NARUC

Winter Committee Meetings

Committee On Energy Resources & the Environment

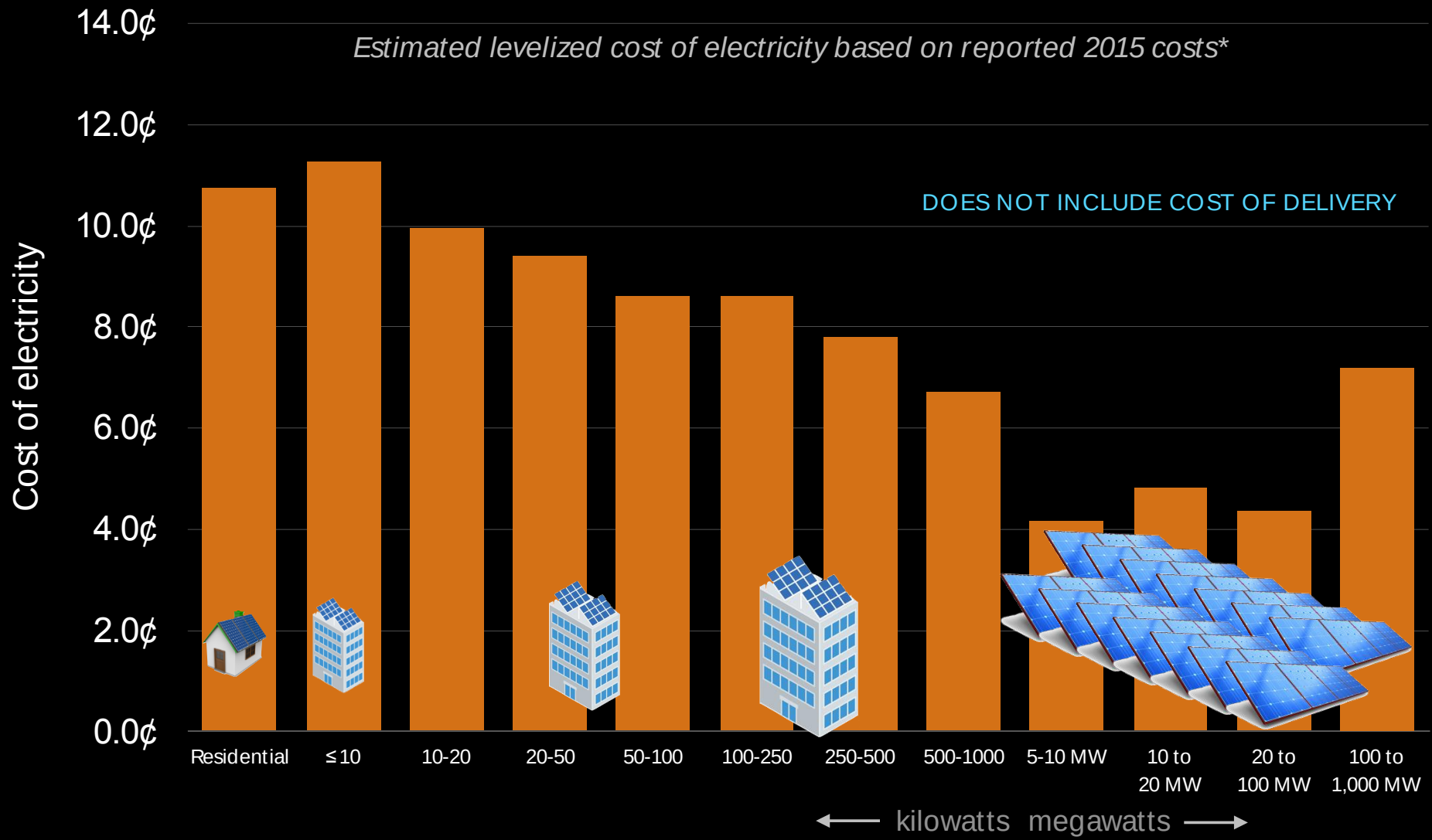
IS BIGGER BETTER?

