



# Climate Safe Infrastructure Working Group

## **Meeting #1**

Stanley Mosk Library and Courts Building

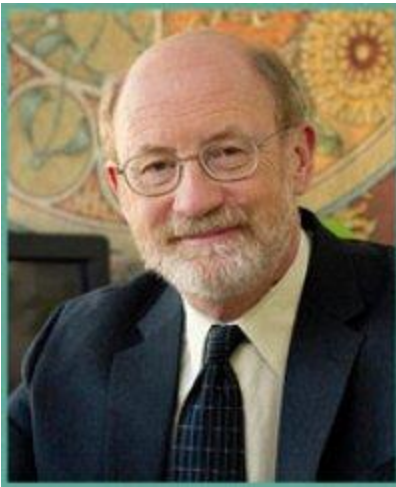
Room 500, 914 Capitol Mall

Sacramento, CA 95814

Thursday, January 18, 2018

10am – 4pm

# Opening Remarks



**Secretary John Laird**  
Natural Resources  
Agency



**Hon. Bill Quirk**  
California  
State Assembly



**Jamesine Rogers  
Gibson**  
Union of Concerned  
Scientists



**Bruce Blanning**  
Professional  
Engineers in  
CA Government



**Deputy Secretary  
for Climate and  
Energy Keali'i Bright**  
Natural Resources  
Agency

# Agenda

Time	Agenda Item
10:00-10:20am	Welcome and Opening Remarks
10:20-10:50am	Overview and Introductions: Working Group and Project Team Members
10:50-11:15	Introduction to AB 2800
11:15-12:00	Co-Development of Project Goals & Objectives
12:00-12:30	Drawing Bounds around the CSIWG: Literature Review (Part I)
12:30-1:30	Lunch
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4:00	Adjourn

# Meeting Goals



1. **SET GOALS** - Through an iterative process, define the goals of, and boundaries around, the work of the Climate Safe Infrastructure Working Group
2. **BUILD SOCIAL CAPITAL** - Get to know fellow Working Group and Project Team members
3. **SHAPE PROCESS** - Clarify the Working Group's preferred ways of working with each other toward a productive, successful outcome
4. **GET READY TO WORK** – Identify project elements, timelines, deliverables, and gain clarity on the work ahead

# Introductions

- Your name, affiliation
- Why are you here, really?
- What do you bring to the discussion?
- What do you most hope to see come out of this Working Group?



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# Climate Safe Infrastructure Working Group

Keali'i Bright, Deputy Secretary for Climate and Energy  
California Natural Resources Agency



# Why Are We Here?

- Climate change impact science is a moving target
- Engineers and design standards don't do well with moving targets
- Billions from taxpayer funding will be spent on new infrastructure
- Executive Order B-30-15: Consider climate change in all state investments
- AB 2800 (Quirk): Directed the creation of the working group
- California's 4<sup>th</sup> Climate Change Assessment



# Executive Orders, Statutes & Administrative

- Executive Order S-13-08, 2009
- Executive Order B-30-15, 2015
- AB 1482 (Gordon, 2015)
- AB 2800 (Quirk, 2016)
- 5-year infrastructure plan
- State Hazard Mitigation Plan
- California/Regional Transportation Plans, California Water Plan, Central Valley Flood Plan, etc.

# 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.

# AB 2800 (Quirk): Final Deliverable

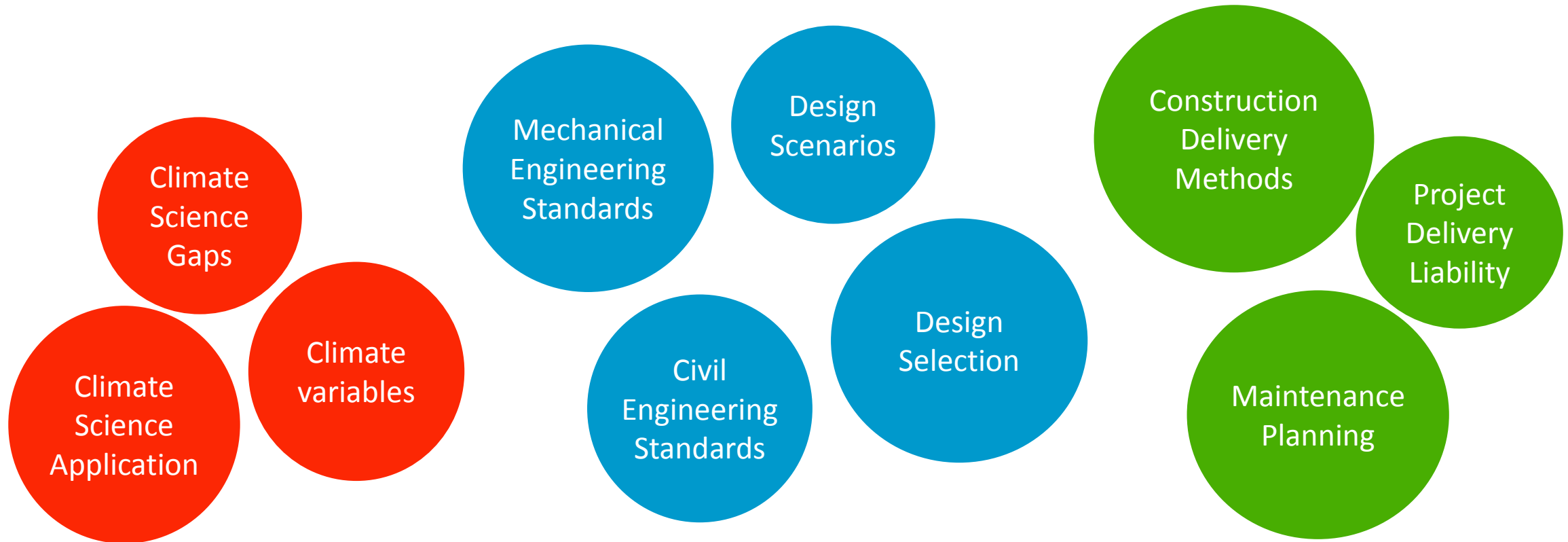
July 1, 2018 -- Report to the legislature and Strategic Growth Council

