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# Climate Change Research Program

FY 2017-2018

**DRAFT** Research Investment Plan



CALIFORNIA STRATEGIC  
GROWTH COUNCIL

**November 15, 2017**

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Program information can be accessed at: <http://sgc.ca.gov/>

To sign up to receive notices, updates, and information regarding the TCC Program (and other SGC grant programs and initiatives), visit the Strategic Growth Council (SGC) website and click on the "Sign Up for Updates" icon at: <http://sgc.ca.gov>.

To receive a hardcopy of this Plan, please contact the SGC at: [research@sgc.ca.gov](mailto:research@sgc.ca.gov) or (916) 327-5362.

***Draft Research Investment Plan: Climate Change Research Program***

This draft Research Investment Plan for the Climate Change Research Program is being released for public comment by the Strategic Growth Council (SGC) on November 15, 2017. This draft does not represent the fully proposed Research Investment Plan for the Program.

The SGC will accept written public comments through Friday, December 15, 2017. Revisions will be made to provide greater clarity on the SGC's vision for the program and to reflect public comments that are received.

**Written comments are due to the SGC by 5:00pm on Friday, December 15, 2017.**

Please submit comments via email to:

**research@sgc.ca.gov**

Or, you may submit comments via postal mail to:

**Strategic Growth Council**

ATTN: Elizabeth Grassi

1400 Tenth Street

Sacramento, CA 95814

On November 17, 2017 the SGC will convene a Public Information Webinar to launch the public process for receiving input on this scoping draft of the Research Investment Plan.

The SGC is also hosting three public workshops on this draft in the cities of Oakland on November 27<sup>th</sup>, Fresno on November 28<sup>th</sup>, and Los Angeles on November 29<sup>th</sup>. The SGC will be accepting written and oral comments at those events. Additional information on the public workshops can be found on SGC's website at:

[http://sgc.ca.gov/pdf/Climate\\_Change\\_Research\\_Program\\_Workshops-2017-11-14.pdf](http://sgc.ca.gov/pdf/Climate_Change_Research_Program_Workshops-2017-11-14.pdf)

The California Strategic Growth Council brings together State agencies and departments to coordinate activities that support sustainable communities, emphasizing strong economies, social equity and environmental stewardship.

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*The SGC intends to consider the public comments received as a result of this 30-day public review period, and will prepare a draft of the Research Investment Plan and the proposal process for the program's grant solicitation in early 2018.*

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## I. INTRODUCTION

### BACKGROUND

In 2017, the Legislature passed Assembly Bill (AB) 109, which created a climate change research program within the Strategic Growth Council (SGC). The legislation allocates \$11 million in Greenhouse Gas Reduction Fund revenues to the SGC to develop a research program to support “research on reducing carbon emissions, including clean energy, adaptation, and resiliency, with an emphasis on California.”

Statutory language directs that the SGC Climate Change Research program will:

- Be guided by a Research Investment Plan that outlines research needs. The Research Investment Plan will be developed prior to awarding grants;
- Award grants on a competitive basis; and
- Be open to eligible institutions, including the University of California, California State University, federally-funded national laboratories, and private, non-profit colleges and universities.

This document is the Research Investment Plan that will guide the development and implementation of the research program. The first sections of the document outline program goals, research priorities, and program structure. The last section of the document, still under development, will provide detail on program administration and application guidelines.

The AB 32 Scoping Plan establishes the framework for actions implementing greenhouse gas reduction to implement the Global Warming Solutions Act of 2008. The Scoping Plan was updated by the California Air Resources Board (CARB) in 2014, identifying the Cap-and-Trade Program as one of the strategies California will employ to reduce the GHG emissions that cause climate change. Research conducted through this program will help put California on the path to meet its goal of reducing GHG emissions to 1990 levels by the year 2020, and ultimately achieving an 80 percent reduction from 1990 levels by 2050. Proceeds from the Cap-and-Trade Program, also known as California Climate Investments (CCI), facilitate comprehensive and coordinated investments throughout California that further the State’s climate goals. These investments must be used to support programs that facilitate GHG emissions reduction in the State and also deliver major economic, environmental, and public health benefits for Californians, including meaningful benefits to the most disadvantaged communities.

