Why Does CCA Matter at the State and Local Level?

Gerry Braun
California CCA Forum
Los Angeles, California
May 19, 2015

Integrated Resources Network

Why Does CCA Matter at the State and Local Level?

CCA is a feasible, efficient, adaptive model for local management of accelerating and unstoppable energy sector change.

Integrated Resources Network

Why Is Energy Sector Change Accelerating and Unstoppable?

New US Solar PV Capacity (GW)

	US	CA
2014E	**6.5GW**	**3.3GW**
Residential	20%	25%
Non-Res	30%	10%
Utility	50%	65%
2018E	**9GW**	**3.1GW**
Res	35%	60%
Non-Res	35%	25%
Utility	30%	15%

Modular clean energy technologies like wind, solar, EV batteries and fuel cells have manufacturing scale economies and lower project finance risk.

Integrated Resources Network

Why Flexible, Efficient, Adaptable Local Change Management?

Local Electricity Supply Opportunities

- Use of City GIS Systems for Energy Planning
- Net Zero Residential Retrofit Program Design
- Community Solar and Wind Sites
- Rooftop Solar Thermal Sites

Clean energy supply and storage technologies are best deployed locally, where there are opportunities for additional cost savings and macro-economic benefits.

Integrated Resources Network

What is the State's Interest?

Local Integrated Analysis/Planning

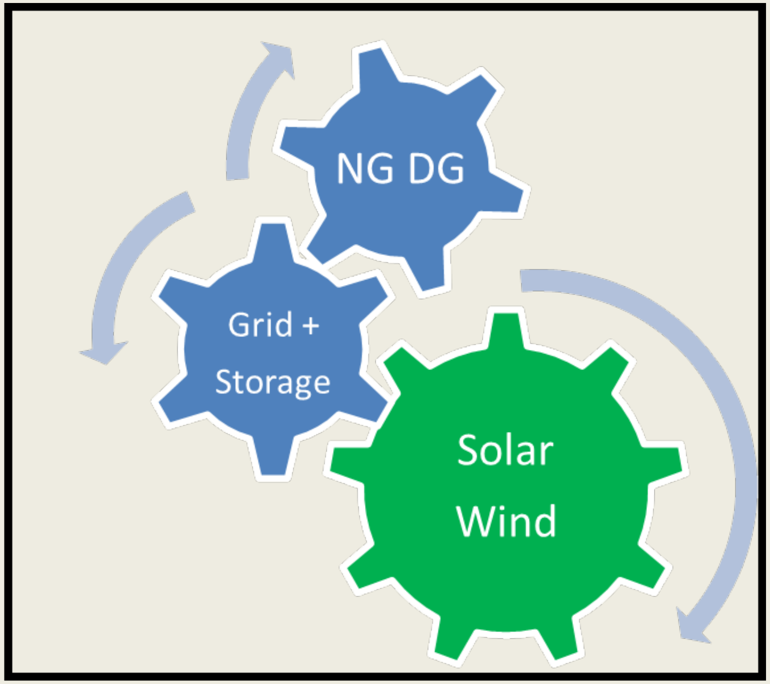
- **Trends**
- **Integrated Model**
- **Local Power Scenarios**
- **Supply/Demand Balancing**
- **Scenario Comparisons**

Subsidiarity is an organizing principle that matters ought to be handled by the smallest, lowest or least centralized competent authority.

Integrated Resources Network

What is a City's or County's Interest?

Transformational Local Electric System

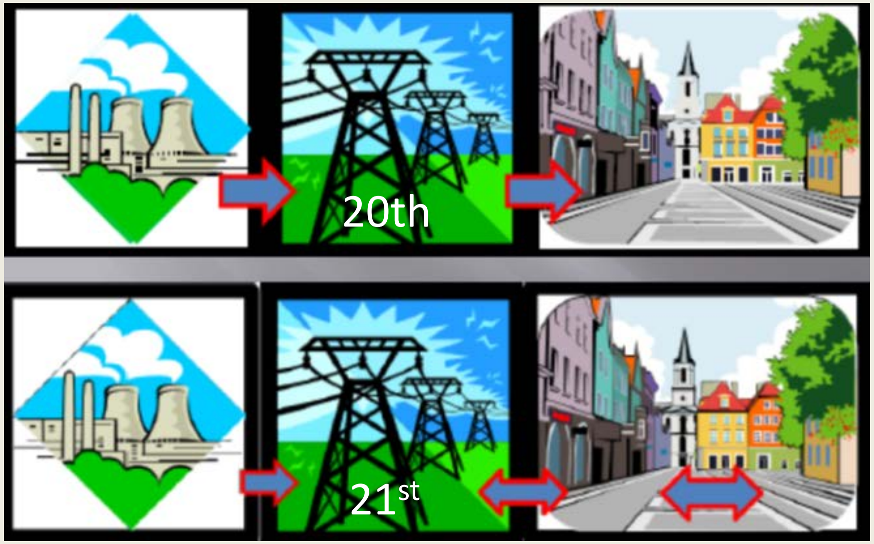


Establishing an effectively governed and competent authority to handle energy matters and reduce costs and GHG emissions.

