Overcoming Regulatory Obstacles to Clean Local Energy Resources

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Gerry Braun

Outline

- Climate Change Context
- Energy Supply Decentralization and Localization
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  - Definitions
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Global Climate Change

- In spite of increased rates of global renewable electricity deployment, consumption increases off-set the effect on CO2 emissions
- Current global CO2 emissions rates continue at a steady, undiminished rate of about 36 billion tons per year.
- 800 billion tons of additional global CO2 emission will result in global average temperatures 2 degrees C above pre-industrial levels.
- If decarbonization does not start now and accelerate, it will take 22 years for global average temperatures to reach 2 degrees C over pre-industrial levels.

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Playing Catch Up

- **Full US decarbonization of current US electricity production, i.e. replacing all power plants that generate CO2 emissions, would require $3.5T.**
- **Current electricity use accounts for one third of GHG emissions.**
- **Thus, decarbonization of the electricity sector, plus 100% electrification of all sectors, would require tripling electricity production, plus replacing all equipment that currently uses methane and petroleum in the building and transportation sectors.**
- **Current annual US tax leveraged renewable power generation capital spend is $56B.**
- **Half a trillion per year on renewable electrification would be more appropriate.**

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California Leading the Way?

- States regulate electricity and methane (natural gas) sales except for inter-state transfers and locally regulated service.
- Diverse renewable portfolio (electricity) mandates apply to all electricity providers and are administered by PUCs.
- California:
  - From 10% renewable electricity in 1990 to 33% in 2020 to 50% by 2030
  - Recent acceleration from 1% per year average renewable supply expansion (mostly large plants)
  - No parallel reduction in per capita energy use (on site and transportation)
  - Goals but no specific mandates for local energy resources (LERs)*

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Clean (Zero Carbon) Local Energy Resources

- **Old:**
  - **Usage reductions and efficiencies**
  - **Demand response management (DSM)**
- **Additional:**
  - **Point of use (aka behind the meter) solar energy, e.g. rooftop solar**
  - **Local renewable electricity, e.g. community shared solar**
  - **Conversion efficiency upgrades, e.g. combined heat and power systems**
    Locally interconnected point of use energy storage, including:
    - **Cold and hot storage and ground sources**
    - **Electric vehicle propulsion systems**
      - **Battery**
      - **Fuel cell**
  - **Solar micro-grids**
  - **Locally produced renewable fuels**
  - **On-site energy management automation**
  - **Etc.**

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Energy Supply Decentralization

- **Increased adoption of LERs:**
  - **Enables zero carbon energy resource development by energy users and local retailers and aggregators**
  - **Enables innovation and economies of manufacturing scale**
  - **Requires local enabling policies and programs**
  - **Requires collaboration between regional utilities and local jurisdictions**
- **Creates an opportunity for accelerated LER deployment**
- **Initially additive to utility renewable portfolio expansion**
- **Later eliminates need to expand centralized infrastructure**
- **Requires "democratization", i.e. locally governed and managed energy supply service:**
  - **Essential to accountability and transparency**
  - **Requires new private and public sector capacities**

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Economic Regulation

- **Economic regulation of monopoly energy services focuses primarily, but not exclusively, on recovery and minimization of costs of service in the form of rates and the alignment of rate design with policy goals.**
- **States regulate energy and other services by companies that operate under franchise agreements with local jurisdictions.**
- **Local jurisdictions, individually and jointly, have experience regulating other public services (e.g. water supply, solid waste and waste-water collection). Some have experience regulating rural or urban electricity or natural gas service.**
- **To varying degrees, states, counties and cities enact legislation requiring regulated service providers to implement programs aligned with social, economic and environmental policy goals.**

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Other Regulatory Authorities

- **Inter-state energy commerce – wholesale transactions and high-voltage transmission service – is regulated by the Federal Energy Regulatory Commission (FERC). Recent FERC orders account for demand response and ancillary grid services using energy storage.**
- **Regional grid balancing, open-access transmission service, wholesale markets, transmission planning and cost recovery for transmission services, are provided by regional transmission organizations (RTOs)**
- **Multiple local and state regulatory processes apply to the siting and permitting of energy supply and delivery projects, and retail energy service**

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State Energy Regulatory Process

- **Legislators enact laws to establish and incrementally adjust energy grid owners' (aka utilities') legal responsibilities consistent with the public interest, e.g. renewable energy portfolio and energy efficiency program implementation.**
- **PUCs are appointed or elected to administer these laws.**
- **For-profit grid owners propose, oppose and draft legislation and generally seek a stable, low risk business model because their rate of return is limited to levels that attract low risk capital.**
- **Energy users generally have historically been concerned with reliability and monthly charges but are now increasingly interested in local clean energy resource deployment. For this reason they are becoming interested in greater economic choice and local control, and new energy regulatory models favoring local control are being authorized by legislatures. See next slide.**