## Outcome Opportunities and Leverage Points

- ✓ Legislation
- ✓ Infrastructure Planning
- ✓ Standards
- ✓ California Standards
- ✓ Best Practices
- ✓ Budget decisions

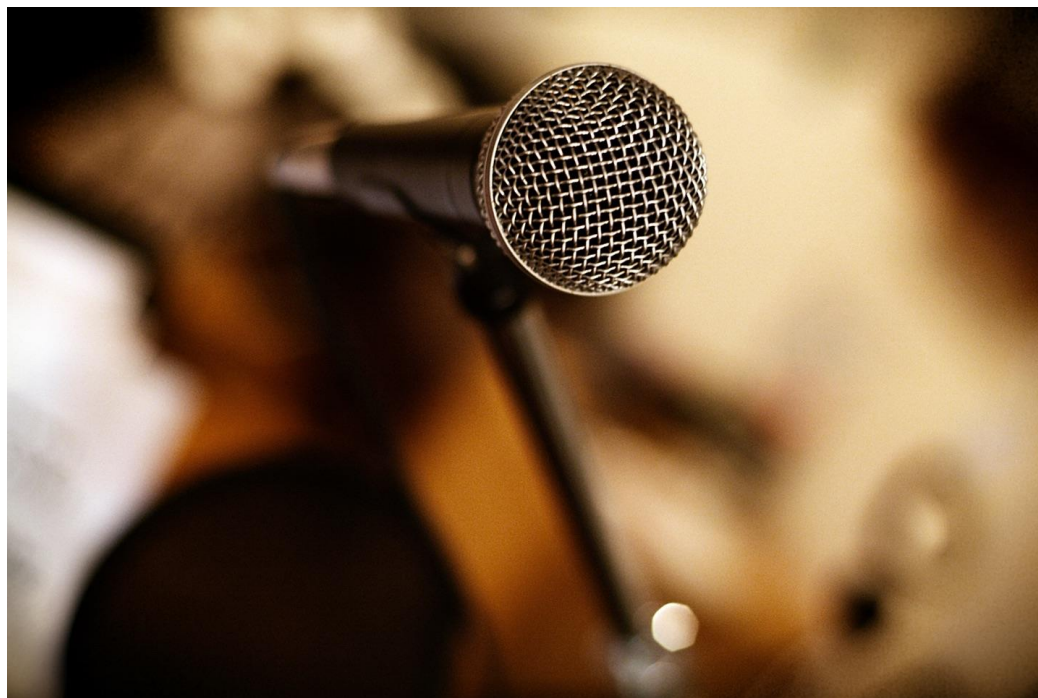
# Conclusion:

How do we ensure state infrastructure meets planned objectives under a changing climate?



Questions?

