

Berkeley Energy Assurance Transformation (BEAT) Project

Timothy Burroughs
Assistant to the City Manager | Chief Resilience Officer

City of Berkeley



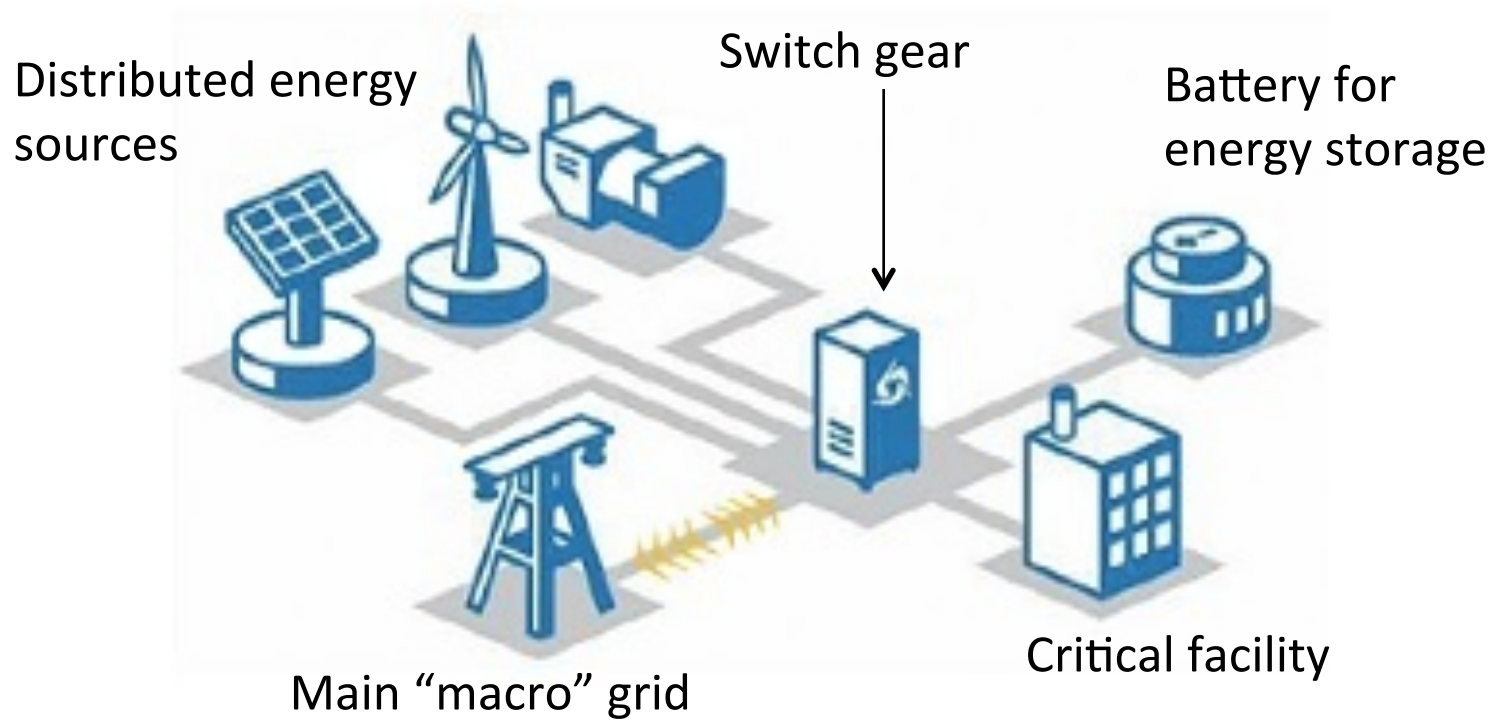
BERKELEY

Resilience Strategy

A plan to advance preparedness and equity in Berkeley, a community known for inclusiveness and innovation



Energy Reliability Solution: Clean Energy Microgrid



Berkeley Energy Assurance Transformation Project (BEAT)

Proposed Solution: Clean Energy Microgrid Communities (CEMCs) in dense urban areas

- Multi-facility microgrid(s)
- Scalable & replicable
- Contributing to the evolution of the grid

Multiple Benefits

- Energy assurance
- Reduce GHG emissions
- Reduce reliance on fossil fuels
- Reduce utility costs
- Advance ZNE communities
- Increase public/private partnerships
- Increase local clean jobs
- Potential grid stabilization
- Advance innovative business models

