Collaborative Local Renewable Energy Integration

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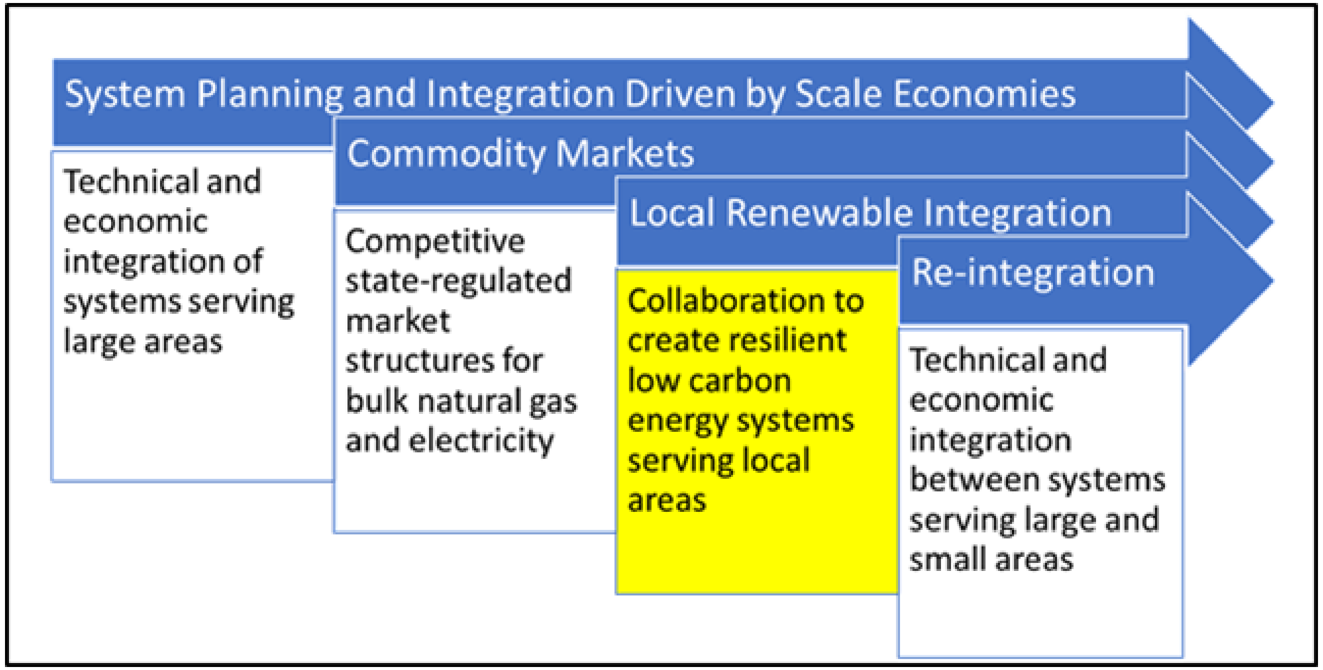
Outline

- Energy Sector Change
- Collaborative Local Renewable Integration Stakeholders
- Policy Barriers and Opportunities



