Paying It Forward
The Path Toward Climate-Safe Infrastructure in California

Report Release
Hosts

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Overview

• Introduction and overview to webinar

• Opening Remarks
  • Secretary John Laird
  • Jamesine Rogers Gibson (UCS)

• Highlights of AB 2800 report

• Q&A with Climate-Safe Infrastructure WG members

• Closing
A Couple of Housekeeping Items

• Please type your questions for presenters into the chat box

• We will try to answer as many as possible after the presentations

• Answers to remaining questions will be posted on the website

• Thank you to USC Sea Grant!
Opening Remarks

Secretary John Laird
Natural Resources Agency

Jamesine Rogers Gibson
Union of Concerned Scientists
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.

Project Decision Making

- Climate Change Impacts Science
- Engineering Standards, Project Planning and Design
- Project Construction Maintenance and Monitoring
AB 2800 (Quirk): Scope of Work & Recommendations

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

1. informational and institutional barriers to integrating climate change into infrastructure design.

2. critical information needs of engineers.

3. selection of appropriate engineering designs for different climate scenarios.
AB2800 Working Group and Support Team

Co-Facilitators
Juliette Finzi Hart
USGS
Susi Moser
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The Climate-Safe Infrastructure Working Group
Amir Aghabouchak
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Deb Niemeier
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John Andrew
DWR
Kristin Heinemeier
Realized Energy
Kyle Meng
UC-Santa Barbara
Martha Brook
CEC
Noah Diffenbaugh
Stanford

Project Team
Keali'i Bright
Natural Resources Agency
Elea Becker Lowe
Natural Resources Agency
Joey Wall
Natural Resources Agency
Guido Franco
California Energy Commission
How We Got Here

• 6 Working Group meetings (Jan-June 2018)
  • Structured, focused, highly interactive
  • Open to public, public comment periods and active engagement in activities
  • Presentations or panels of local experts/examples

• In parallel: Ongoing webinar series to
  • Highlight WG members’ expertise and work
  • Bring in outside expertise
  • Educate and engage interested stakeholders

• Literature review

• Outreach (deliberate and opportunistic)

http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/
Paying it Forward:
The Path Toward Climate-Safe Infrastructure in California

A Report of the Climate-Safe Infrastructure Working Group to the California State Legislature and the Strategic Growth Council

September 2018
A Wealth of Resources For You

- 16-page Executive Summary
- 160-page Full Report
- 13 Appendices
- These and additional materials (meeting materials and webinars) produced over the course of the project are all available at: http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/
Overview: A Report in 10 Parts

Chapter 1: Motivation
Chapter 2: The Problem
Chapter 3: Vision
Chapter 4: Elements of a Framework to Action
Chapter 5: Summary
Chapter 2: Climate
Chapter 3: Infrastructure
Chapter 4: Data & Analytics
Chapter 5: Project Pipeline
Chapter 6: Governance
Chapter 7: Finance
Chapter 8: Implementation
The Problem

Changing climate • More and/or worsening extremes

Aging infrastructure • Deferred maintenance • Changing technology • Population growth
California at a Crossroads

Our infrastructure must be resilient and sustainable to withstand these growing threats, particularly from worsening extreme events. Yet California’s infrastructure is not.
The Vision: A Climate-Safe Path for All

Source: CSIWG (2018), Paying It Forward
**Adaptation Pathways: Not a Step Change but a Change in Many Steps**

**STEP 1**: Determine thresholds of significance where climate impacts would cause unsafe conditions or unacceptable disruptions to performance.

**STEP 2**: In the short-term, add protections or risk mitigation measures that are relatively quick to implement, maintain long-term flexibility but ensure desired performance.

**STEP 3**: Be ready to implement the next level of infrastructure protective measures as Trigger 1 is approached; start planning for protective measures needed at Trigger 2 to ensure continued level of performance as climate change accelerates.

**STEP 4**: Plan for next risk mitigation measures needed as climate continues to change, using the latest science; given acceleration, there is less time for planning between Triggers 2 and 3.

**STEP 5**: Be ready to implement new designs and strategies as Trigger 3 approaches. Continue as needed, employing combinations of strategies to achieve societally acceptable performance and trade-offs.