Center Street Garage Rebuild

The New Center Street Garage will be:

BETTER

- More accessible spaces
- More EV Spaces
- Stormwater retention system
- Photovoltaic system on roof
- Microgrid ready
- New, larger art display space

BIGGER

- 720 parking spaces
- 300+ bicycle spaces

**OPENING FALL
2017**



Center Street Garage- Starting from the Ground Up



BEAT Project Goals for a Clean Energy Microgrid Community (CEMC)

- **Goals & Deliverables for Phase I**

- Develop a financially attractive, scalable, and replicable **model and case study for CEMCs in dense urban areas**
- Design a shovel-ready Downtown Berkeley CEMC **Pilot Plan**, using Center Street Garage as anchor
- Develop a set of **guidelines** to reduce planning, permitting & financing risks & uncertainties
- **Share & transfer knowledge** to other communities

- **Phase II**

- Obtain funding and build CEMC in Downtown Berkeley

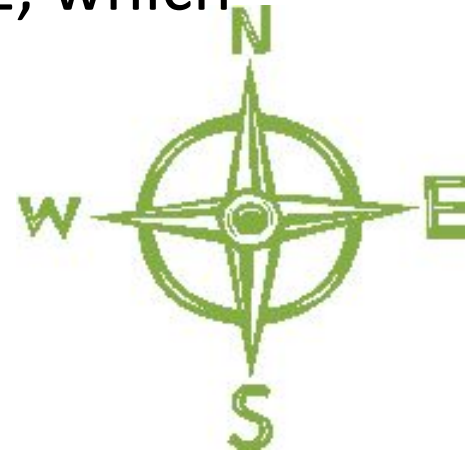
BEAT Project Team

- **Project Team**
 - City of Berkeley
 - Association of Bay Area Governments (ABAG)
 - Center for Sustainable Energy (CSE)
 - Interface Engineering
 - Lawrence Berkeley National Laboratory (LBNL)
 - NHA Advisors LLC
 - URS Corporation
 - West Coast Code Consultants, Inc. (WC³)
 - Hatch Associates
- **Technical Advisory Group (TAG)** will include: PG&E, CPUC, CAISO, UC Berkeley, local non-profits, businesses and developers.
- **Steering Committee** will include Rocky Mountain Institute and Urban Sustainability Directors' Network

Regulatory Team

- **URS, ABAG, CSE, WC³, City of Berkeley Planning and Building & Safety staff**

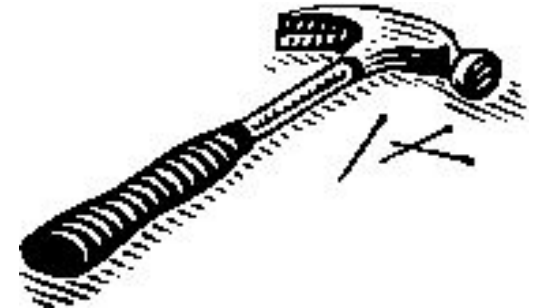
Local permitting pathways and optimization will be coordinated by ABAG and supported by City Planning and Building & Safety staff and the City's plan check consultant (WC³). State regulatory pathways and optimization will be coordinated by the CSE, which will engage PG&E, CPUC and CAISO.



Technical Team

- **URS, LBNL, Interface Engineering, City of Berkeley Public Works staff**

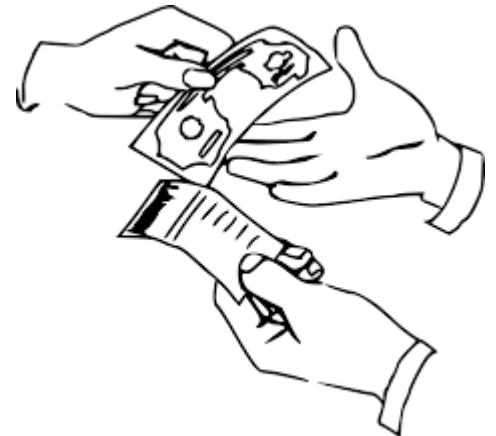
The technical feasibility analyses, development of the model for CEMCs in urban areas, and the technical Downtown Berkeley shovel-ready pilot plan and all associated elements will be led by URS with a subcontract with LBNL to use their DER-CAM model. This work will also be supported by City Public Works staff.