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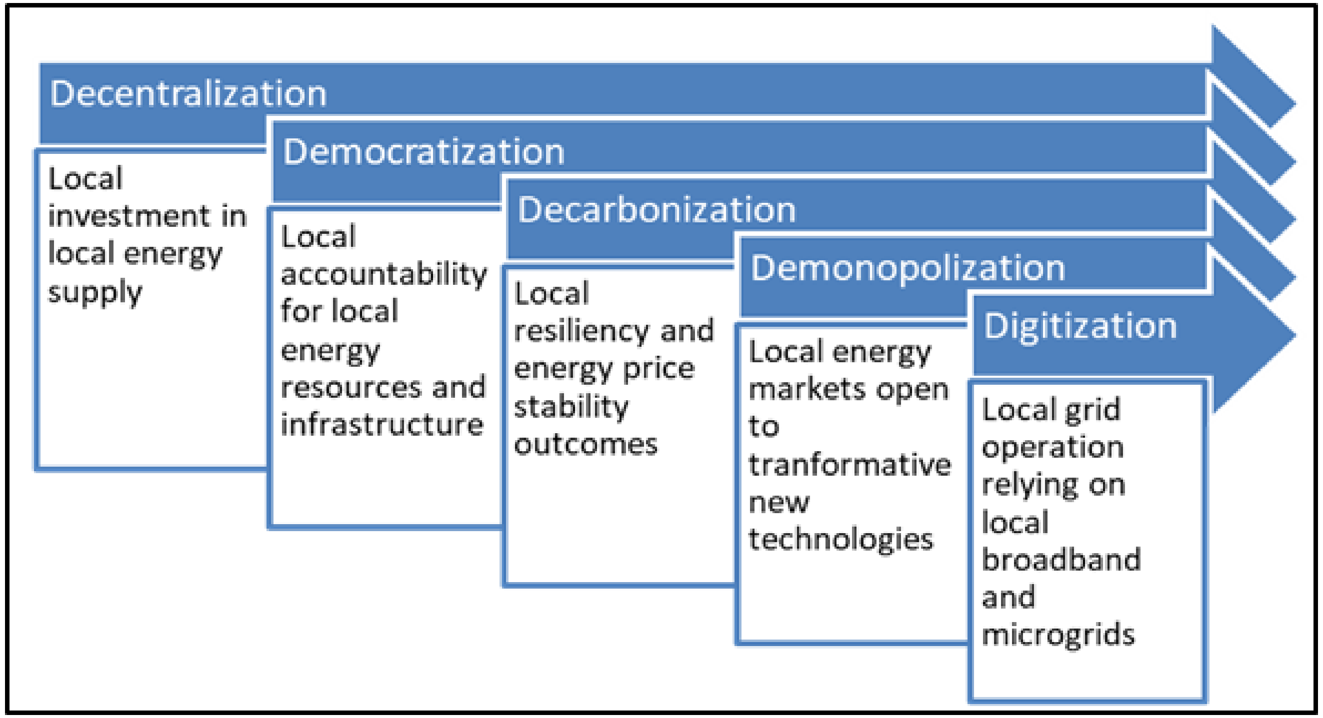
Vectors of Energy Sector Change

- Modular new energy technologies drive decentralization, which in turn creates opportunities for energy democracy and decisions that accelerate decarbonization.
- Monopoly utility business models aren't allowing economically efficient deployment of modular new technologies nor their effective integration with smart local infrastructure.



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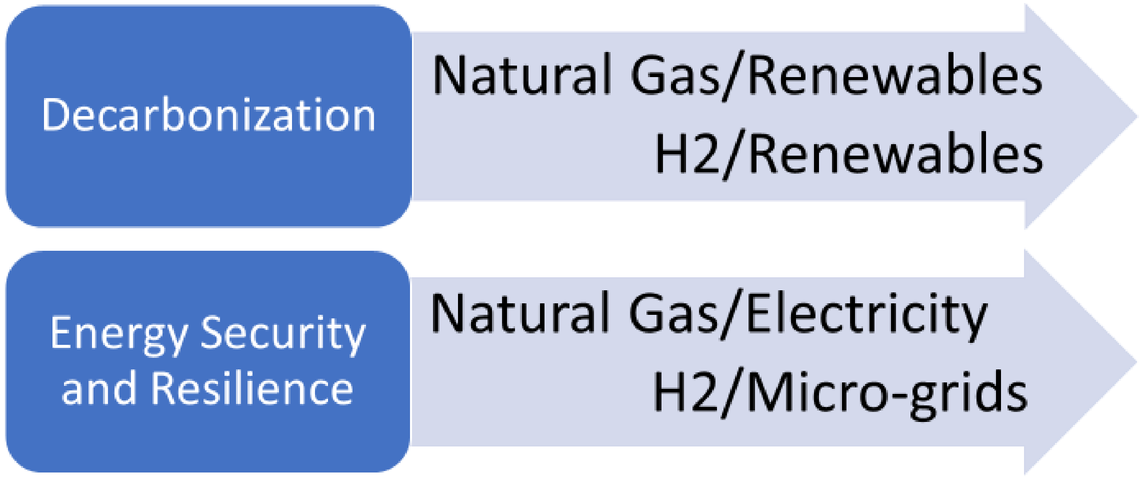
An Integrative Energy Sector Decarbonization Scenario

- Natural gas and electricity are key to local decarbonization and resilience and are starting to displace petroleum in the transportation sector.
- Longer term, hydrogen from solar and wind can add to the mix of low and zero carbon transportation fuels.
- Seasonal hydrogen storage will complement battery storage, enabling fuel cells, microgrids and combined cooling, heating and power systems to provide local energy security and resilience.