Integrated Resources Network

Multi-directional power flows & multi-level planning and integration

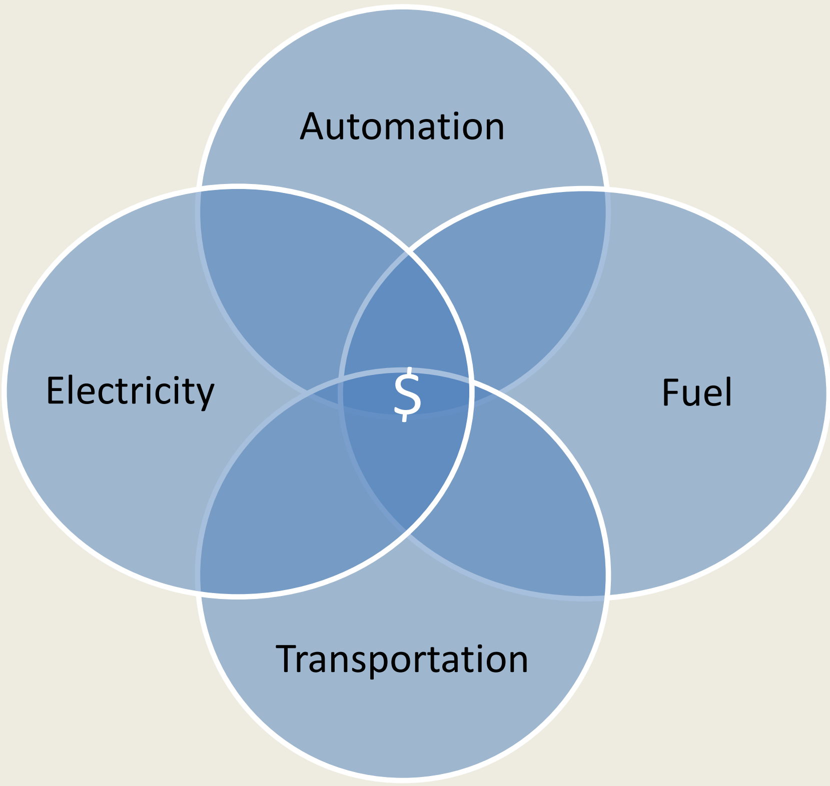
Competent in what essential disciplines?



Competent to evaluate local needs and opportunities and adapt the basic CCA model to deliver "integrated-decentralized" energy service. The same principles apply to local electric system integration as to regional.

Integrated Resources Network

Why Locally Planned and Integrated?



Each California community has unique goals/priorities, energy usage and prosumer trends, plus local siting/resource opportunities.

Integrated Resources Network

Integrated Energy Analysis

Baseline & Trends

Davis Energy Profile - 2012

Table 2. Usage

Davis Energy Usage - 2012		
	GWh	GWh
Building Electricity		282
Residential	144	
Non-residential	138	
Building Natural Gas		120
Residential	88	
Non-residential	31	
Transportation Fuels	84	84
Total	486	486

Table 3. Costs and Carbon

Davis Costs and Emissions - 2012		
	Annual Energy Bill	Carbon Footprint
	$ millions	Metric Tons
Electricity	43.5	66966
Natural Gas	16.4	63436
Transportation		
Light vehicles	23.1	59251
Heavy trucks		41765
Total	83.1	231419

Note: End use rather than source energy metrics were used consistently throughout the model and analysis.