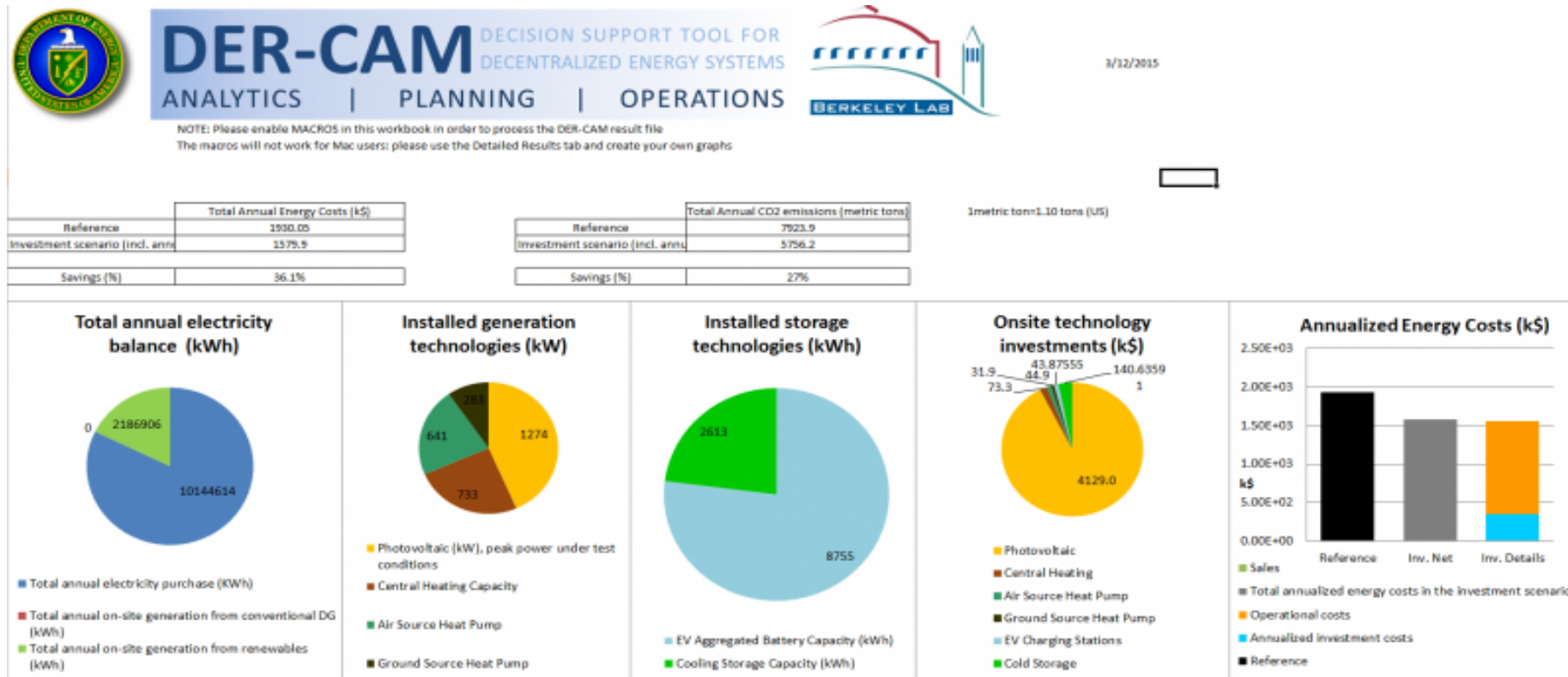
Financial & Governance Team

- **URS, LBNL, NHA, Hatch Associates**

URS will lead the financial analyses, with support from LBNL, NHA, Hatch, and TAC members PG&E and CAISO, to determine feasible and attractive business and governance models for developing CEMCs in urban areas as well as defining a model for the Downtown Berkeley pilot project.