Decarbonization and Local Energy Resilience



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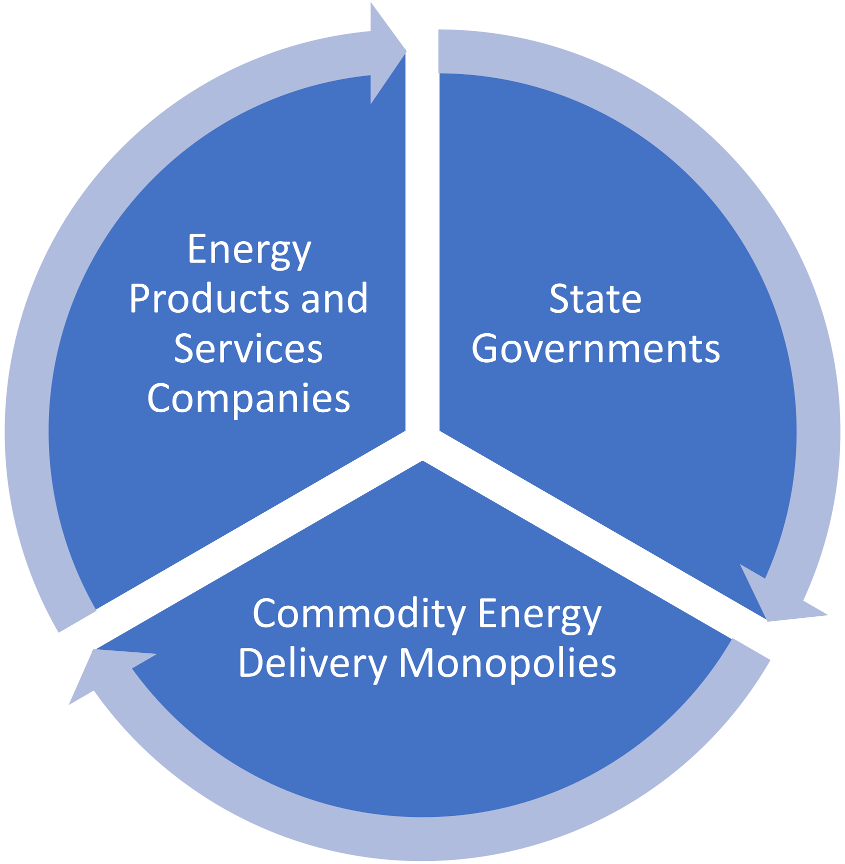
Evolutionary US Energy Sector Change

New technolgies can drive evolutionary (but not radical) change through a process of:

- companies seeking market access by engaging with state and local governments;
- governments regulating the performance metrics of energy delivery monopolies; and
- energy delivery monopolies collecting and spending money in the process of sourcing products and services.



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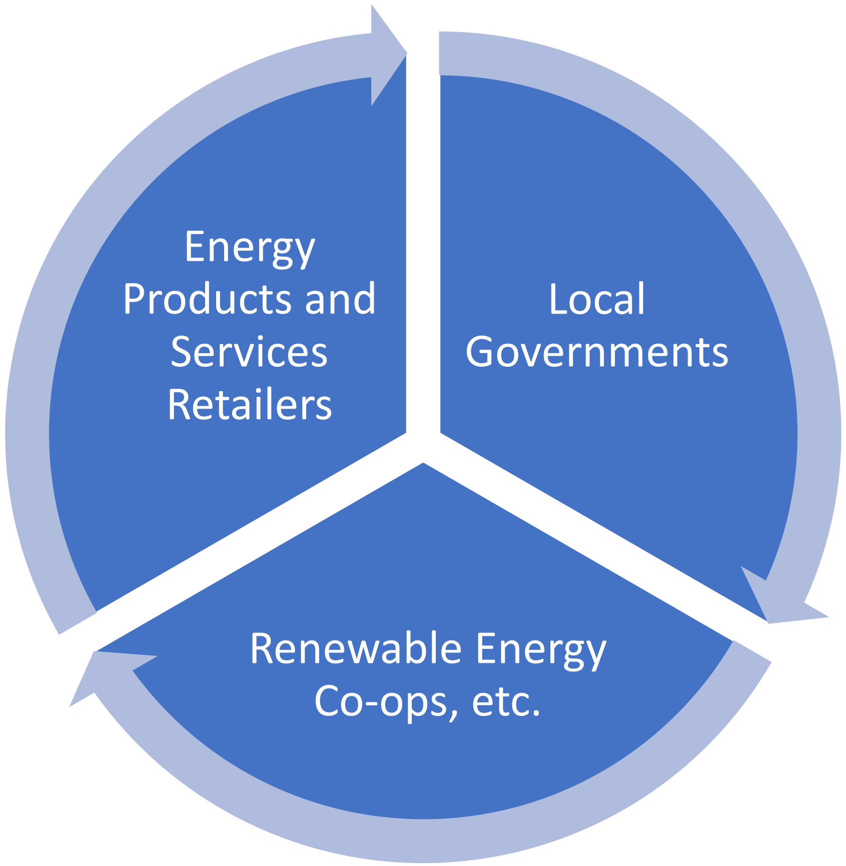
Radical US Energy Sector Change