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**Key**:
- **Steps for existing infrastructure**
- **Step for new infrastructure**
- **Steps for existing infrastructure and new infrastructure**
Prioritize Social Equity & Inclusion

In...
- Research
- Project development and prioritization
- Decision-making processes
- Finance
- Workforce development
- Procurement
- M&E

Source: CSIWG (2018), Paying It Forward
Framework for Action: “It Takes a System”

**Data and Analytics**
- Climate risk forecasts
- Vulnerability assessments

**Project Pipeline**
- Planning process
- Standards for prioritizing
- Project management & coordination

**Governance Structures**
- District & municipal
- Regional & State
- Federal & private projects

**Financing Tools**
- Funding (revenue source)
  - *Taxes, fees, grants, private $*
- Financing (deal structure)
  - *Debt, pay as you go, risk hedging*
- Innovative instruments
  - *Financing-insurance combination*

**Implementation Aids**
- Training & Professional development
- Accountability mechanisms
- Monitoring & Evaluation

**Coordination & Integration Across Scales**

**Iterative Planning & Review Cycle**

Source: CSIWG (2018), *Paying It Forward*
Data & Analytics

- What is used • What is needed • What is available • In what form

- More than forward-looking climate science
  - Societal drivers of change (population change, land use, technology, values)
  - Social inequities and vulnerabilities
  - Economics of adaptation and inaction
  - Full life-cycle assessment, valuation of costs and benefits
  - Adaptive design

- Platforms, processes, tools
Project Pipeline

• Iterative process
• Meaningful engagement
• Systemic planning
• Screening for climate impacts
• Calculating project feasibility
• Probabilistic risk management
• Innovative design options

Source: Adapted from re:focus partners (2015)
Governance

- Traditional governance through standards, codes, guidelines etc.
- Compilation of those relevant to state infrastructure
- Processes for updating and augmenting them at state level
  - Performance standards
  - Standards of professional practice
  - Standards of care
  - Voluntary standards
  - Manuals of practice
- Liability needs special attention
- Institutions for integrated infrastructure systems
Infrastructure Finance

• Federal and state spending trends
• Structural challenges to infrastructure finance – the “pre-existing condition”
• Added challenges (and opportunities) of infrastructure finance under climate change
  • Costs
  • Accounting for CC in finance
  • Data and analytics to support infrastructure financing
• Dedicated funding vs. accountability in all projects
• Emerging innovative financing tools
Implementation Aids

• Training, capacity building and other workforce issues
• Statewide coordination at the highest level
• Translating State policy to the project level
  • Cal-MOP
  • Procurement guidance
  • Incentives
  • Permitting, waiver guidance, code changes
• Development of metrics of performance & success
• The question of best practices
### Vision
- Policy signal
- Pathways approach
- Centrality of social equity

### Data and Analytics
- Climate risk forecasts
- Vulnerability assessments

### Project Pipeline
- Planning process
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### Governance Structures
- District & municipal
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### Implementation Aids
- Training & Professional development
- Accountability mechanisms
- Monitoring & Evaluation

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**RECOMMENDATION 1:** Adopt Climate-Safe Path for All as Statewide Policy

**RECOMMENDATION 2:** Provide permanent source of funding for state climate change science efforts

**RECOMMENDATION 3:** Provide funding for infrastructure agencies to interact with science community

**RECOMMENDATION 4:** Build staff capacity to improve project development (integrated, inclusive planning, Financing options, full life-cycle assessments etc.)

**RECOMMENDATION 5:** Provide guidance & encourage effective stakeholder engagement from the start
RECOMMENDATION 6: Update all climate-sensitive standards, codes and guidelines; work through relevant professional societies/standard-setting organizations; develop guidelines to go above minimum standards; work through liability issues

RECOMMENDATION 7: Assess the true costs over the full life-cycle of infrastructure projects; make efforts to help policy-makers and the public to better understand the necessity of bearing these costs through outreach.
**Walking the Path… The CSIWG Recommendations (cont.)**

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**COORDINATION & INTEGRATION ACROSS SCALES**

**ITERATIVE PLANNING & REVIEW CYCLE**

**RECOMMENDATION 8**: Develop work plan on how to address the training and professional development gaps of its infrastructure-related workforce.

**RECOMMENDATION 9**: Establish a Standing CSIWG to devise and implement a process for coordinating and prioritizing Climate-Safe Path related resilience policies and actions at the highest level.

**RECOMMENDATION 10**: Translate Climate-Safe Path policy into practice (through manuals, contracting language, incentives, identification of metrics of success, best-practices compendium etc.)
Next Steps

- Briefings to SGC, State Legislature
- Conference presentations
  - Academic
  - Practitioners
- Outreach to organizations, professional societies across U.S.
- CSIWG as champions in their respective agencies, organizations, professions
- Engage with other processes where CSIWG experience and insights can serve
Q&A Panel of CSIWG Members

Noah Diffenbaugh, Stanford

John Andrew DWR

Nancy Ander DGS

James Deane CA High Speed Rail Authority

Martha Brook CA Energy Commission

Cris Liban L.A. Metro
Report and Additional Resources

• **Permanent website:** [http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/](http://resources.ca.gov/climate/climate-safe-infrastructure-working-group/)

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Thank you!

• This concludes the Climate-Safe Infrastructure Webinar Series

• The *Climate-Safe Infrastructure* Webinar Series recordings and slides will be a lasting resource
  • Find report, webinars, meeting materials and other outputs of CSIWG at: