

Advanced Community Energy “ACE”



A Program to Integrate Energy and Urban Planning
for Decarbonization, Resilience and Energy Equity
in All California Communities



Aug. 15, 2019

Summary

1. California's goals for carbon neutrality, resilience, environmental equity and a reliable electricity system require a local energy strategy
 - City/county actions will affect GHG emissions
 - Resilience and equity need local solutions
2. Advanced Community Energy (ACE) = A statewide program to create local electricity systems, connected to the grid, that address local priorities, advance state policy goals, and support the state's power grid
3. The moment is right for the the Legislature to authorize an ACE program that will reach all California cities and counties
 - An umbrella policy to achieve SB 100 and address fire readiness and other urgent state priorities
4. The Center for Climate Protection (Center) & ACE team are committed to work with the state and stakeholders to implement ACE



The Context and the Need

- Severe climate & ecosystem disruptions are high-risk for coming decades
- Energy is both a major cause of climate disruptions and a necessity of life

We must pursue two major goals, in parallel and with urgency:

1. Stop making things worse => adopt sustainable energy practices => decarbonize, electrify, displace fossil fuel use
2. Prepare for impacts of damage already done => resilience

California's needs are multi-dimensional:

- Happening now: Wildfires growing in frequency and severity
- Happening now: Intense rains, floods, landslides
- Happening now: Electricity system transformation at the grid edge; scalable technologies; autonomous adoption; challenging grid impacts
- Unclear: How to address equity and benefit vulnerable communities
- Unclear: Best measures to enhance local climate resilience
- Unclear: Best role for IOUs in decarbonization & resilience
- “Resilient Communities”: a worthy idea without a plan or a goal

ACE is a Comprehensive Strategy for California

- The most effective strategies for decarbonization and resilience are in the realm of city/county planning
 - *Changing the patterns that drive fossil-fuel consumption (e.g., commuting)*
 - *Electrifying fossil-fuel using activities (e.g., buildings)*
 - *Building community resilience to disruptive events, equitably*
- All strategies for decarbonization & resilience require electricity. Yet today, electricity system planning is not coordinated with city/county planning
- Advanced Community Energy (ACE) is a state-administered program that integrates city/county planning with utility power system planning
 - *ACE involves structured collaboration between local government planning, electric utilities, local constituents, labor and diverse technology companies*
- ACE requires updating IOU roles & incentives to support local collaboration and local energy resource deployment
- ACE can be an umbrella program that addresses several major state initiatives recently adopted or currently moving through the Legislature (SB 774; SB 1339 implementation)

What's already happening locally

California has numerous local initiatives for decarbonization and resilience (many funded by CEC EPIC grants)