State policy can accelerate more radical change by incenting and creating structures for integrative planning that accounts for local opportunities and trade-offs. It will involve:

- Energy products and services retailers licensed by local governments;
- Local governments implementing climate action and adaptation plans; and
- Renewable energy co-ops and newly chartered municipal utilities ("remunicipalization")



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Energy Utilities

US energy utilities evolve; they don't reinvent themselves. Their business model motivates them to maximize revenues and assets under ownership. Their investments in local renewable supply for local delivery remain minimal for understandable reasons. But as decentralized supply expands, they can accelerate the expansion by investing in local assets for resiliency, zero carbon fuel supply and grid services.

The Business Council for Sustainable Energy®

READINESS FOR RESILIENCE: Clean Energy Solution Case Studies

Large-Scale Fuel Cell Systems For Resiliency, Grid Services and Clean Air

CaSFCC

Utilities in both the U.S. and South Korea are embracing large-scale stationary fuel cell systems

Location	Utility	Size	Delivers
Bridgeport, Connecticut	Dominion Energy	14.9 MW	Resiliency and power for 15,000 homes
Newark, Delaware	2 Delmarva sub-stations	30 MW	Power for 22,000 homes
Brookhaven, New York	PSEG/ Long Island Power Authority	39.8 MW	Resilient combined cooling, heat and power and small footprint
Hwaseong City, South Korea	Gyeonggi Green Energy	59 MW	Supplies grid power and district heating, 5.2 acres
Daesan, South Korea	Hanhwa Energy, Korea East West Power	50 MW	Direct hydrogen for combined heat and power to local utility
Incheon, South Korea	KOSPO	20 MW	Combined Heat and Power
Busan, South Korea	Korea South East Power	30.8 MW	District heating and power for 71,500 homes

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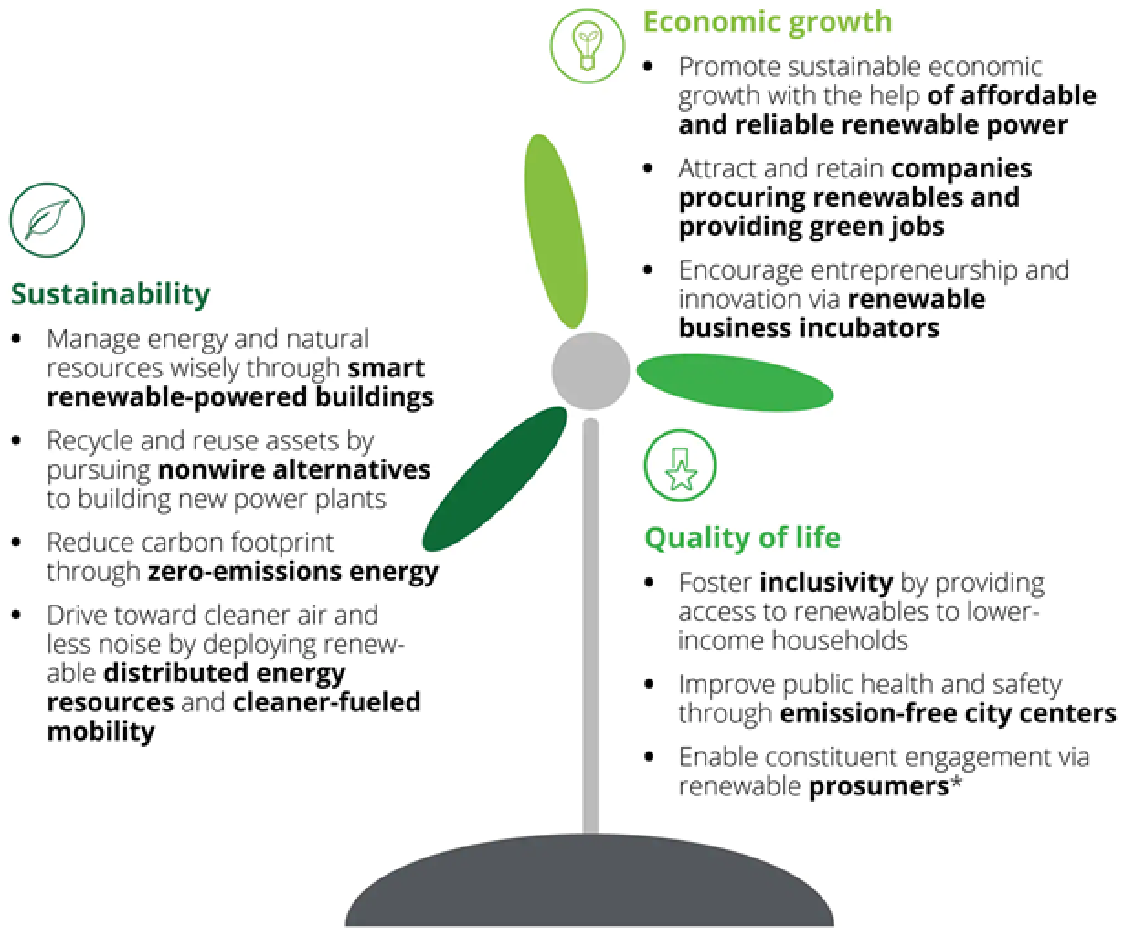
Smart Renewable Cities and Counties