Microgrid Design Using DER-CAM



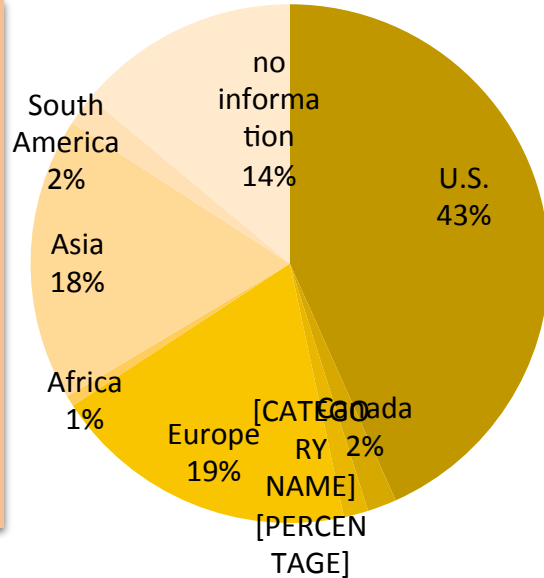
Distributed Energy Resources Customer Adoption Model (DER-CAM) is an economic and environmental model that can be applied to microgrids to optimize design while minimizing cost and CO₂ emissions.

About DER-CAM

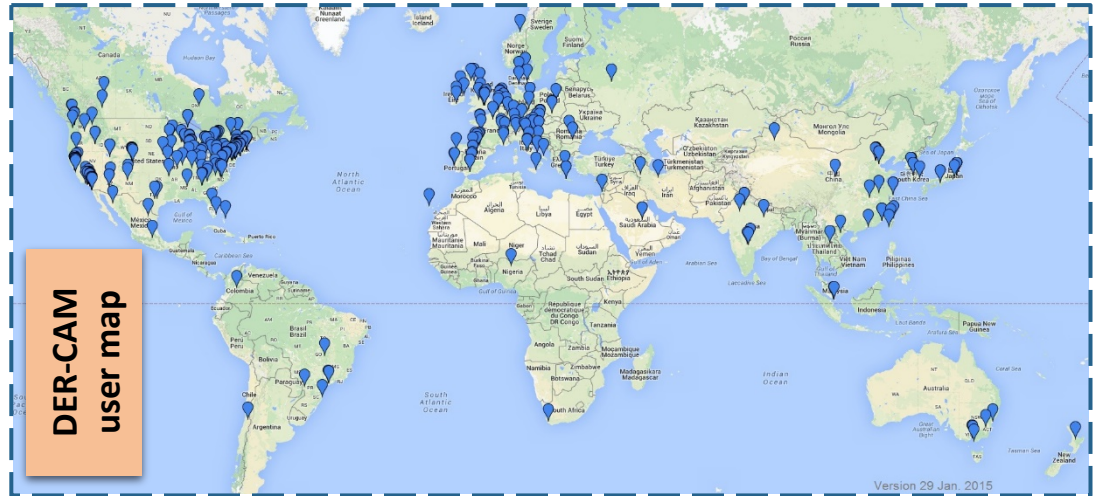
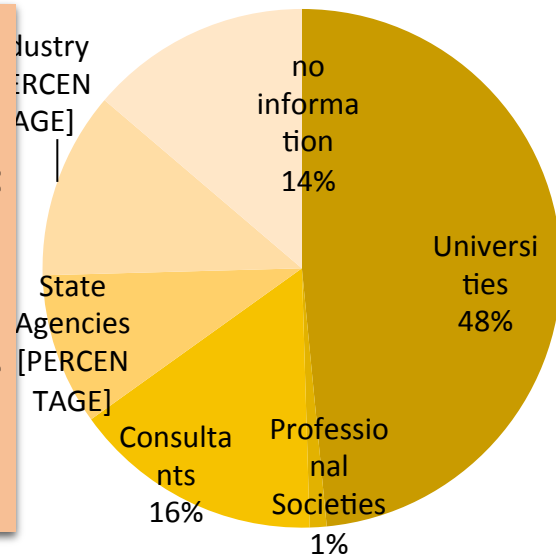
- A software tool **developed by Lawrence Berkeley Lab**
- **Two main versions:**
 - Investment and Planning DER-CAM: Optimal sizing and placement of energy supply solutions for microgrids, used in microgrid conceptual design and feasibility study
 - Operations DER-CAM: Optimal dispatch of microgrid assets, used in supervisory microgrid control
- **Wide range of technologies:** including fuel cells, conventional distributed generators, combined heat and power, renewable generators, electric vehicles, conventional storage, advanced storage, building retrofits
- **Multi-energy microgrid modeling:** electricity, heating, cooling end-uses

About DER-CAM

DER-CAM users by region
(52 different countries total)