Integrated Resources Network

Local Renewable Power

Davis Solar Electricity Deployment Status		
	2012	2015
Sites	1039	1800
Cumulative Capacity (MW)	7.4	19.6
Annual Production (GWh)		
Building Scale (< 1 MW)		
Residential PV (1)	10.5	20.0
Non-res PV	3.2	16.0
Other (>1MW)	0.0	0.0
Total Annual Production (GWh)	13.7	35.9

Yolo County Renewable Power Status		
	2012	2015
	Annual GWh	
Existing Biomass/WTE	199	195.5
Existing Wind Power	0	3.733
UC Davis Solar	12.25	43.75
City of Davis Solar	13.7	35.9
Other Yolo Solar*	0	0
Total	225	278.9

* not estimated

Integrated Resources Network

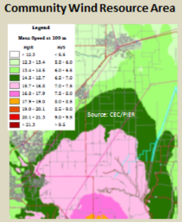
Community Solar and Wind

City Controlled Community Solar Sites

Property	Acres	MW
Davis Municipal Golf Course	149	20
Old City Landfill/PVUSA Site	186	25
Wastewater Treatment Plant	224	30
Howatt/Clayton Ranch	773	103
Wastewater Treatment Plant	2	0
Playfields Park	1	0
Mace Park and Ride	1	0
Pubic Works Corp Yard	4	1
Parks Corp Yard	2	0
Totals		179

Source: City of Davis/UCD

Community Wind Resource Area



Integrated Resources Network

Reference Case

Reference Case Building Usage

Trends 2005 to 2012

- Residential:
  - electricity usage (51%)* changed by -6.2% since 2005
  - natural gas usage (74%)* has changed by -1.8% since 2005
- Non-residential:
  - electricity usage (49%)* has changed by 12.4% since 2005
  - natural gas usage (26%)* has changed by 5.3% since 2005

Reference Case

Davis Building Energy Use - IOU Scenario					
	2015	2020	2025	2030	2035
	Annual GWh				
Building Electricity	283.4	288.3	295.5	306.0	321.1
Residential	137.9	129.6	122.4	117.1	115.1
Non-residential	145.5	158.7	173.1	188.9	206.1
Building Natural Gas	119.6	118.1	116.9	114.2	108.5
Residential	87.8	86.7	85.5	84.4	83.4
Non-residential	31.8	33.0	34.3	35.6	37.0
Building Solar Heat	0.0	0.8	1.5	3.1	6.1
Total	402.9	407.1	413.9	423.2	435.8

* Trend information (source energy basis) was provided by the PG&E Green Communities Program

Integrated Resources Network

Reference Case Transportation Usage

Davis Transportation Energy Use - IOU Scenario					
	2015	2020	2025	2030	2035
	Annual GWh				
Car					
ICEV gasoline	29.8	28.7	26.6	22.9	17.1
EV - elect.	0.6	1.1	2.3	3.7	6.0
FCEV - NG H2	0.0	0.2	0.5	0.9	1.9
FCEV - Solar H2	0.0	0.1	0.4	1.6	3.2
Van/Lt. Truck liq.	39.1	39.1	37.1	33.3	27.9
Van/Lt. Truck elec.	0.0	0.0	0.9	1.8	2.9
Heavy Trk/Bus liq.	30.6	24.5	18.4	12.3	6.1
Heavy Trk/Bus NG	0.0	6.1	12.3	18.4	24.5
Other	0.4	0.4	0.4	0.4	0.4
Totals	100.5	100.3	98.8	95.3	89.9

Integrated Resources Network

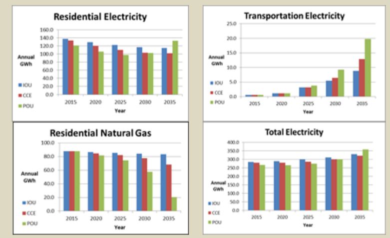
Reference Case Renewable Power

City of Davis Renewable Power Deployment - IOU Scenario					
	2015	2020	2025	2030	2035
Solar Target (Annual GWh)	N/A	N/A	N/A	N/A	N/A
Wind Target (Annual GWh)	N/A	N/A	N/A	N/A	N/A
On Site Solar (GWh)	35.9	44.9	52.4	57.1	60.3
Community Solar (GWh)	0.0	0.0	0.0	0.0	0.0
Community Wind (GWh)	0.0	0.0	0.0	0.0	0.0
Total (Annual GWh)	35.9	44.9	52.4	57.1	60.3
Solar Capacity (MW)	19.6	24.9	29.1	31.7	33.5
Wind Capacity (MW)	0.0	0.0	0.0	0.0	0.0