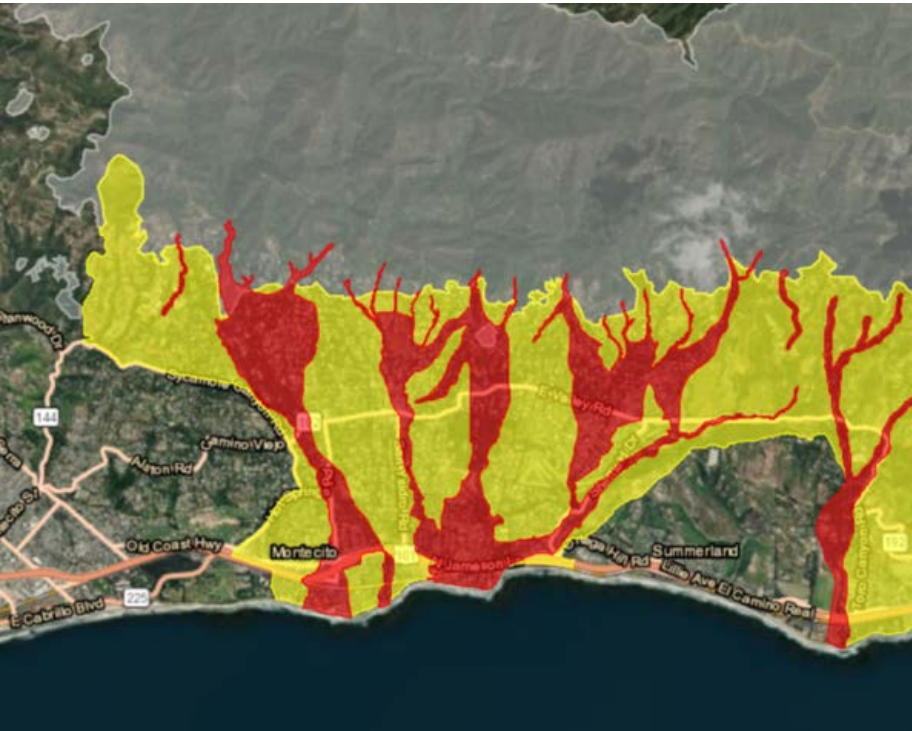
- Oakland EcoBlock: One contiguous city block retrofitted for 24-hour energy self-sufficiency: <https://www.youtube.com/watch?v=bKmfGI5Ogik>
- Arcata-Eureka Airport Microgrid: Able to separate from the grid and function as an electrical island: <https://redwoodenergy.org/community-choice-energy/about-community-choice/power-sources/airport-solar-microgrid/>
- Drawdown Marin: Campaign to reverse GHG impacts through community-determined local solutions: <https://www.marincounty.org/depts/cd/divisions/sustainability/climate-and-adaptation/drawdown-marin>
- Goleta Load Pocket Initiative: Developing a local clean power system for transmission-vulnerable Santa Barbara area: <https://clean-coalition.org/community-microgrids/goleta-load-pocket/>
- Kaiser Richmond Medical Center Microgrid: Can provide 3-hours emergency backup in island mode without fossil fuels: <https://lookinside.kaiserpermanente.org/powering-up-for-health/>

Case Study: Goleta 220KV/66KV Distribution System (The “Goleta Load Pocket”)



- Distribution System Locked within Service Boundary Peninsula. System load delivered via single pair of 220KV transmission lines, with 66KV back-up tie lines providing only a fraction of system load.
- Coastal Cities Surrounded by Extreme Fire/Earthquake/Landslide Zones, with high potential for public safety power shutoff (PSPS) conditions.
- Estimated Resilience Gap Between Primary Transmission and Back-up Tie Lines: ~200MW/400MWh.
- County and municipal governments developing strategic energy plans but need state and utility assistance.

Case Study: Montecito Community Microgrid Initiative (“MCMI”)



- Dec. 2017 – Jan. 2018: Montecito community ravaged by rapid sequence of Thomas Fire and debris flows from torrential rain: 23 deaths, entire neighborhoods swept away
- MCMI would provide resilience to critical facilities (Fire/Water Districts, Schools) located at the end of the Hot Springs 16KV circuit
- Microgrid designs forced behind the meter as circuit modernization deemed not practical by SCE from traditional “least cost, best fit” analysis, limiting ability to design for maximum capacity at low load sites
- ACE program could provide a platform for developing a true community microgrid that is replicable within Goleta Load Pocket