# Opportunity for Public Comment

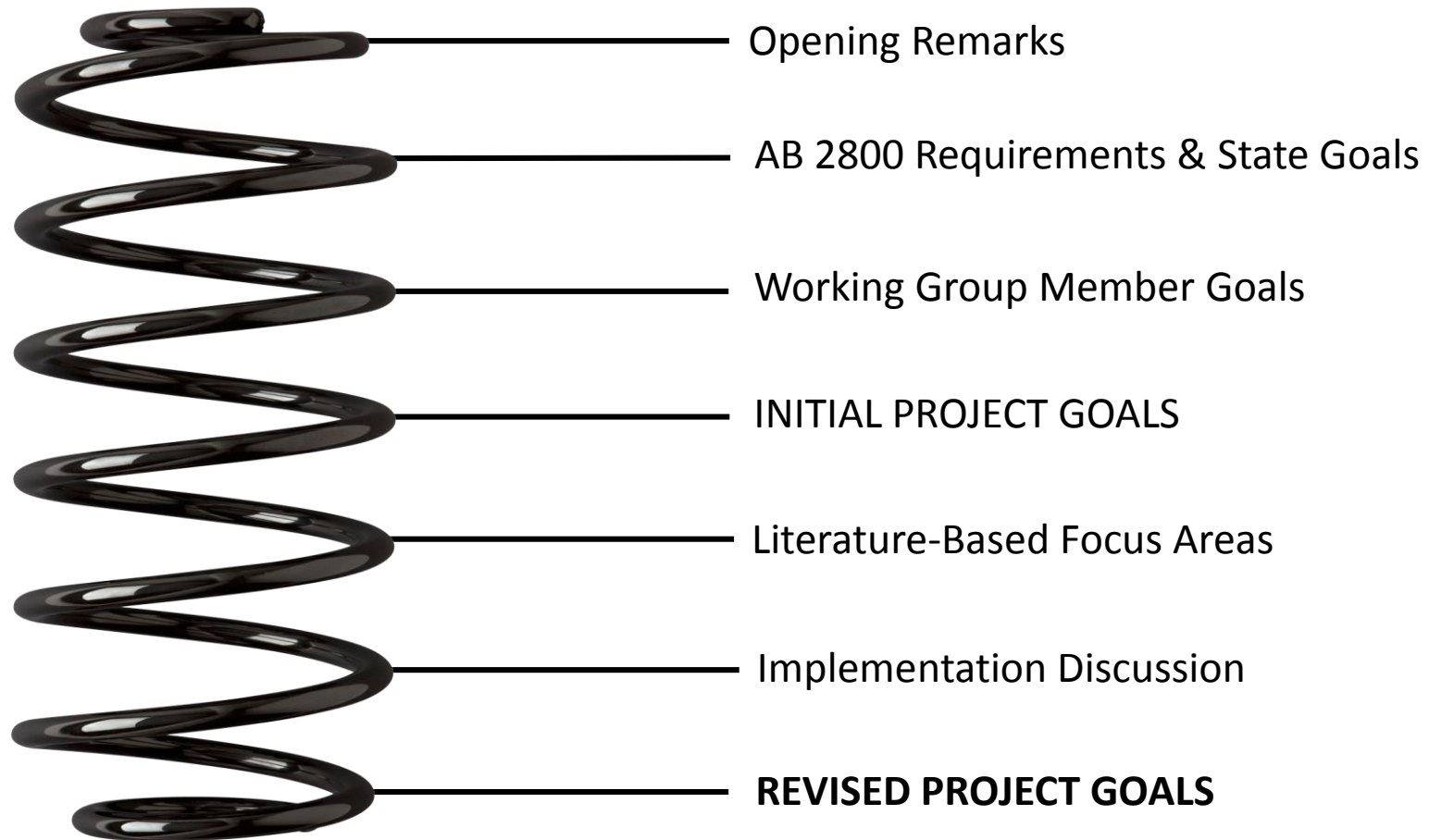




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# Working Toward Feasible Project Goals



# Co-Development of Project Goals & Objectives



# Project Goals & Foci (Prelim)

- **ENGAGEMENT** (focus on State-owned/-invested infrastructure and those looking to state for guidance):
  - Soliciting input into WG process
  - Engagement during WG process
  - Dissemination of results of this WG to legislated audiences
  - Recommendation for ongoing engagement beyond life of WG
- **SCIENCE** (all-inclusive):
  - Information needs of engineers
  - Bridging science to engineering decisions
  - Gaps/what is missing to make the connections
  - Research priorities
  - Transitioning from historical approaches to adaptive approaches
  - Actionable science
- **POLICY** (overarching):
  - Overarching long-term goals to pursue
  - Guidance on connecting science to practice of engineering design
  - Placing standards in broader context of all available means to create climate-resilient/safe communities



Source: S. Moser, CSI Working Group Members organizing project foci and objectives into clusters

# Project Goals & foci (Prelim)

- OUTPUTS (by July 1)
  - Report with recommendations, implementation strategies
  - Tools, techniques, guidance for how to operationalize recommendations
  - Recommendations/strategy for near-term infrastructure investment opportunities
- LONGER-TERM OUTCOMES: Indications of success/vision
  - Widely accepted climate change standards
  - CA (and individual state agencies) serve as a model for the rest of the US
  - Change culture of engineering by embodying resilience in codes
  - Sustainable and resilient, safe buildings and communities
  - Ensure that updated codes are implemented correctly and used
- PRINCIPLES UNDERLYING WG'S WORK
  - Perspective: Seeking solutions for social systems
  - Use of social, behavioral, economic science along with physical science
  - Learning about science, learning about real-world infrastructure decision-making



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# Literature Overview ... well, overview.

Before lunch (30 min):

- Review initial questions
- High level overview of the literature
- First reactions... to be mulled over during lunch

After lunch (30 min):

- What are your “go-to” sources?
- What gaps are there in what we’ve outlined?
- What other questions should we examine in the literature?
- How do our goals fit into the available state of knowledge?



# Issues for the Working Group to Consider

1. The universe of types of infrastructure to focus on
2. General types and sector-specific standards and procedures, climate-sensitivity, importance
3. Linking climate science to risk/exposure assessments, infrastructure standards
4. Approaches to prioritization
5. Processes for developing/changing standards and how to ensure, track, reward adoption/implementation
6. Ensuring delivery of climate-safe infrastructure, with and beyond standards



# Infrastructure

## Includes:

- Buildings of all types
- Communication facilities for all types of communication technologies
- Energy generation and distribution systems
- Industrial facilities
- Transportation networks of all types (land, air, water) and supporting facilities
- Drinking water and waste water systems
- What are we missing?