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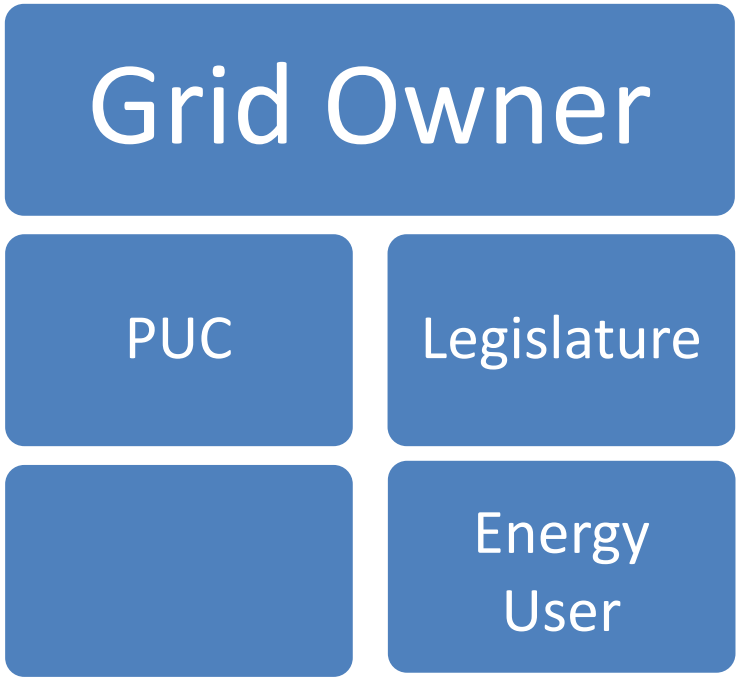
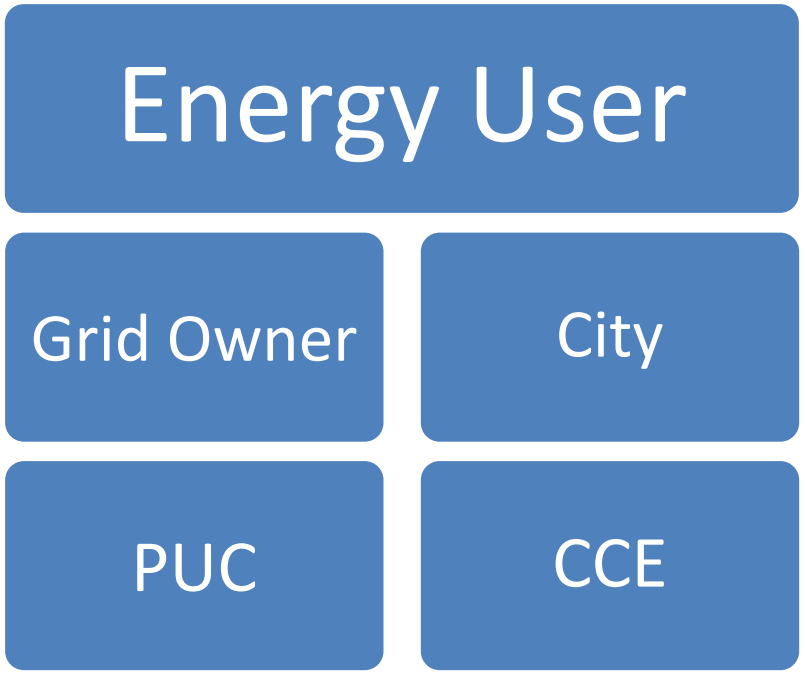
Energy Service Models

Utility Control Model: PUCs oversee and depend on grid owners for information. Energy users depend on legislatures to protect their economic and environmental interests. Legislatures are dependent on PUCs to oversee grid owner's implementation of state policy. Individual legislators depend on corporate political contributions.



Local Control Model: PUCs continue to oversee and on grid owners for information. Energy users depend more on city and county elected bodies to represent them on CCE governing boards and protect their energy related economic and environmental interests. Legislatures and PUCs continue to have responsibility for economic regulation of private ownership of public infrastructure.



Technology and Economic Shifts

- **Technology/Manufacturing**
  - **Data explosion and automation benefits are empowering the smart cities movement.**
  - **New renewable electricity sources are coming in below electricity market prices in some regions, empowering the community choice movement.**
- **Economics**
  - **On-site solar price parity is expanding geographically from areas of high grid electricity price and high resource quality.**
  - **Natural gas prices are at an historic low.**

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Energy Policy Incoherence - 1

- Red states
  - Status quo utility regulation
  - Utilities moving to capture cost savings as utility scale renewable prices continue to trend downward
  - Dressing up utility-scale solar as “community” solar
- Blue states
  - Tweaking the basic IOU business model to accommodate LER
  - Reluctantly empowering local jurisdictions to implement community choice while protecting IOU bundled customers and grid owners from revenue loss impacts.