The goal of the Climate Change Research program is to advance research to support low-income and disadvantaged communities, including equitable outcomes in the implementation of the State’s climate change policies and investments

The Program is an opportunity to advance the SGC’s vision to support healthy, vibrant, and resilient communities. The Program is designed to leverage SGC’s role as an interagency body to focus on cross-cutting research investments that build community resilience, integrate land use and development considerations, and facilitate the transformation of California communities through outcome-based research. The Program will demonstrate how the State’s investment can build an innovative, outcome-driven partnership between the State and the research community that will directly support achieving California’s climate change goals.

## II. PROGRAM GOALS

The Climate Action Team Research Working Group, a body that includes representatives of nearly all executive branch agencies, boards, departments, and offices, developed a Climate Change Research Plan in 2015.<sup>1</sup> The 2015 Plan identified research needs and priorities for the next three to five years. The Plan was the State's first multi-agency climate change research plan, and it considered research needs in four areas: monitoring and modeling; greenhouse gas emission reduction; adaptation and resilience; and cross-cutting research needs. Following public workshops and a public comment period, the Climate Action Team approved the 2015 Plan. The intention of the 2015 Plan was for it to inform individual agency research programs. Therefore, it is being implemented through a number of state initiatives, including the research programs of the California Air Resources Board, California Department of Transportation, California Energy Commission, and through the Fourth California Climate Change Assessment, a cross-cutting research initiative led by the California Energy Commission, California Natural Resources Agency, and the Governor's Office of Planning and Research that will be completed in 2018.<sup>2</sup>

The 2015 Plan provides a strong foundation for SGC's research program. The direction provided by that plan and discussions with implementing departments on implementation progress have helped identify goals for SGC's Climate Change Research Program. These goals were also informed by discussion at the October 23, 2017 SGC Meeting.<sup>3</sup>

The goals of the SGC Climate Change Research Program are to leverage SGC's role as a cross-agency body to:

**1. Invest in research that has a clear and demonstrated connection to the State's climate change goals, including greenhouse gas emission reduction and supporting climate adaptation and resilience.**

All research projects and partnerships will include a description of how the research will support achieving the State's climate goals. It is expected that this could be through diverse avenues, including tool development to support planning, studies to support technology adoption and deployment, or other approaches to understand and identify barriers, challenges, and opportunities for policy design, implementation, and evaluation.

**2. Advance research to support low-income and disadvantaged communities, and advance equitable outcomes in the implementation of the State's climate change policies and investments.**

Research projects and partnerships should be designed to address and facilitate achieving climate outcomes in low-income and disadvantaged communities. This can be achieved through direct connection with communities and community-based organizations, explicit examination of replicability of projects in low-income and disadvantaged communities, or other mechanisms that demonstrate how research investments will be leveraged to support low-income and disadvantaged communities.

**3. Build a program that augments, builds connections, and fills gaps across existing research programs.**

Research projects and partnerships should reflect innovative and cross-disciplinary approaches to addressing research questions and, where possible, link to or build off previous State research investments.

**4. Prioritize outcome-based research linked to practical climate action.**

Outcome-based research will make a direct connection to enabling climate actions. This could include projects that support on-the-ground action in the community or region; directly reduce GHG emissions via technology development or deployment; or pilot projects

<sup>1</sup> [http://climatechange.ca.gov/climate\\_action\\_team/reports/CAT\\_research\\_plan\\_2015.pdf](http://climatechange.ca.gov/climate_action_team/reports/CAT_research_plan_2015.pdf)

<sup>2</sup> CARB Research Program: <https://ww2.arb.ca.gov/our-work/programs/research-planning>

Caltrans Research Program: <http://www.dot.ca.gov/drisi/>

CEC Research Program: <http://www.energy.ca.gov/research/>

<sup>4</sup> California Climate Change Assessment: <http://resources.ca.gov/climate/safeguarding/research/>

<sup>3</sup> October 23, 2017 SGC Meeting Agenda and link to Video: <http://sgc.ca.gov/Public-Meetings/2017/Meeting-Materials-10232017.html>

**5. Model meaningful engagement with the research community, community-based organizations and other stakeholders at all stages of the program to ensure relevance and utility of research process, projects, and results.**

Engagement should extend from the earliest stages of research, such as proposal design and scoping, through to accessible delivery of research findings, data, and recommendations.