- Deloitte sees renewable energy as the “linchpin of smart city and utility goals”.
- Smart renewable cities (SRCs) can be agents of transformative change. They have a vision that integrates renewables and smart initiatives. 18 cities around the world qualify as SRCs, including Chicago, San Diego and Los Angeles. The newest SRCs are greenfield smart city projects entirely powered with renewables.

How renewables can contribute to smart city goals



*Prosumer: Energy consumer and producer.

Source: Deloitte analysis.

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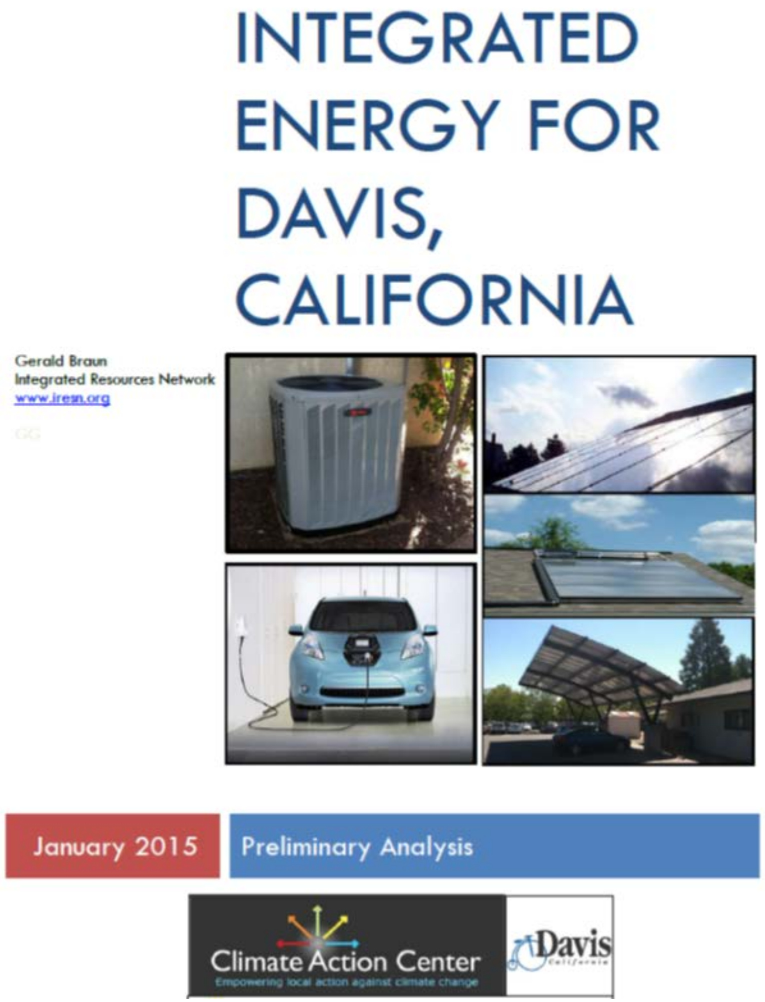
All Renewable Climate Action is Local

- US cities and counties are taking up climate action and adaptation planning. Implementation depends on purposeful collaboration with local utilities.
- Integrated energy analysis informs plans to empower citizens and businesses to produce and store the energy they use; and to develop community renewable projects to serve those who can’t.



