

# Signature Initiatives Working Group Draft Report – Appendix A2

## Environmental Change, Sustainability, and Justice

April 2018

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### BRIEF SUMMARY:

Many of the greatest economic, societal, and political challenges of our century revolve around environmental issues, including energy, climate change, water, land use and scarcity, food production, resource extraction, biodiversity loss, diseases, and human health. This initiative proposes a wide coordination of units—stretching from the humanities and social sciences to STEM and the professional schools—to examine, predict, and mitigate these challenges, and in the process become an international leader in solution-based scholarship that fosters societal change.

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### EXECUTIVE SUMMARY:

Many of the greatest economic, societal, and political challenges of our century revolve around environmental issues: energy, climate change, water, land use and scarcity, food production, resource extraction, biodiversity loss, land/air/water pollution by non-bio-friendly waste products, diseases and human health, to name a few. These issues, and their perceptions, responses, and consequences, stretch from the humanities and social sciences to STEM (and beyond), and thereby provide a unique opportunity to bring all corners of our campus together around a common mission. Berkeley's unmatched breadth and depth across disciplines positions us to examine, predict, and mitigate these challenges, and in the process become an international leader in solution-based scholarship to foster societal change. Coalescing our research, teaching, and training around the urgent challenges of our era also positions us to realize our mission to give back to California and the world. Here, we outline an ambitious and inclusive plan to make the environment a galvanizing focus of university research, training, and outreach. Our vision would break down disciplinary silos across campus by incentivizing faculty engagement and student training around interdisciplinary, real-world problems.

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### THE CHALLENGE:

#### Why Berkeley? Why Now?

In California, Stanford (Woods Institute) and UCLA (Institute of the Environment and Sustainability) have already launched and moved ahead with efforts related to what we outline here. Other major initiatives (e.g., reorganization and fundraising) around the environment are firmly established and highly successful at Harvard, Yale, Columbia, and Duke. However, *none of these universities can approach the breadth of Berkeley's expertise across nearly all dimensions of environment and its many intersections with society.* The degree to which environmental issues reach across divisions, departments, and colleges speaks to the potential of this topic to support and promote comprehensive academic excellence in research and training across campus. The rapid growth in students majoring in topics associated with the environment and sustainability is a testament to the student demand for greater emphasis in these areas. Our schematic of a hypothetical initiative around the environment (Figure 1) suggests how such an effort could include and connect a large and diverse set of departments.

Furthermore, each of these efforts has been more narrowly construed and, thus, misses huge opportunities to engage industry, the public and their broader campus communities. Berkeley is already ranked as the #1 campus in the world in environmental science and sustainability by every major ranking service; now is the time to become more than the sum of our (excellent) parts. The potential power and rewards of coordination around the environment across campus are extraordinary.

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## **METRICS AND MILESTONES:**

We recommend that UC Berkeley differentiate itself from other efforts across the country by taking on a select number of themes, such as those described here, and creating teams across disciplines and professional schools that will strive to do the following:

- Define the problem in detail, suggest new approaches, and describe the likely impact of changes.
- Undertake demonstration projects involving collaborations with governments and institutions that use experimental methods when possible to determine if the new approaches will ameliorate the problem.
- Commit to having an impact in at least some of the areas identified in the next ten years.

**What Does Success Look Like in Ten Years:** The goal would be to involve researchers across the campus in order to make real contributions to advancing environmental sustainability, and justice in America and in the world.

## **SMART METRIC – Specific/Measurable/Ambitious/Relevant/Time-Bound**

Environmental Change, Sustainability and Justice clearly presents a challenge that is ambitious, relevant, and timely. The themes listed below are specific and each lends itself to time-bound and measurable goals. Since “top-down” initiatives typically fail on the Berkeley campus, we hope that once this challenge is presented to the campus, some of the specific topics will energize groups of Berkeley faculty members who will take the lead in formulating an initiatives around them.

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## **EXEMPLAR THEMES WITHIN THIS CHALLENGE:**

We invite the UC Berkeley community to submit ideas (at any stage of development). We also want to hear from faculty already working on research programs within the scope of this Signature Initiative. For any idea submitted, please limited it to 500 words at this stage. Ideas may be specific or broad, but should lend themselves to measurable and time-bound goals. We envision broad themes for this Signature Initiative and include here some campus units that might provide leadership for dealing with these themes (see figure 1):