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## City of Seattle's Auditor's Office Assessment of Vulnerable Transportation Infrastructure:

- Bridges and culverts
- Causeways and coastal roads
- Pavement surfaces
- Surface drainage
- Hillside slope stability

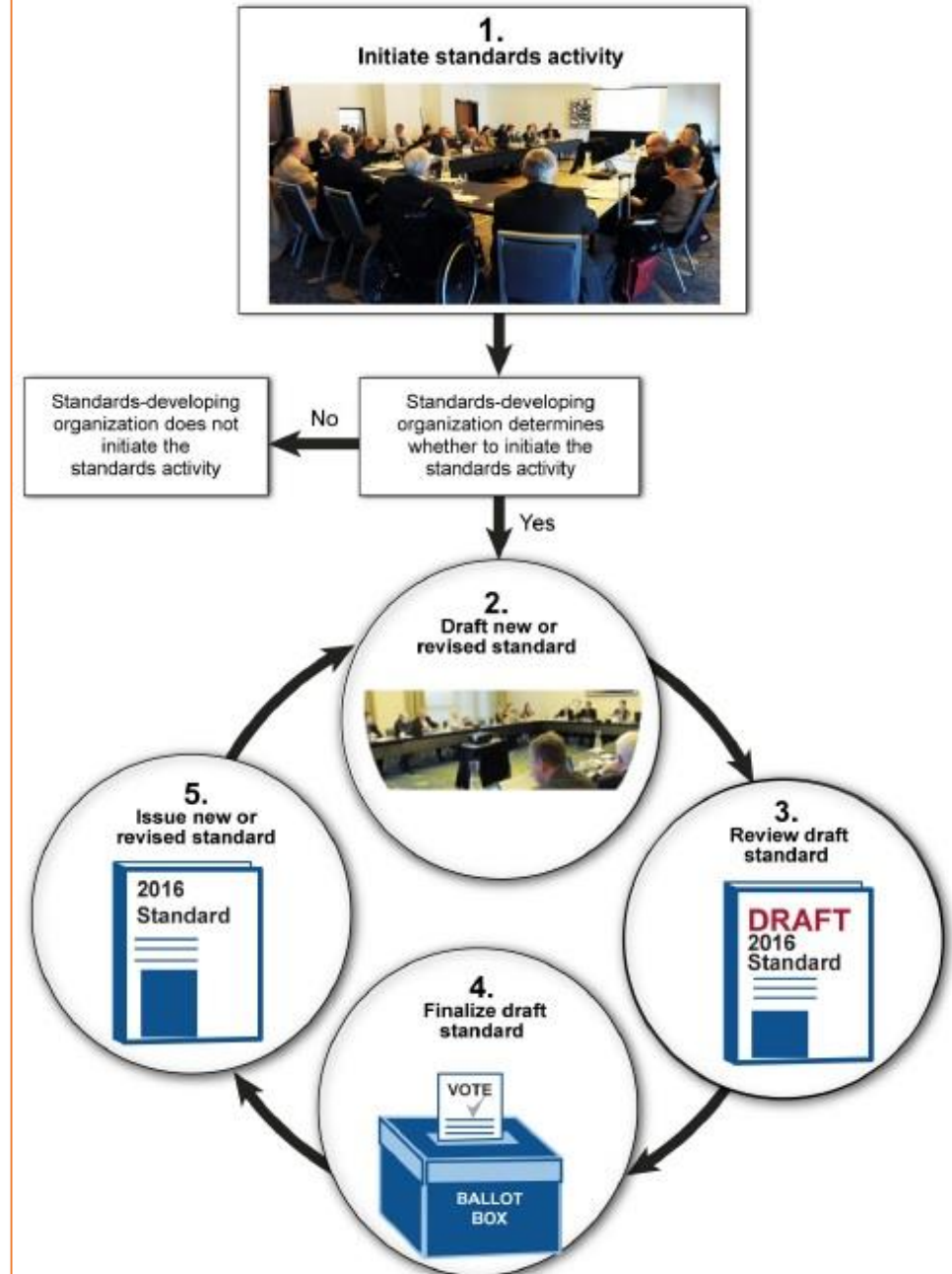
Key Task (Meeting #2) - identify infrastructure relevant/important for the State to consider for AB2800

# Standards and Procedures

- By design: slow, deliberate, conservative, tested, and consensus-based

“It is difficult to reconcile the dynamic nature of climate change with the stable framework of infrastructure design.”  
(GAO 2016, p.20)

Figure 1: Generalized Standards-Developing Process



# Standards and Procedures

Different ways to develop/implement standards:

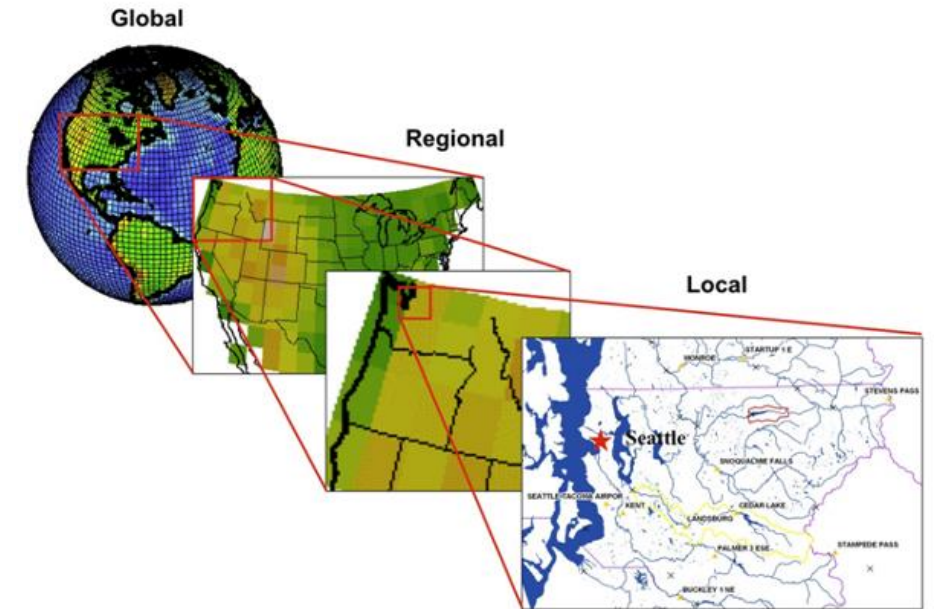
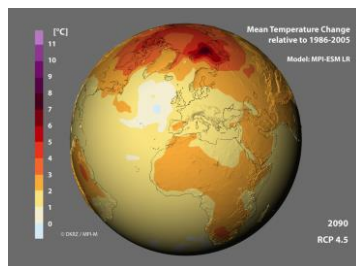
- International vs. US-only vs. state-based
- Mandatory vs. voluntary
- “Best” or “accepted” practices and principles
- Design vs. performance