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Energy Policy Incoherence - 2

- **Settled energy policy that favors LER investment is negated by unpredictable market rules making investment risky and hard to value.**
- **Codes and standards mandating natural gas heating that deter investments that reduce GHG emissions by substituting electricity for natural gas.**

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Regulatory Obstacles

- **Limiting and undervaluing clean local energy resources:**
  - **Size limits on net metered on-site solar arrays and under-payment for net annual production**

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Local Electricity Generation

- **Electricity feeding in to distribution circuits is typically valued similarly to electricity feeding in at higher voltages, i.e. at the cost that must recovered to pay for an incumbent utility's current generation portfolio and its operation, or at the avoided marginal generation cost, plus any adjustments that account for locational benefits.**
- **This does not account for the aggregate effect of "unloading" the high voltage grid, thus avoiding expensive upgrades and avoiding congestion.**

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Net Energy Metering (NEM)

- **NEM tariffs have treated solar electricity flowing into the local grid as of equal value to electricity drawn from the local grid to the extent annual on-site generation does not exceed annual on site consumption. This is consistent with neutral valuation of energy efficiency investments. However, sizing of on-site solar arrays is limited to the size required to meet historical annual demand. Any "excess" annual production is typically valued at the avoided marginal generation cost, typically less than 50% of the bundled generation costs.**

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“Non-bypassable” Charges

- “Bundled service” includes supply and delivery, or in utility parlance, generation, transmission and distribution.
- Non-bypassable charges are levied to recover costs incurred by utilities in providing bundled service.
- They include charges for nuclear decommissioning, public purpose programs, long term supply contracts in place during term of bundled service.
- State-regulated grid owners have legislative and regulatory permission to recover non-bypassable charges from any interconnected customer, including customers purchasing generation services separately from other providers.

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Overcoming Obstacles

- **Replacing net metering annual production limits with fair prices for metered electricity based on time of use and time of supply would result in economically optimized rooftop PV systems and other on-site generators.**
- **Identifying an appropriate price preference for electricity generated in or near a community would encourage LER investment, thus accelerating local climate resiliency and minimizing unnecessary investment in additional high voltage transmission.**
- **Capping and then phasing out non-bypassable charges would enable an orderly transition from centralized energy systems to energy systems with the capacity to develop and deploy clean local energy resources.**

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Obstacle: Sub-optimal Rooftop Solar Sizing

- **Problem: Current interconnection rules prevent cost-effective sizing of on-site solar arrays. Arrays must be sized to produce less than historical annual usage.**
- **Solution: Replacing net metering annual production limits with fair prices for utility and site supplied energy based on time of use and time of supply respectively.**

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Other Impediments

- **Local jurisdictions lack timely access to conveniently formatted electricity usage and delivery information necessary to local LER investment.**
- **Technically irrational allocation of grid access charges**
- **Compartmentalized vs. integrated regulation of complementary and interactive local energy resources, e.g. storage vs. demand response**
- **Cost of effective representation in "quasi-judicial" regulatory processes**
- **Incapacity of energy monopolies to innovate and locally customize**
- **Costs of local energy security and climate action investments are additive to costs paid by local energy users for public purpose programs administered by the state.**

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Overcoming Other Obstacles

- **Fully supported data reciprocity between utilities and local jurisdictions would result in more expeditious LER project development, locational benefits to grid owners, ratepayer savings, more cost-efficient efficiency retrofit and net zero building programs.**

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Moving Local Clean Energy Forward

- **Don't look to Federal regulators.**
  - **The climate policy outlook at the Federal level adds urgency to the need for energy sector decentralization and democratization, especially in light of the need for investment in local resiliency and energy security infrastructure.**
- **Don't look to state regulators.**
  - **State regulatory attention is organized around a legislatively constrained and monopolistic business model that has never and cannot now cost-efficiently develop and deploy clean local energy resources.**
- **Local jurisdictions will need to learn.**
  - **They are already competent to regulate local services, but not yet energy services. In the service areas of state regulated companies, there is no economic regulation, local or otherwise that rationally accounts for both costs and avoided costs of supply resources feeding into the local electricity grid.**

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Clearing a Path

- **Strategic rationalization of non-bypassable charges, grid access charges, local energy data access, etc.**
- **Local economic regulation of local energy supply services. Clear and legislatively established terms of pre-emption by state regulatory authorities**
- **Data driven local integrated resource planning by:**
  - **Existing municipal utilities and co-ops**
  - **Community choice energy service agencies**
- **Incentives for deployment of local micro-grids as standardized platforms for economic integration of local clean energy resources.**

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Thank you!

gbraun@iresn.org

www.iresn.org

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Clearly identifying the problem is eighty percent of its solution.