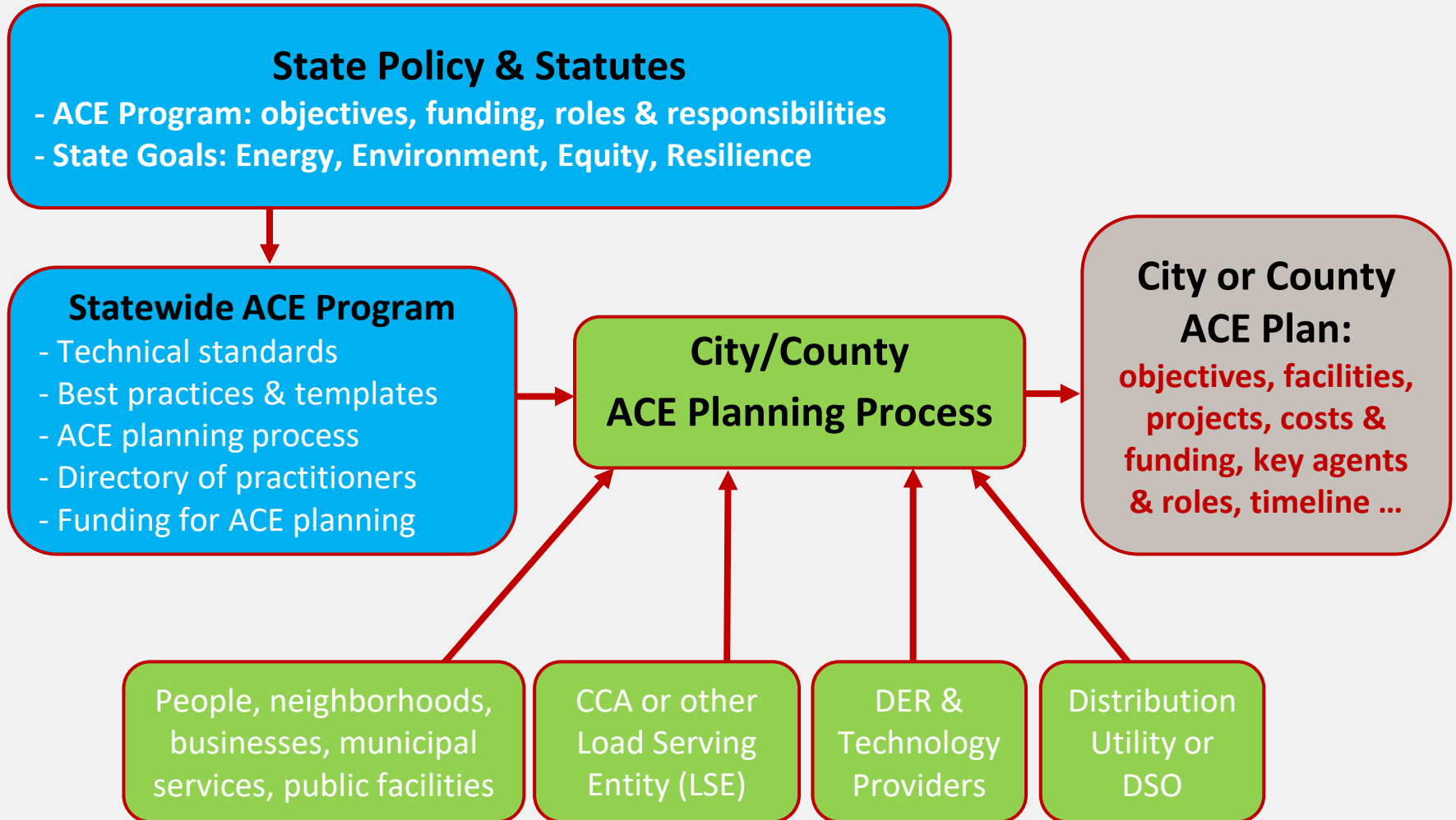
The disconnect between local government planning and electricity system planning

- Cities and counties develop general plans and climate action/adaptation plans, typically with little consideration of the electricity grid and no involvement with the electric utility (unless they're muni electric utilities)
 - Some local governments may be able to take on ACE planning, but many lack the funding and expertise; many communities will be left behind without state support
- IOU distribution planning and integrated resource planning do not engage with local governments and local electrification plans
 - IOU regulation does not provide flexibility to address local needs
 - But ... Community Choice Agencies (CCAs) can align their resource procurement to serve local initiatives and provide grid services
- Unstructured customer PV & EV adoption can drive grid operating challenges and costly infrastructure upgrades
 - ACE planning can design local resources to support grid operation and minimize infrastructure upgrade needs