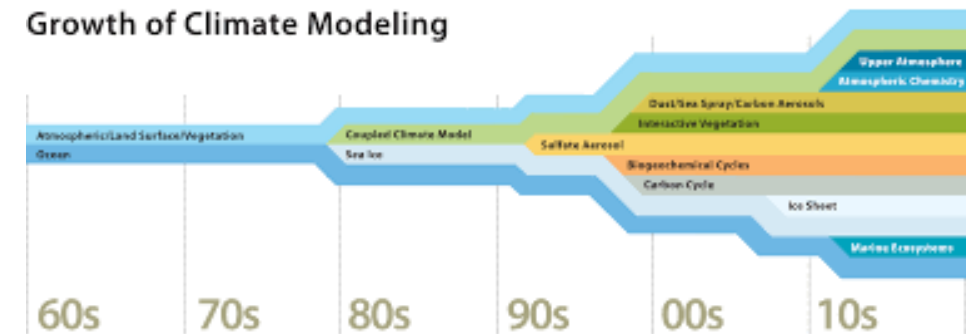
# Linking Climate Science to Standards

ASCE (2015):

*“The requirement that engineering infrastructure meets future needs and the uncertainty of future climate at the scale of the majority of engineering projects leads to a dilemma for practicing engineers. This dilemma is a gap between climate science and engineering practice that must be bridged.”*



Growth of Climate Modeling



Source: Global Institute of Sustainability

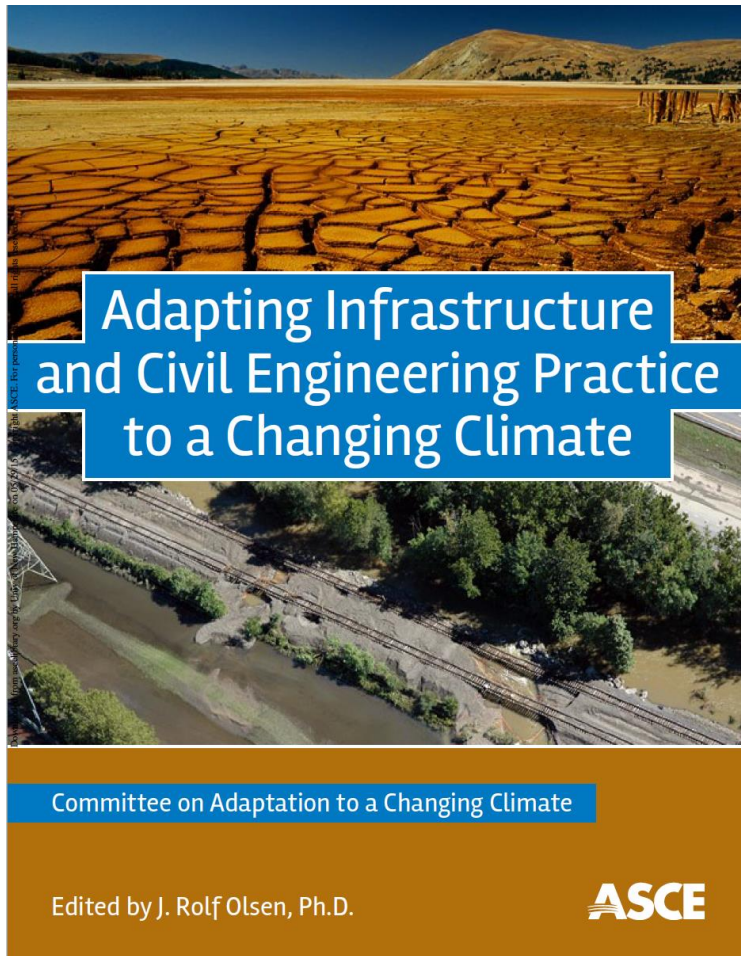
# Linking Climate Science to User Needs

Climate-Change Phenomenon	Change in Environmental Condition	Design Implications
Temperature change	Rising maximum temperature; lower minimum temperature; wider temperature range; possible significant impact on permafrost	Over the short term*, minimal impact on pavement or structural design; potential significant impact on road, bridge scour and culvert design in cold regions Over the long term, possible significant impact on pavement and structural design; need for new materials; better maintenance strategies
Changing precipitation levels	Worst case scenario, more precipitation; higher water tables; greater levels of flooding; higher moisture content in soils	Over the short term, could affect pavement and drainage design; greater attention to foundation conditions; more probabilistic approaches to design floods; more targeted maintenance Over long term, definite impact on foundation design and design of drainage systems and culverts; design of pavement subgrade and materials impacts