Integrated Resources Network

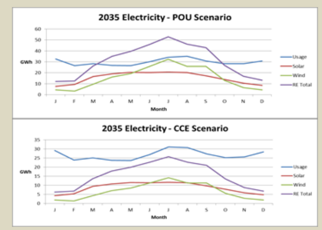
Local Power Cases

Local Power Cases - Usage



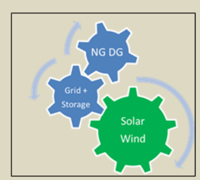
Integrated Resources Network

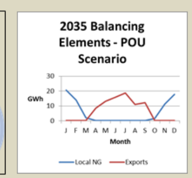
Local Power Cases – Renewable Power



Integrated Resources Network

Seasonal Supply/Demand Balancing

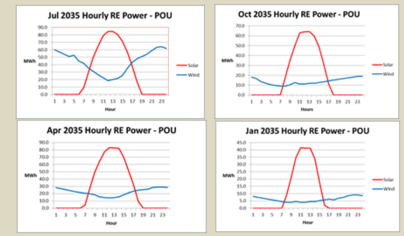




Integrated Resources Network

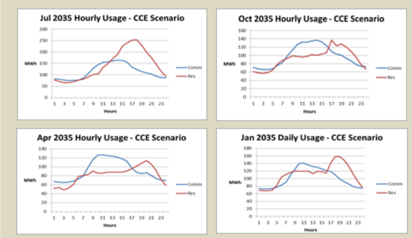
Supply/Demand Balance

Daily Solar and Wind Profiles



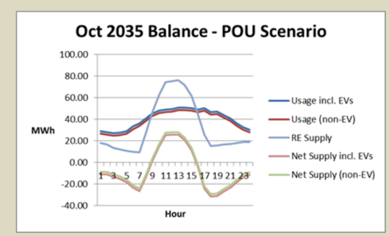
Integrated Resources Network

Daily Building Usage Profiles



Integrated Resources Network

EV Demand Response Potential

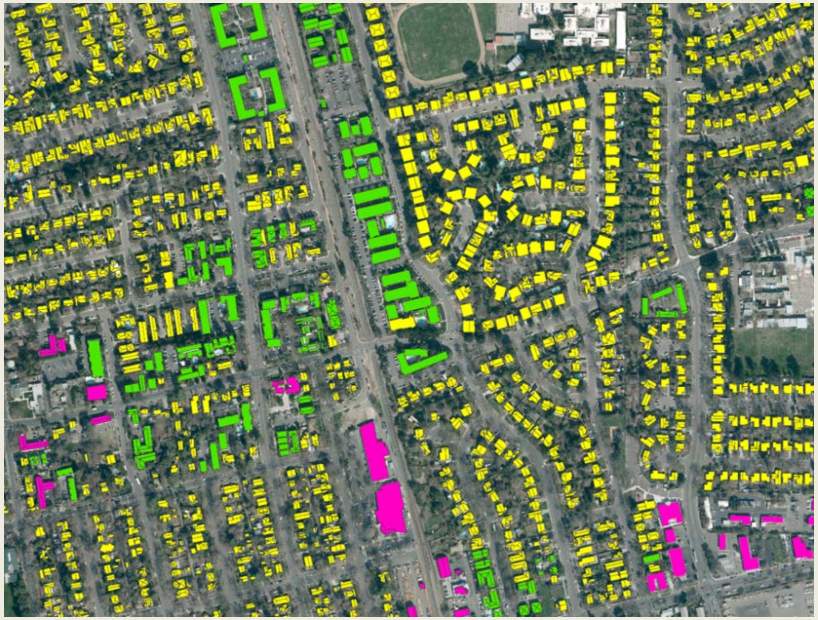


Integrated Resources Network

Integrated Resources Network

CCAs Can Develop Capacity for Local Planning and Technical Integration.

Estimating Rooftop PV Technical Potential



So can non-CCA jurisdictions. Building local integrated analysis and planning capacity should matter to the state as well. An increasing share of state managed funds should be allocated to this public purpose.

Integrated Resources Network

CCAs Can Develop Capacity for Local Planning and Technical Integration.