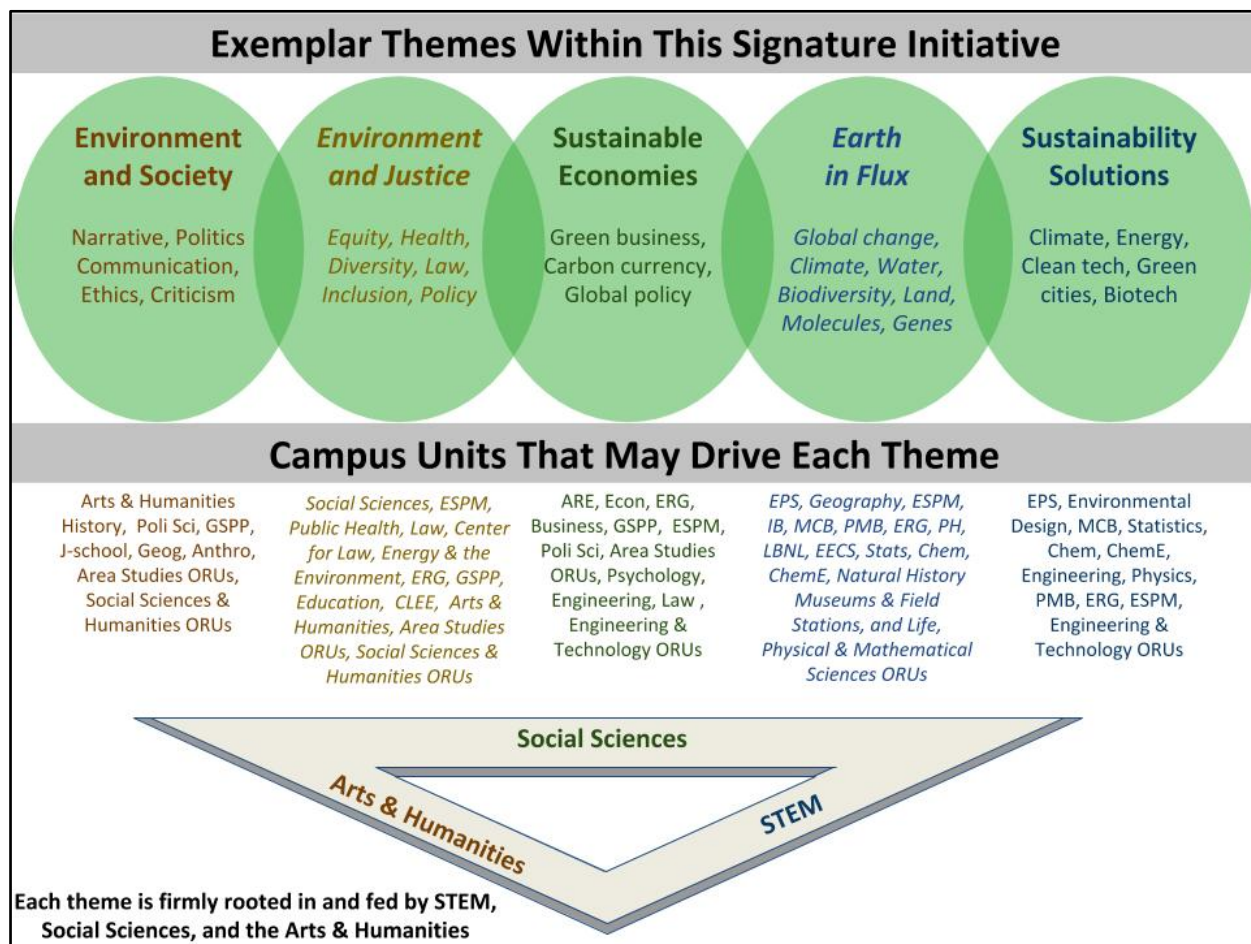
- *Environment and Society* (Communication, Narrative, Politics, Ethics, Criticism). *Campus Units:* Arts and Humanities, History, Political Science, Graduate School of Journalism,, Geography, Anthropology,, Goldman School of Public Policy, Area Studies ORUs, Social Sciences & Humanities ORUs
- *Environment and Justice* (Equity, Health, Diversity, Law, Inclusion Policy). *Campus Units:* Social Sciences, Environmental Science, Policy, and Management (ESPM), School of Public Health, Berkeley Law, Center for Law, Energy and the Environment, Energy Resources Group, Goldman School of Public Policy, s, School of Education, Arts & Humanities, Area Studies ORUs, Social Sciences & Humanities ORUs

