The societal context: A need for urgent action

• Climate & ecosystem disruptions are already severe & rapidly getting worse
• Impacts fall most heavily on vulnerable & disadvantaged communities
• Energy systems are a major cause of disruption, and yet, we can’t do anything without energy

We need to pursue three major goals, in parallel and with urgency

1. **Sustainability** => Stop making things worse => convert to sustainable energy practices => decarbonize, electrify, reduce & displace fossil fuel use
2. **Resilience** => Prepare for impacts of damage already done
3. **Equity** => Prioritize environmental and social justice; create a just energy transition

All three goals require local action

• Decarbonize society through local planning & initiatives:
  – Housing density, zoning & land use, building codes, mobility services, etc.
• Enhance resilience through local electricity systems & microgrids
• Ensure the resilience, health and economic benefits of local clean energy reach all people, communities and neighborhoods
The industry context: The power system is evolving from a centralized kWh delivery system to an interactive network

- End-use customers care about electricity services, not kWh
- It’s no longer true that “All electricity must come from the grid”
- Scalable distributed technologies are in direct competition with grid kWh and create a new “behind-the-meter market” so that
  - Any customer can generate & store electricity & manage load with on-site devices
  - The grid & wholesale commodity market are becoming the residual supply
  - End-users can customize reliability, power quality, resilience, environmental attributes & cost-effectiveness, and can become grid participants, not just consumers
  - Local power systems can be optimized for a neighborhood, town or city
  - BUT … institutional inertia & incumbent political power, combined with rising grid infrastructure costs & declining DER costs, incentivize grid/load defection
  - First movers will be financially capable C&I and affluent residential customers
The electricity system is evolving to a “bimodal” structure with a vibrant, participatory distribution side

**Legacy 20th Century Electric System:**
- All supply is from the bulk system
- Distribution service is one-way
- Consumers only consume

**Bimodal 21st Century System:**
- Local resources supply a major share of new electrification demand
- Distribution network connects diverse customers & community resources
- Customers are grid participants, not just consumers
- Distribution operator manages local grid to reduce bulk system impacts
Policy vision: Statewide deployment of clean resilient DERs, microgrids, energy efficiency retrofits, demand management

Realizing the vision will provide diverse multiple benefits

- Resilience for future climate extremes
- More rapid decarbonization of power grid, building and transport sectors
- Well-paying jobs for economic recovery from Covid
- Community financial benefits from local resource ownership
- Attractive environment for private investment in the clean energy future
- Load profiles shaped to minimize adverse grid impacts

Three major legislative actions are needed

1. State support for local energy resilience planning => shovel-ready projects
2. Funding for implementing energy projects, prioritizing disadvantaged communities
3. Form Open Access Distribution System Operators from existing IOU distribution utilities, to provide the network platform for participating customers & DERs
Thank you.

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Electric System Policy, Structure, Market Design