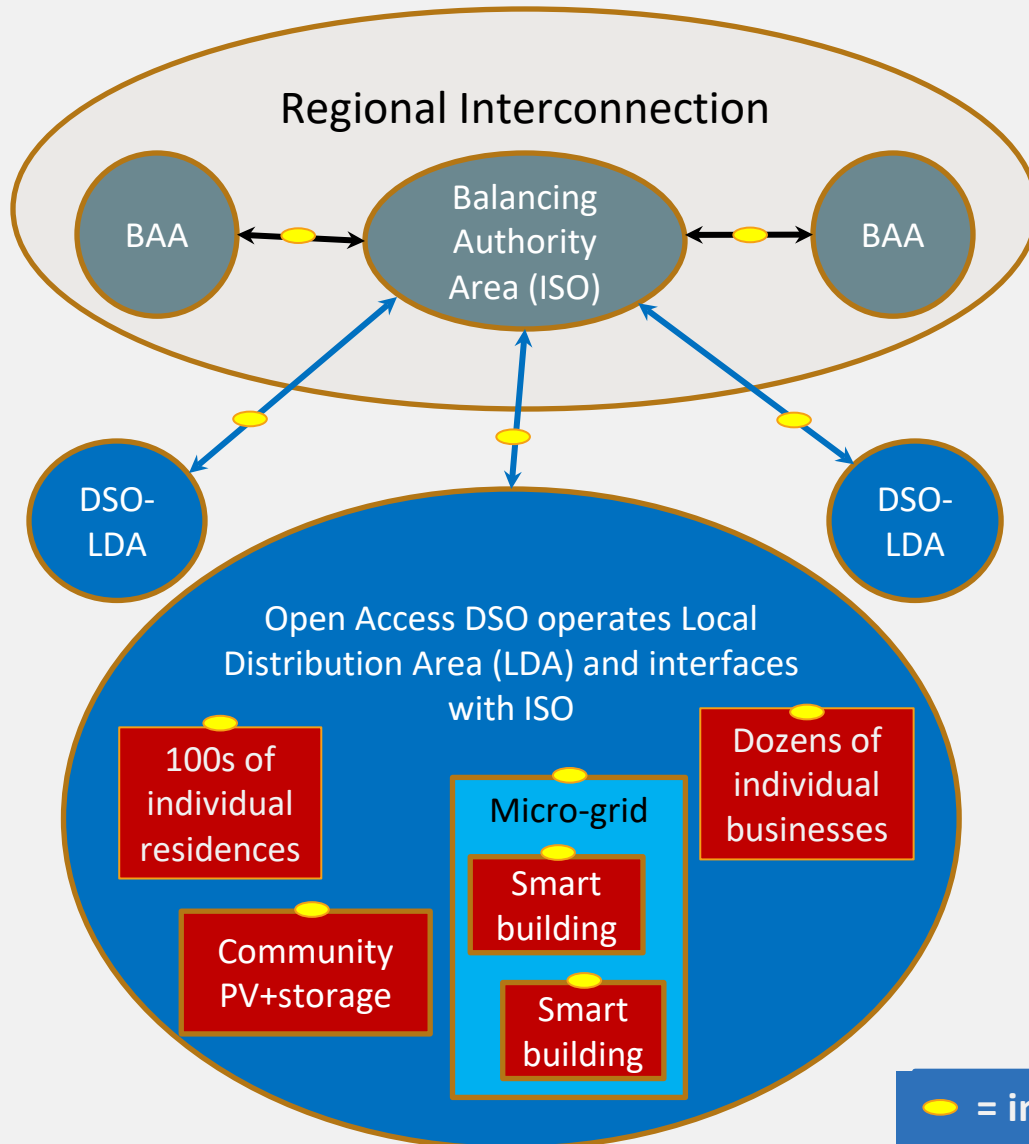
ACE entails collaboration across siloes and involves whole-system perspectives

- A state agency could support ACE planning and implementation of ACE systems
 - Disseminate practical designs and models for critical-facility microgrids and local power systems
 - Provide clearinghouse for best practices and practitioners
 - Create templates for local government ACE planning processes
 - Allocate funding for ACE planning and near-term resilience projects
- ACE planning brings together local government planners, electric utilities, local constituents, labor, technology companies, energy justice and other advocates
- IOU functions and incentives require regulatory changes to better support local priorities and state policy goals
- New role for the IOU — Open Access Distribution System Operator — to facilitate local energy projects and growth of distributed resources