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Universities

Experience gained on university campuses is transferable to smart cities and counties. It can:

- inform climate action and adaptation planning and design of local energy programs; and
- provide an invaluable assist to collaboration between local governments and large energy utilities, even in states that do not yet have strong commitments to renewable energy deployment.

Rank	School	State	Total Amount of Renewable Electricity per FTE Student (MMBtu)
1	Southwestern University	TX	40.8
2	Austin College	TX	40.7
3	Whitman College	WA	39.8
4	Haverford College	PA	38.1
5	University of Tennessee at Knoxville	TN	34.8
6	Bryn Mawr College	PA	34.6
7	Swarthmore College	PA	32.7
8	Dickinson College	PA	27.7
9	Knox College	IL	26.9
10	University at Buffalo	NY	26.6

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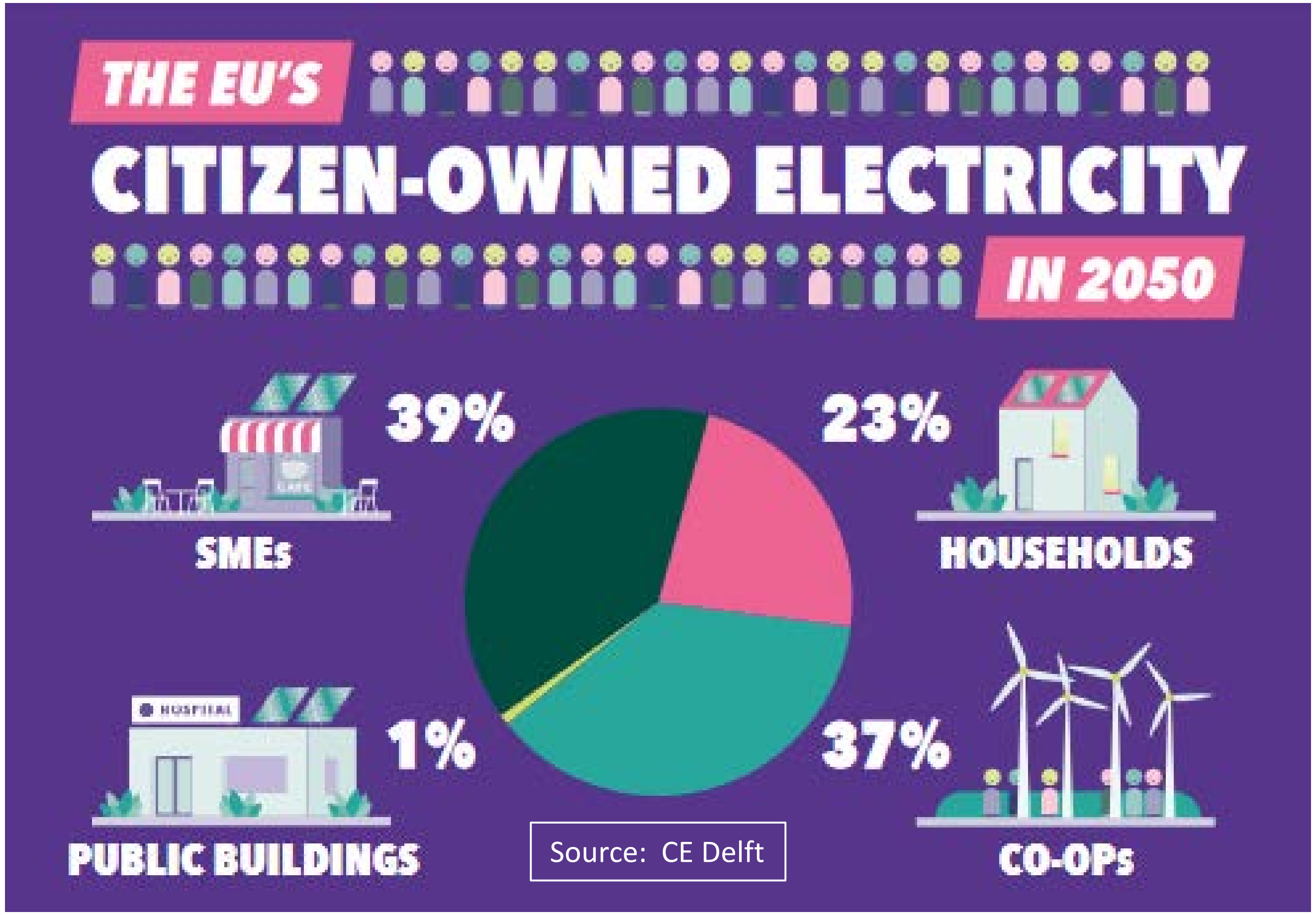
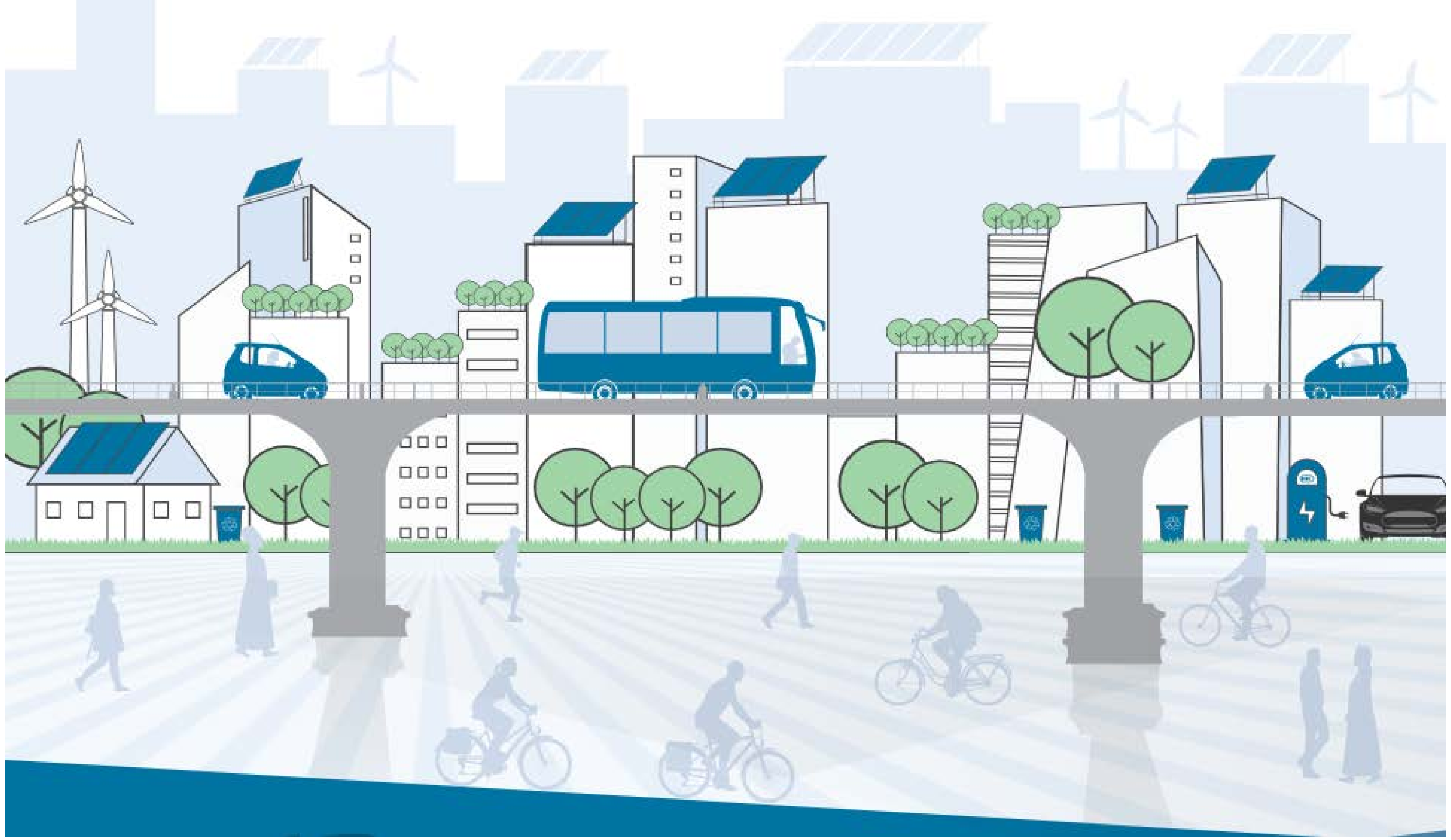
Europe

- Europe is redesigning its energy service model for better balance between locally produced and imported renewable energy through “remunicipalization” and creation of renewable energy cooperatives.
- US states regulate energy service and can do the same. First, they must affirm the rights of communities to determine their own energy futures.