(Meyer 2006)



# ASCE 2015 Report

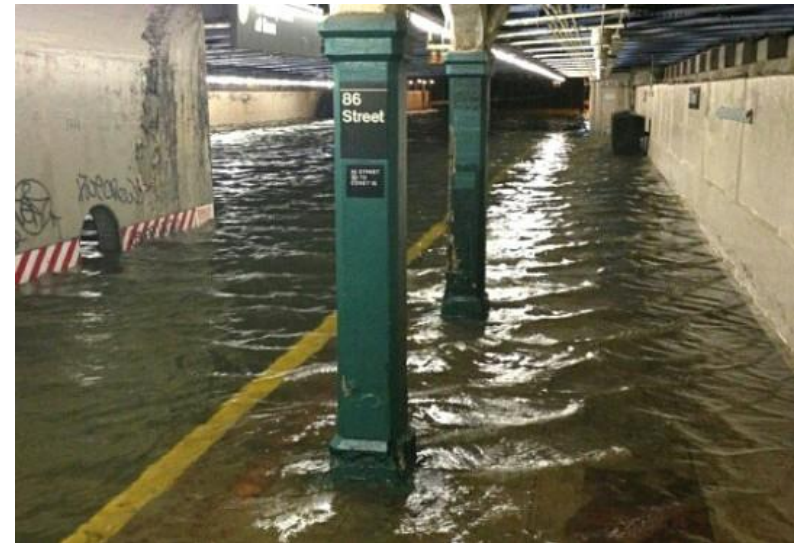


## Recommendations:

- Engineers and climate scientists must engage in cooperative research
- Practicing engineers, project stakeholders, policy makers and decision makers should be better informed about uncertainty
- Engineers need new paradigm for world in which climate is changing
- Critical infrastructure most at risk should be identified

# NYC Preliminary Climate Resilience Design Guidelines

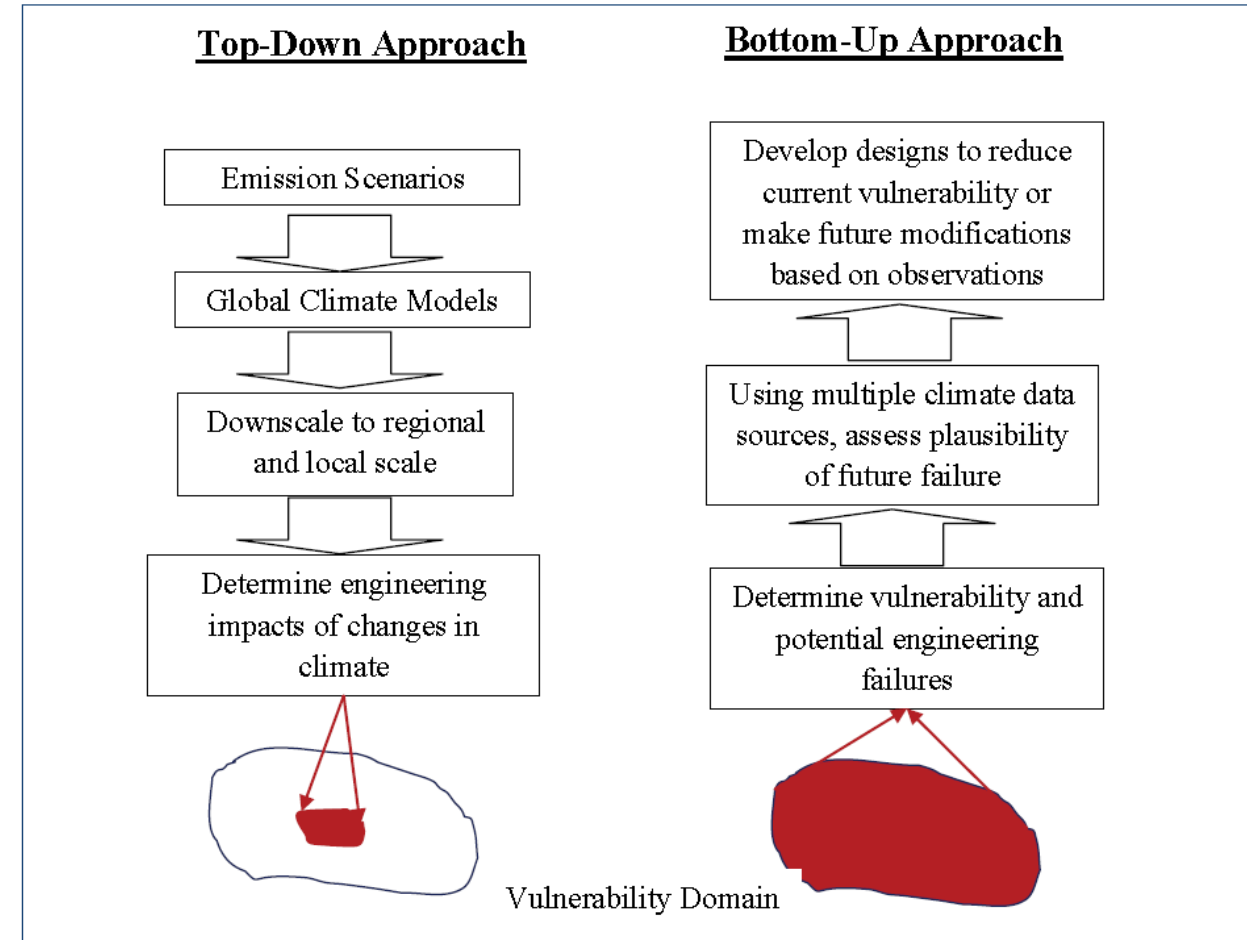
- Use New York City Panel on Climate Change (NPCC) climate projections
- Plan across *useful life* vs. *design life*
- Manage uncertainty through flexible adaptation pathways
- Project specific recommendations:
  - Financing requirements
  - Ongoing hazard mitigation projects
  - Interdependencies
  - Existing projects and risk studies