**6. Continue to advance and develop a common research platform to support climate change planning, policy development, and implementation across all sectors at the state, regional, and community scale.**

A common basis for research includes building from a common base (e.g., emission scenarios and global climate models) to project future climate impacts (e.g., temperature, humidity, precipitation and hydrology, wildfire, etc.) and assumptions on land use and land cover change, carbon dynamics, population, and economic growth.

**7. Leverage and complement existing research funding and policy innovations to accelerate climate change research, innovation, and policy and technology deployment.**

Research projects should demonstrate how they advance research supported by other funding sources or build on recent accomplishments in climate change policy or planning to achieve specific outcomes.

### III. RESEARCH PRIORITIES

Through consultation with State agencies and other State climate change research programs, SGC has identified the following four priority research areas for the 2017-18 Climate Change Research Program.

1. Supporting and Protecting Vulnerable Communities from the Impacts of Climate Change
2. Integrating Land Use, Conservation, and Management into California's Climate Change Programs
3. Increasing Data Accessibility and Planning Support for Local and Regional Climate Change Planning
4. Accelerating and Supporting Transitions to Climate Smart Communities

Within each priority research area is a list of specific research questions. Applicants will be asked to develop an application that addresses a specific research question (Research Project Grant) or that addresses a priority research area or areas (Research Partnership Grant).

#### A. RESEARCH PRIORITY 1: SUPPORTING AND PROTECTING VULNERABLE COMMUNITIES FROM THE IMPACTS OF CLIMATE CHANGE

Evidence shows that climate impacts have disproportionate impacts in the State's most vulnerable communities.<sup>4</sup> The biophysical impacts of climate change may disproportionately impact vulnerable groups, negatively impacting their health and livelihoods.<sup>5</sup> More holistic adaptation requires adopting policies that allow vulnerable communities to withstand the impacts of climate change while simultaneously addressing existing inequities. Policies intended to adapt and strengthen resilience in the face of climate change also have the potential to exacerbate existing inequities and vulnerabilities if they are not designed from the outset to address, rather than further entrench these patterns. The State has committed to protecting the most vulnerable communities.<sup>6</sup>

<sup>4</sup> Shonkoff, S.B., Morello-Frosch, R., Pastor, M., and Sadd, J. 2011, The Climate Gap: environmental health and equity implications of climate change and mitigation politics in California- A Review of the Literature: Climatic Change, DOI 10.1007/s10584-011-0310-7, 19p.

<sup>5</sup> CDPH, Climate Change and Health Equity Program. <https://www.cdph.ca.gov/Programs/OHE/Pages/CCHEP.aspx>

<sup>6</sup> Executive Order B-30-15

Through its Climate Change Investments, the State is committed to delivering major economic, environmental, and public health benefits for Californians, including meaningful benefits to the most disadvantaged communities. In many cases, these are the same communities that are most vulnerable to changing climate conditions. However, research is needed to better understand vulnerability in the context of a changing climate and to further refine how we understand, define, and integrate climate vulnerability in State programs and investments. Research products in this area could include tool development and comparisons across existing tools and multi-attribute analysis of climate risk. Partnership with community groups should be a key component of research to address vulnerable and disadvantaged community needs for climate resilience.

Specific research topics include the following:

- 1) How can the State and/or communities measure community resilience within and across sectors? How can such a measure be integrated into State planning and investment?
- 2) What tools are available to identify potential “hot spots” of observed climate change, projected climate risk, and population vulnerability? Can these tools be integrated into program design or evaluation?
- 3) In what ways do the impacts of climate change affect availability and affordability of key services for low-income and disadvantaged communities?
- 4) What critical infrastructure in communities is missing from local resilience planning? How can this infrastructure be incorporated into hazard mitigation procedures?
- 5) What resources are needed to assist low-income and disadvantaged communities to meet goals stated in their adaptation plans? What mitigation actions or strategies can provide resilience co-benefits?
- 6) How are existing community climate vulnerabilities affected, maintained, or lessened through state, regional, or local policy?
- 7) What tools are available or can be developed to measure progress toward and to achieve equity outcomes in land use and development decisions?