US States Can Change the Local Energy Game

State laws and policies can acknowledge that citizens and communities are stakeholders in the energy system; grant rights to them to invest, produce, consume, store and sell renewable energy; and require that governments and private market participants guarantee and honor these rights and work with one another to serve the public interest in climate action and adaptation. Nevada's AB 405 (2017) granting such rights (in a limited context) was the first such law in the US.



Cities and Counties Can Continue Changing the Local Energy Game

- Affirming community and citizen rights will empower creation of renewable energy communities. As local governments support weigh in, they can become more pro-active as regulatory and policy enablers, as project partners and facilitators, and as infrastructure operators.
- States will have an important role in removing barriers and creating opportunities for collaborative renewable energy integration.

Focusing State Energy Policy on Shared Interests

- California still drives evolutionary energy sector change through state regulated energy monopolies.
- But local jurisdictions are taking climate action and adaptation seriously and seeking more radical change. Community Choice is sweeping the state because cities and counties want local renewable resource development and local control of electricity service.

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Barriers to Local Energy Collaboration and State Policies to Lower Them

- Individual net energy metered solar power systems are often unnecessarily small and economically sub-optimal.
- California community renewable projects are rendered undevelopable by excessive grid access charges.
- Centralized (vs. local) efficiency program administration is typically cost-inefficient.
- Split incentives, e.g. renewable microgrids deliver resilience, but someone must pay for it.

Collaborative target:	States can:
On-site solar/storage	Enact state legislation affirming energy user rights to produce and store energy on their property and local authority to maximize benefits to local economies.
Community renewable energy and storage	Empower counties and cities to implement community renewables on a virtual net metering basis and loosen economically punitive restrictions on sizing of solar arrays powering buildings and campuses.
Energy efficiency	Identify state subsidized energy efficiency programs that would be most effectively delivered by local communities and companies.
Energy resilient infrastructure and services	Consider providing incentives for local government investments in renewable microgrids powering critical local infrastructure and disaster recovery.

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Opportunities for to Promote/Enable Collaborative Local Energy Integration

Opportunities:

- Local zero carbon vehicle fueling infrastructure;
- University engagement in local energy integration;
- Community solar for underserved communities;
- Transportation and building data sharing and mining;
- Model-driven climate action planning, and
- Integrative utility service training.

Collaborative target:	States can:
Clean transport fuels	Support and guide collaborative local planning, permitting and regulation of local zero carbon vehicle fueling infrastructure.
University engagement	Fund increased and more effective university engagement in support of collaborative local energy integration.
Underserved communities	Help low income communities capture maximum economic and employment benefits of on-site and community renewable resource and energy resilience investments.
Data and data analytics	Set standards for secure, seamless sharing of local energy and GIS data and information in support of local energy program design and implementation.
Climate action planning	Support local energy system modeling and gas and electric utility engagement in support of local climate action and adaptation and action planning.
Local energy training	Expand utility service training to encompass safety and operations of gas and electricity infrastructure as well as other locally provided utility services.

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Conclusions Pertinent to State Policy Choices

1. Local renewable energy technical and economic integration will require policy alignment and collaboration among cities, counties, energy utilities (both gas and electric), and state government.
2. States should ask: Is effective local renewable integration possible under current rules? If not, step one would be regulatory reform to make it possible.
3. States should consider establishing a point of coordination within state government with funding and authority to facilitate collaborative local renewable integration.
4. While contracting for expert support of collaborative engagement with energy utilities, local governments should be building staff capacity to more deeply engage.
5. University based faculty/student teams can help fill local renewable energy planning and analysis and program development gaps.
6. All local governments and states have an interest in achieving the most secure, resilient and cost-effective balance between locally produced and imported renewable energy.
7. Data and data analytics are key to climate action and adaptation as well as energy service goal setting and tracking. Utilities and local governments should be expected to share data for purposes of integrated local renewable energy planning and progress tracking.

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Thank you!

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