DER-CAM users
by business type

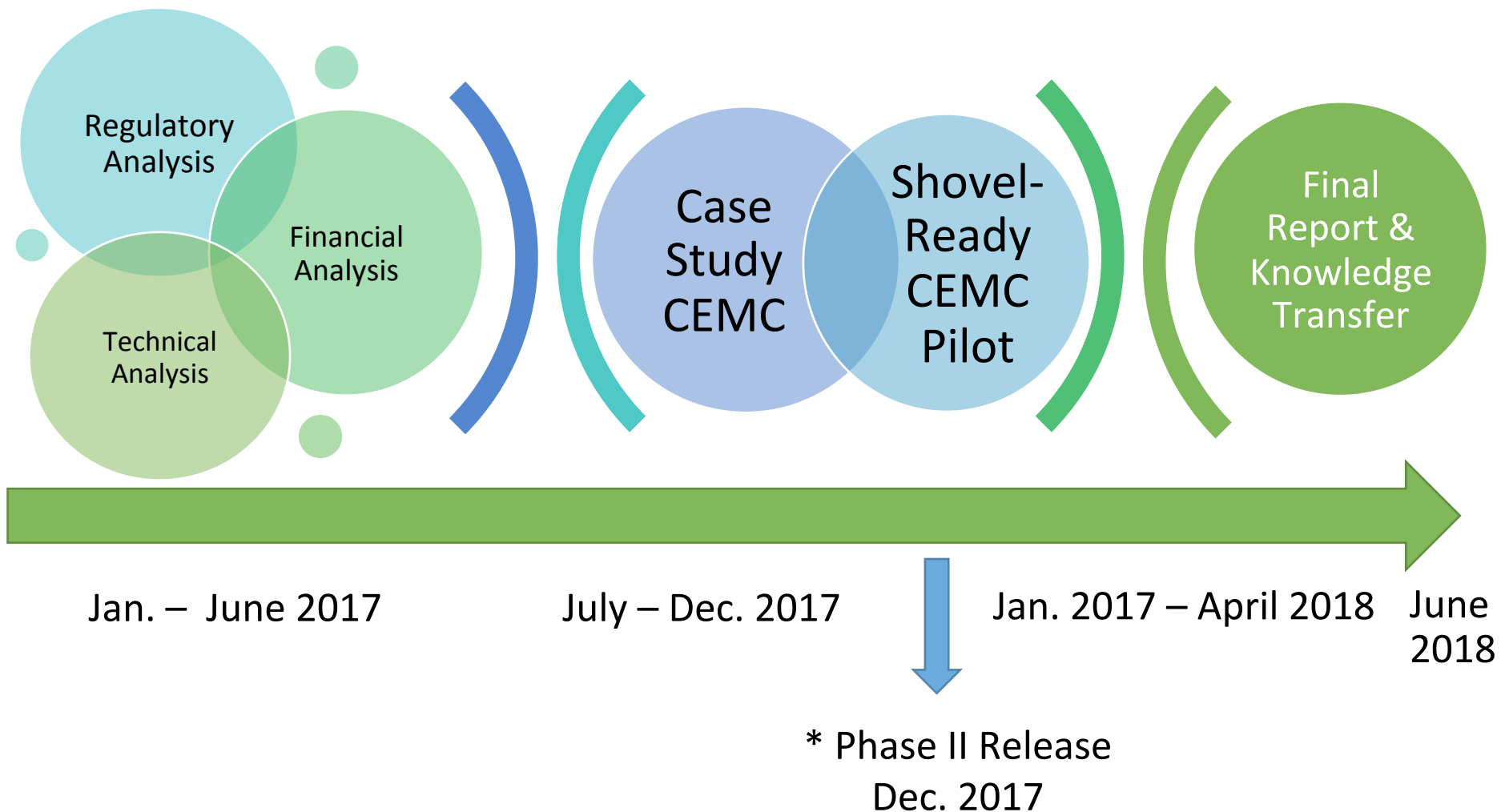


DER-CAM team success

- 2013 US Presidential Early Career Award for Scientists and Engineers awarded by President Obama in 2016
- Tool of choice for key industry stakeholders
- Partnership with prestigious universities and companies
- 80+ peer-reviewed and 60 other publications



Timeline & Key Milestones



Contact Information

- Timothy Burroughs
tburroughs@cityofberkeley.info
(510) 981-7437
- Katie Van Dyke (*on maternity leave until February*)
kvandyke@cityofberkeley.info
(510) 981-7403
- Marna Schwartz (*on maternity leave starting March*)
mschwartz@cityofberkeley.info
(510) 981-7473