## **B. RESEARCH PRIORITY 2: INTEGRATING LAND USE, CONSERVATION, AND MANAGEMENT INTO CALIFORNIA CLIMATE CHANGE PROGRAMS**

Conservation, management, and development of California’s land base has important implications for the State’s climate change policy. Conversion of land can lead to the loss of stored carbon, agricultural food production, and diminish ecosystem services. Resulting development can also result in an increase in emissions through driving and energy consumption. Changes on the landscape also have important implications for the ability of natural systems, infrastructure, and communities to prepare for, respond to, and recover from climate-induced changes and extreme events.

Additional research is needed to understand the relationships between natural and social systems, and to develop mechanisms that integrate and account for ecosystem services in land conservation, management, and development decisions and in the State’s climate change programs. Research results can include tools and methodologies to assess and advance State and local planning decisions. Addressing these issues will require expertise spanning multiple disciplines, including planning, public policy, economics, ecology, agriculture, and others.

Specific research topics include the following:

- 1) How can we identify public and private lands with a high conservation and/or restoration value, as well as adaptation and resilience value? What methodologies are available to prioritize protection or investment in these lands?

- 2) What strategies are available to improve the connection between SB 375 regional Sustainable Community Strategies, local planning efforts, and the conservation and/or restoration of natural and working lands?
- 3) How does the State's need for infill development align with climate risk and hazards? How should climate change risk and community resilience be integrated into new development planning?
- 4) What multi-attribute tools are available to account for the integrated benefits (local and downstream) of land management practices, such as forest management, agricultural food production, or watershed restoration? How can these tools be integrated into decisions, including conservation and food security investments?
- 5) What are the costs and benefits of existing and/or new strategies that support appropriate conservation of natural and working lands and achieve infill development goals?
- 6) How can the State maximize its investments to support resilient carbon storage on natural and working lands? How can investments in natural and working lands support the dual goals of climate change mitigation and adaptation?

### **C. RESEARCH PRIORITY 3: INCREASING DATA ACCESSIBILITY AND PLANNING SUPPORT FOR STATE, LOCAL, AND REGIONAL CLIMATE CHANGE PLANNING**

Cal-Adapt, the state's interactive website for exploring climate change at a local level, was developed with energy-related funds to support adaptation and planning in the electricity and natural gas sectors. However, as a publicly available, free tool, Cal-Adapt has been adopted to support resilience initiatives beyond the energy sector. For example, the 2017 update of California's general planning guidelines points local governments to Cal-Adapt to support a statutorily required adaptation element of general planning. Similarly, the adaptation guidance from the Governor's Office of Planning and Research directs state agencies to Cal-Adapt as a supporting resource.

Additional research is needed to broaden the scope and data available in Cal-Adapt so that it can effectively support resilience initiatives beyond the energy sector. Research products in this area will likely include tool development, including integration of community adaptive capacity with climate hazards, as well as assessments of user needs and identification of approaches for the long-term sustainability of planning support tools like Cal-Adapt or other resources for planning.

Specific research topics include the following:

- 1) How can Cal-Adapt be expanded to support and expand its utility beyond the energy sector and to satisfy the direction given in State and local planning guidance documents? What datasets are needed to support planning by state agencies, local governments, resource managers, special districts, or other users?
- 2) What outreach and training modules are needed to assist local planners, natural and water resource managers, community-based organizations and others beyond the energy sector to use climate change data and projections? What datasets can be developed to further help local planners, managers, and others understand hazards in spatially explicit ways?
- 3) How are extreme events affected by multiple concurrent or sequential climate events (e.g., wildfire, coastal and inland flooding; drought) across sectors? How can this information be used to help stress test systems, infrastructure, operations, etc.?
- 4) How can we assess, aggregate, and appropriately represent implications of multiple climate impacts to develop "hot spot" visualizations that aggregate multiple climate-related impacts?