# Prioritization

- Need/state of good repair/status according to "deferred maintenance" list
- Exposure or vulnerability to climate change risks
- Capacity to fund
- Social equity
- Importance to local community/regional/state functioning (i.e., economics)



(ASCE 2015, p.21)

# Adoption / Implementation

- Institutions/actors involved
- Processes
- Certification
- Training
- Financial management and funding models to implement climate-safe infrastructure
- Other common barriers and evidence/examples/suggestions for overcoming them



# Ensure Delivery of Climate-Safe Infrastructure

- Common challenges in implementation/ adoption of new standards
- Workforce capacity building, e.g.:
  - skills in effective communication
  - engagement
  - economics/financial management
  - measuring performance/effectiveness
  - social equity
  - climate science and enhanced understanding / modeling skills
- Leadership development
- Non-standard strategies
- Others TBD



# Initial Reactions?



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## LUNCH

12:30-1:30pm

- On-site delivery
- Discuss goals, discussion to date, gaps in literature with fellow members

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# Bounding the Work of the CSIWG

- Gaps?
- Your go-to literature?
- What's in, what's outside the scope?
- What is needed?





# Opportunity for Public Comment



# Agenda

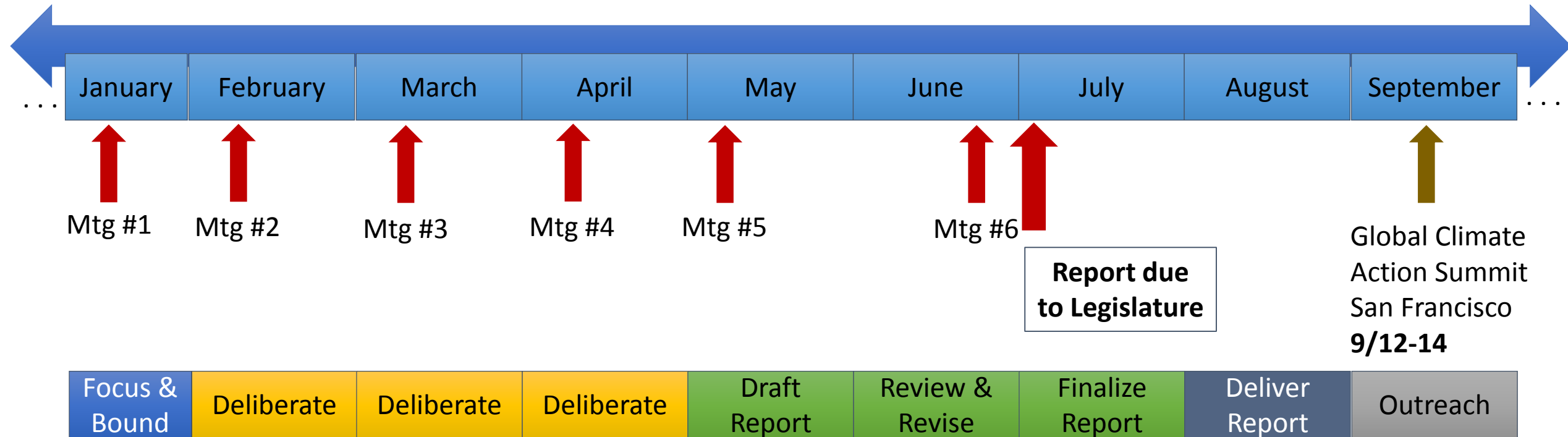
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# Project Implementation – How to Get It Done

- Project timeline
- Meeting dates/locations & topics
- Webinar series
- Working Group process
  - Rules of engagement
  - Structure
- Role of project team, facilitators



# Project Timeline



# Meeting Dates, Locations, Topics & Tasks

Mtg	Dates	Locations	Topics and Tasks
1	1/18	Sacramento	Determine project goals; WG structure and process
2	2/12	Los Angeles	Identify relevant infrastructure, sector-specific infrastructure standards, climate-sensitivity, information needs
3	3/13	Bay Area	Linking forward-looking climate science and impacts information with standards, codes, certifications throughout infrastructure design/implementation/maintenance cycle
4	4/11	Sacramento	Sector-specific design standards and cross-sector interdependencies
5	5/9	San Diego	Governance of setting/changing design standards; non-standard strategies to ensure climate-safe infrastructure; deliberation of draft report; agree on refinement needs
6	6/20	Sacramento	Agree on final report revisions; delivery and outreach/promotion; project debrief

# Webinar Series

## Purpose

- Get to know WG members and share expertise.
- Educate about infrastructure issues.
- Effective use of WG meeting times.
- Maintain a constant drum beat on the topics of the WG.
- Bring in outside expertise and perspectives to enrich WG discussions.