- *Sustainable Economies* (Green Business, Carbon Currency, Global Policy). *Campus Units:* Agriculture and Resource Economics, Economics, Energy Resources Group, Haas School of Business, Goldman School of Public Policy, ESPM, Political Science, International and Area Studies, Psychology, Electrical Engineering and Computer Sciences, Berkeley Law, Engineering & Technology ORUs, Areas Studies ORUs
- *Earth in Flux* (Global Change, Biodiversity, Land, Climate, Water, Molecules, Genes). *Campus Units:* Earth and Planetary Science, Civil and Environmental Engineering, Geography, ESPM, Integrative Biology, Molecular and Cell Biology, Plant and Microbial Biology, Energy Resources Group, School of Public Health, Lawrence Berkeley National Lab, Electrical Engineering and Computer Sciences, Statistics, College of Chemistry, Natural History Museums & Field Stations, and Life, Physical & Mathematical Sciences ORUs
- *Sustainability Solutions* (Climate, Energy, Clean Technologies, Green Cities, Biotechnology). *Campus Units:* Electrical Engineering and Computer Sciences, Materials Science and Engineering, Lawrence Berkeley National Lab, Earth and Planetary Science, College of Environmental Design, Molecular and Cell Biology, Stats, Chemistry, Chemical Engineering, Physics, Plant and Microbial Biology, Energy Resources Group, ESPM, Engineering & Technology ORUs

A large number of projects could be undertaken under these themes; we single out ten here as examples of projects that are specific and lend themselves to measurable and time-bound goals.

1. Designing energy-smart and socially conscious cities of the future
2. Developing energy-smart and socially conscious transportation systems for people and goods
3. New technology and partnerships for home-based energy storage
4. Environmental justice-informed water and air pollution plans for California and associated policy
5. Sustainable functional self-recycling materials to reduce environmental impact of future technologies (electronics in particular)
6. Re-envisioning carbon markets and payments for ecosystem services
7. Combining natural history museum collections and long-term data from UC reserves to inform e.g., projections for the spread of diseases such as sudden oak death, lyme disease, or malaria as a result of changes in biodiversity and the environment
8. Developing effective models for the planet's surface (water, air, rocks, clouds, plants, and animals, including humans) on the wide range of necessary length and time scales to permit effective prediction of mitigation efforts
9. Developing socially informed strategies to reduce human consumption of water, energy and materials
10. Developing new sustainable energy production and storage systems (including batteries, solar cells, wind, etc.)

Figure 1: Exemplar themes around Environmental Change, Sustainability, and Justice.



## IMPLEMENTATION:

Successful implementation of projects within this initiative must begin with broad faculty interest and buy-in, a clear strategic plan with well-defined objectives, and a realistic plan for funding and fund-raising. As summarized below, our campus has hosted several efforts in the area of the environment and sustainability (e.g., climate science, energy, global change). Incomplete or unrealistic funding models, particularly a heavy reliance on large gifts, has been a recurring threat to long-term viability of these programs. Far-reaching interest in many facets of the environment at the undergraduate and graduate levels suggests summer and certificate programs, professional degrees and industry and agency partnerships provide promising potential routes for sustainable funding. Several of these funding paths have been deemed realistic based on polls of students (undergraduate and graduate) and assessments of the regional “market” and demand in professional Masters programs in several aspects of the environment. Our conceptualization of the environment at Berkeley as a truly interdisciplinary, cross-college, and humanities-to-STEM initiative emphasizes the potential and critical necessity of adopting an inclusive scope in building sub-initiatives. Many narrowly-construed efforts have proven to have limited support and short lifespans on our campus—it is essential to the successful implementation of this far-reaching initiative that we engage our campus’ great breadth and depth around this topic.

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## **HISTORY ON CAMPUS OF CROSS-DISCIPLINARY EFFORTS IN THIS AREA**

A number of past and current cross-disciplinary efforts relate to the themes outlined under the broad umbrella of Environment. However, considering that we sit in the most environmentally-conscious region of the world and in a region (the Bay Area) that produces more private philanthropy towards environmental issues (estimated conservatively at \$600 million annually) than any state and most countries, it is striking that Berkeley has not promoted a truly large-scale initiative around environmental themes. Past and current efforts include the Berkeley Institute for the Environment (BIE), Energy Biosciences Institute (EBI), Berkeley Energy and Climate Institute (BECI), Berkeley Initiative in Global Change Biology (BiGCB), Climate Readiness Institute (CRI), Berkeley Law's Center for Law, Energy & the Environment (CLEE), the Berkeley Institute for Parks, People, and Biodiversity within CNR, California Institute for Energy and Environment (CIEE), the Berkeley Atmospheric Sciences Center (BASC) within EPS, and the Energy Institute at Haas. The Accelerator for Climate, Energy, and Environment Solutions (ACE<sup>2</sup>S) is in active development and is a campus and LBNL fundraising priority. Describing the objectives, successes, and failures of each of these efforts is beyond the scope of this document, but it is worth noting that some have not lived up to the potential we believe the campus has in this realm, while others have achieved success because of their focus.