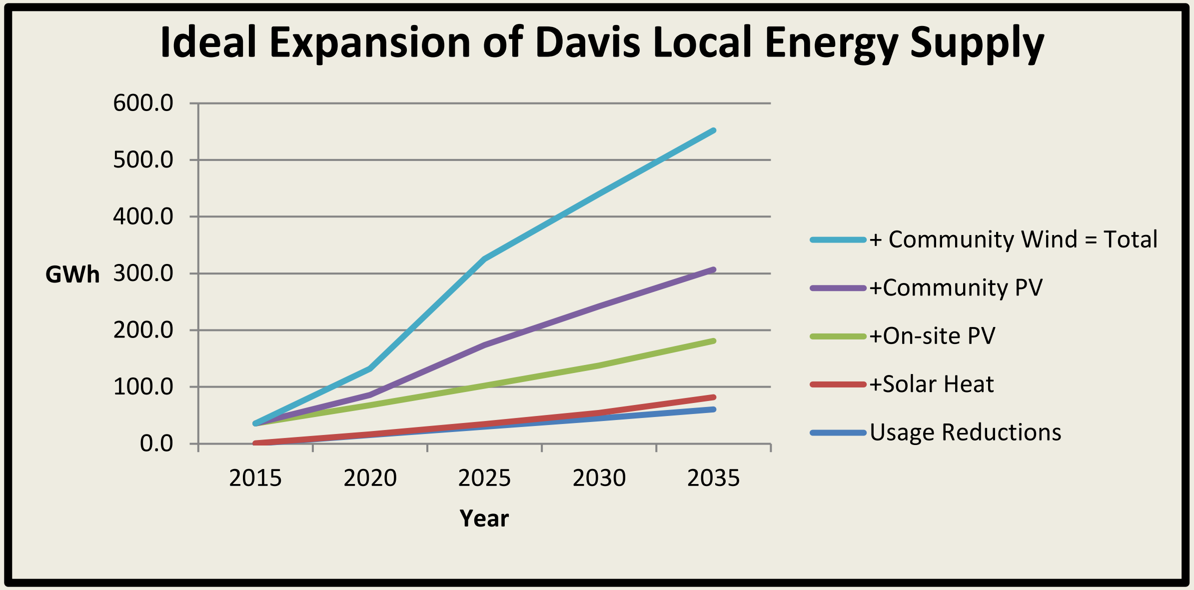
Estimating Rooftop PV Pragmatic Potential

So can non-CCA jurisdictions. Building local integrated analysis and planning capacity should matter to the state as well. An increasing share of state managed funds should be allocated to this public purpose.

Integrated Resources Network

State/Local CCA Collaboration

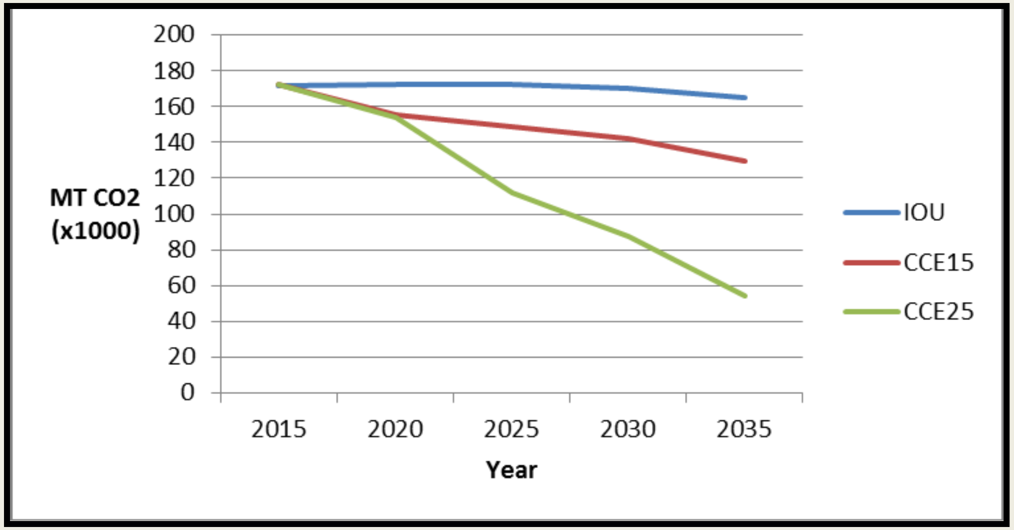
Recommended Action: Allocate an increasing share of public purpose program funding to cost shared development of full-time local energy supply planning and management capacity and locally specific integrated energy analysis.



Integrated Resources Network

Concluding Thoughts

Carbon Footprint Impacts of Local Clean Energy



CCA programs are constrained by a 20th century electricity service business and regulatory model that may evolve. The extent and direction of their evolution will determine long term outcomes.

Integrated Resources Network

Thank you!

gbraun@iresn.org
www.iresn.org
916-402-4143

References:

1. http://www.municipalsustainability.com/webinars.htm
    a. January 13, 2015 – Davis, California Integrated Energy Analysis
    b. March 10, 2015 - Near Zero Neighborhood Retrofit Plan for Davis, California
    c. May 19, 2015 – Solar Thermal Deployment Plan for Davis, California
2. http://californiaseec.org/documents/best-practices/best-practices-for-energy-managers

Integrated Resources Network