## Launch

January 30, 12pm

## Frequency

Ca. every 2-3 weeks

## Approach

Widely advertised

Open to interested public

CSIWG member participation

Recorded for public/CSIWG use

Educational and interactive



# Roles of Project Team



## Core Project Team

- Keali'i Bright
- Joey Wall
- Guido Franco
- Elea Becker Lowe
- Susi Moser (facilitator)
- Juliette Finzi Hart (facilitator)

## State Roles

- Ensure proper process & delivery
- Link to relevant processes internally
- Communicate externally with stakeholder network
- Assist with travel arrangements
- Assist with meeting logistics
- Serve as resources to WG

# Roles of Project Facilitators

- Support CSIWG deliberations in and between meetings
- Assist with background research, literature searches/review
- Develop meeting agendas and logistics
- Prepare meeting materials and notes
- Track and keep project on course, on time
- Draft/revise final report
- Develop outreach strategy and materials
- Design and facilitate webinar series
- Be accountable for project deliverables



*Questions?  
Clarifications?*



# You Shape Your Own Process

- Capacity assessment
- Rules of engagement
- WG structure
- Other



(Agreements summarized in Meeting Notes)

# Revisiting Project Goals & Foci

(no significant revisions; see also meeting notes)

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# Review of the Day

CHARGE

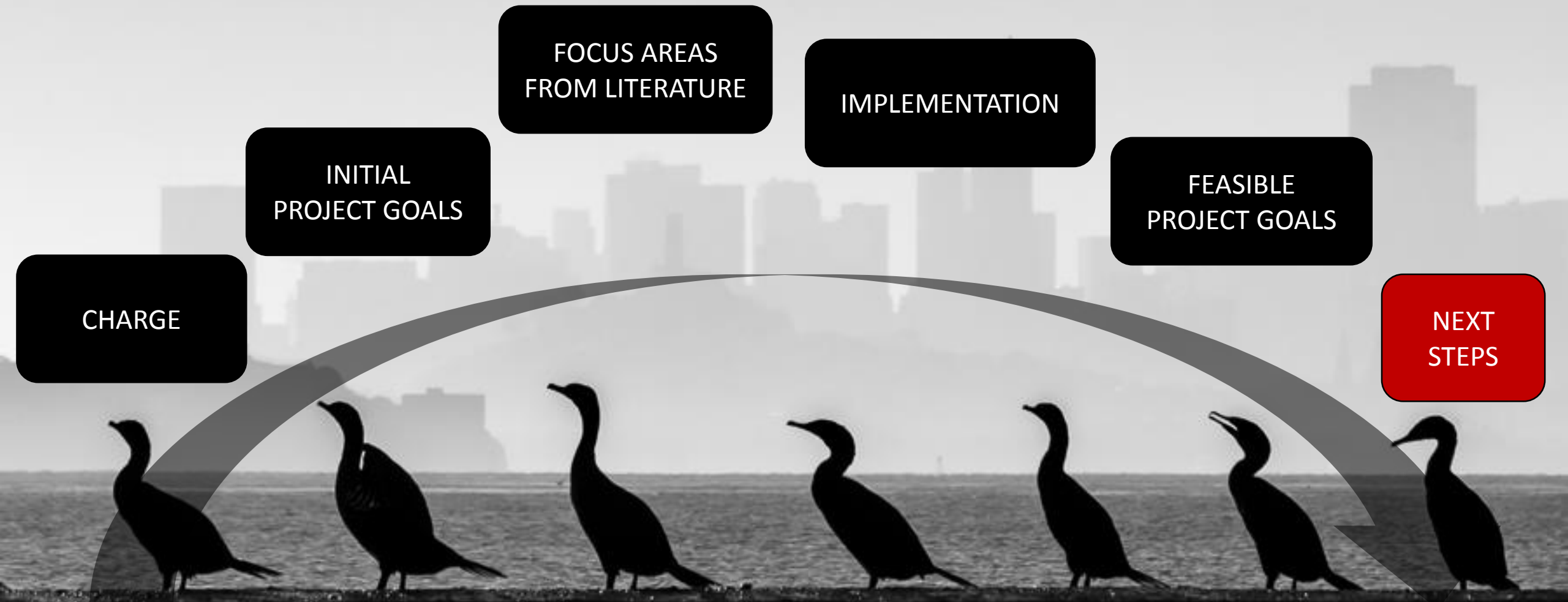
INITIAL  
PROJECT GOALS

FOCUS AREAS  
FROM LITERATURE

IMPLEMENTATION

FEASIBLE  
PROJECT GOALS

NEXT  
STEPS



# What We Determined and Agreed on Today...

- Project goals/foci
- CSIWG members' capacities
- Working Group structure & process
- Rules of engagement
- Project elements
- Timeline
- Project team & facilitators' roles





# Opportunity for Public Comment



# Next Steps

## We Will

- Launch webinar series on 1/25
- Prepare Meeting #2 (Los Angeles)
- CNRA will find out whether report needs external review (peer, public)
- Send out worksheet/homework
- Prepare meeting notes of this meeting and share with WG
- Send calendar invites for webinars

## You Will

- Make travel arrangements for LA meeting
- Complete preparatory work ahead of Mtg #2 (worksheet to be sent to WG asap)
- Share any references of reports deemed useful to the work
- Share names/contacts of people who would like to stay abreast of Working Group's work; Project team will put on distribution list

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*Toward  
Climate-  
Safe  
Infrastructure*



Thank you!