea Becker-Lowe at Elea.Beckerlowe@resources.ca.gov or at climatesafeinfrastructure@resources.ca.gov

... and she will direct the inquiry accordingly.
Toward Climate-Safe Infrastructure

Thank you!