ACE planning is a structured collaborative process, created and funded by state legislation



Future power system: distributed resources, decentralized and layered operations and markets



Open Access Distribution System Operator (DSO) is the essential new role for the IOU distribution utilities

- Community & behind-the-meter resources add resilience & support local decarbonization
- DSO coordinates all loads & DER for a smooth interface with ISO
- *Future: Open Access DSO operates local state-regulated markets for prosumers, microgrids, public services & 3^d party DER providers*
- Each layer can “island” from layer above at the interface point, when needed for resilience, safety, or to support the grid

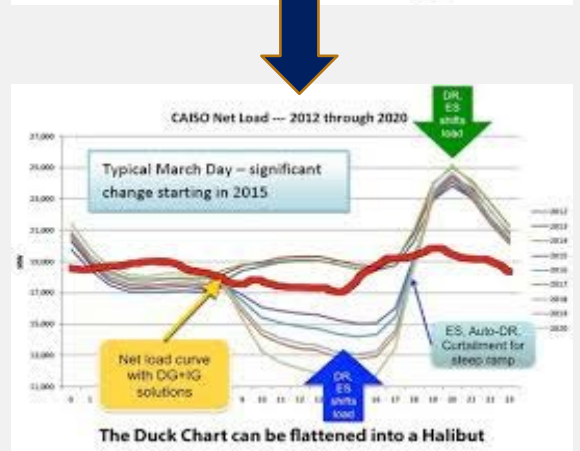
● = interface point

ACE is an umbrella for related state initiatives

- ACE can encompass several major initiatives recently adopted or currently moving through the Legislature
- [AB 1144 \(Friedman\)](#) – SGIP for critical facilities, would allocate 10% of SGIP funds for storage for CFs in high wildfire threat areas
- [SB 774 \(Stern\)](#) – Identify locations where microgrids may provide increased electrical distribution grid resiliency; 2-year bill
- [SB 350 \(Hertzberg\)](#) – multi-year centralized resource adequacy mechanism; 2-year bill
- [AB 1054 \(Holden\)](#) – passed 2019 - a wildfire liability insurance fund that requires utilities to meet certain benchmarks on safety, limits on executive pay, and \$5 Billion investment in safety improvements
- [SB 1339 \(Stern\)](#) – implementation at CPUC - facilitate the commercialization of microgrids for distribution customers; directs CPUC to develop separate electrical rates and tariffs for microgrids
- [SB 700](#) – implementation at CPUC - extend the collection for the self-generation incentive program add community resiliency

ACE Benefits

- **Delivers security and resilience:** Provides ongoing power to critical and priority locations in communities; islanding enhances both local and system security
- **Reduces emissions:** Local resources provide cost-effective and secure energy for electrifying transportation, homes, and buildings in coordination with local general plans and climate action plans
- **Optimizes grid & lowers costs:** ACE systems can be designed to lower peak loads, flatten load profiles, provide grid services & manage variability locally to support grid operations, smooth the ducklings & reduce grid infrastructure costs
- **Benefits local economies:** Increases economic investment in cities and communities, growing quality jobs in clean energy; can be targeted to benefit disadvantaged & vulnerable communities, and reward property owners for participating
- **Offers a replicable & scalable approach:** ACE systems can serve an entire city or many local neighborhoods; statewide ACE program will disseminate best practices & templates for replication in all cities & counties



Policy actions required to move ACE forward

- Legislation is needed
 - Define purpose, implementation process & milestones, designate lead agency and authorize funding for statewide ACE program
 - Direct CPUC to update role of IOUs to be collaborators in ACE planning and add performance metrics to utility compensation
- The state agency designated by legislation (CEC?) will proceed to implement and manage ACE program
- CPUC proceeding develops regulatory changes for IOU distribution utilities
- Consider phased implementation of ACE; for example:
 - Start with microgrids on critical facilities in high climate-risk communities (e.g, first responders; service facilities for displaced people)
 - Extend ACE to all disadvantaged communities; eventually to entire state

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www.cleanpowerexchange.org/advanced-community-energy