- 5) How can climate models better inform existing efforts to mitigate hazards like wildfire, coastal flooding, and inland flooding?

#### **D. RESEARCH PRIORITY 4: ACCELERATING AND SUPPORTING TRANSITIONS TO CLIMATE SMART COMMUNITIES**

California's cities, counties, tribes, and regions are critical partners in achieving the State's climate change goals – both to reduce GHG emissions and build resilience. Adoption of clean energy technologies and investments in active transportation, transit, and zero-emission technologies must be supported at all levels of government. Increasing the development and implementation of climate-informed planning and policies at the local and regional level will be critical to the State's climate success.

Additional research is needed to understand the barriers and challenges to community transformation and its just and equitable distribution. This can include work to understand implementation of low-carbon technologies, but also uptake of alternative modes of transportation or clean energy. Furthermore, research is needed to better understand and quantify the effectiveness of some local-scale climate interventions.

Specific research topics include the following:

- 1) What are the environmental quality, economic, and/or social implications of innovative mobility strategies (e.g., pricing strategies, road charge strategies, reduced parking requirements, or streamlining of permits for electric vehicle charging)?
- 2) What are the drivers and barriers to increased investment in and use of active transportation options?
- 3) How can active and public transportation options be integrated into programs to alleviate congested transportation corridors?
- 4) What are the costs, benefits, feasibility, and acceptability of different approaches to mitigating the urban heat island (for example, expanding urban forests)?
- 5) What are the waste feedstocks and where are they located throughout the State? What is the highest and best use of those feedstocks, taking into account constraints such as transportation costs, community air protection, existing facilities, local policies, and other factors?

### **IV. PROGRAM STRUCTURE**

To achieve the goals outlined above, the Strategic Growth Council will distribute research funding through two mechanisms.

#### **A. RESEARCH PROJECT GRANTS**

Research project grants will be awarded to individual researchers or research groups to examine a specific research topic. Grant duration will be one year, with results expected at the completion of the grant. SGC staff will administer and manage grant implementation and progress, with assistance from relevant state agencies, boards, or departments.

Award amount: \$100,000 to \$300,000 per project

#### **B. RESEARCH PARTNERSHIP GRANTS**

Research Partnership Grants will be awarded to research consortia, collaboratives, centers, or institutes with a focus on a broader research priority area. The grant recipient will work in collaboration with SGC to administer

and allocate funds to specific research initiatives. The SGC award must be encumbered and expended in year one of the agreement. However, it is expected that SGC funds will be linked with additional funding sources and investments to achieve longer-term outcomes and results.

Research Partnership Grants provide an opportunity to develop and model collaborative research partnerships to achieve SGC's goals. The proposal should include a model for State-Academic collaboration and engagement with community-based organizations or other stakeholders in the research process.

Award amount: \$2 to \$4 million per partnership

The total amount available for Research Project Grants and Research Partnership Grants will be determined through development of the Research Investment Plan, based upon public input.

## **V. PROGRAM ADMINISTRATION AND APPLICATION INSTRUCTIONS**

Specific program administration criteria are still under development and will integrate feedback from public workshops. The final draft of the Research Investment Plan will expand on the topics below.

### **A. THRESHOLD REQUIREMENTS**

All applicants must demonstrate how the proposed research will facilitate the reduction of greenhouse gas emissions in California.

All applicants must also discuss how the research will benefit low-income or disadvantaged communities.

### **B. ELIGIBLE APPLICANTS**

The program is open to applicants from the University of California, California State University, federally-funded national laboratories, and private, non-profit colleges and universities.

### **C. PROGRAM TIMELINE**

All funds administered through this program must be encumbered and expended by June 30, 2019.

### **D. APPLICATION INSTRUCTIONS**

All applicants will be required to submit a narrative research proposal. The research proposal will include, at a minimum, the following elements:

- Statement of work
- Researcher qualifications
- Partnership and engagement plan
- Benefits of the research to low-income and disadvantaged communities

Proposals will be scored against a set of scoring criteria under development.