Surprising findings on the economies of scale of solar energy

John Farrell, Director of Energy Democracy,
Institute for Local Self-Reliance

ILSRs
ENERGY DEMOCRACY INITIATIVE

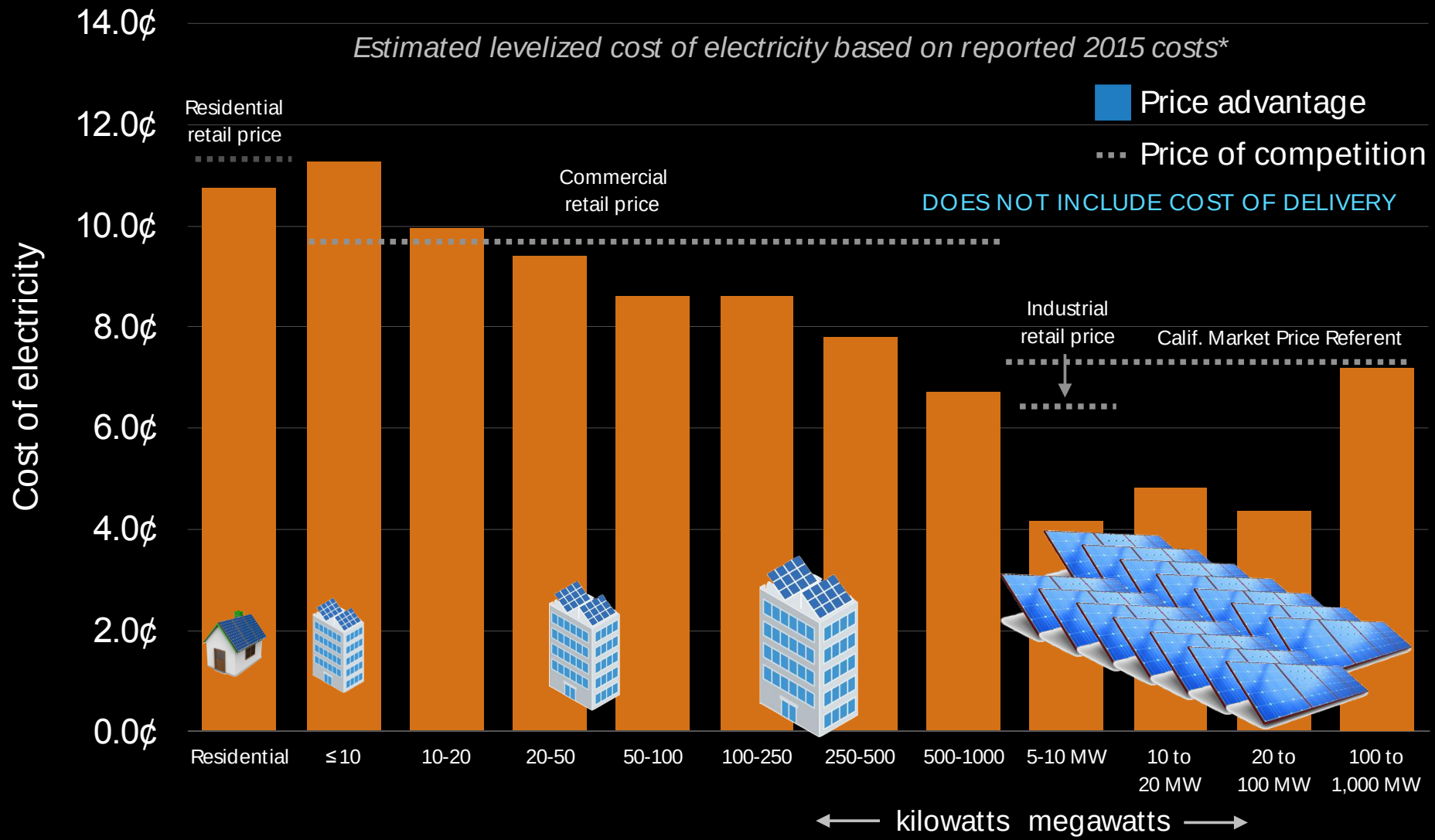
SOLAR ECONOMIES OF SCALE



Sources: Tracking the Sun IX and Utility-Scale Solar 2015 (SunShot, Berkeley Labs); SAM (NREL); ILSR

ILSR's ENERGY DEMOCRACY INITIATIVE

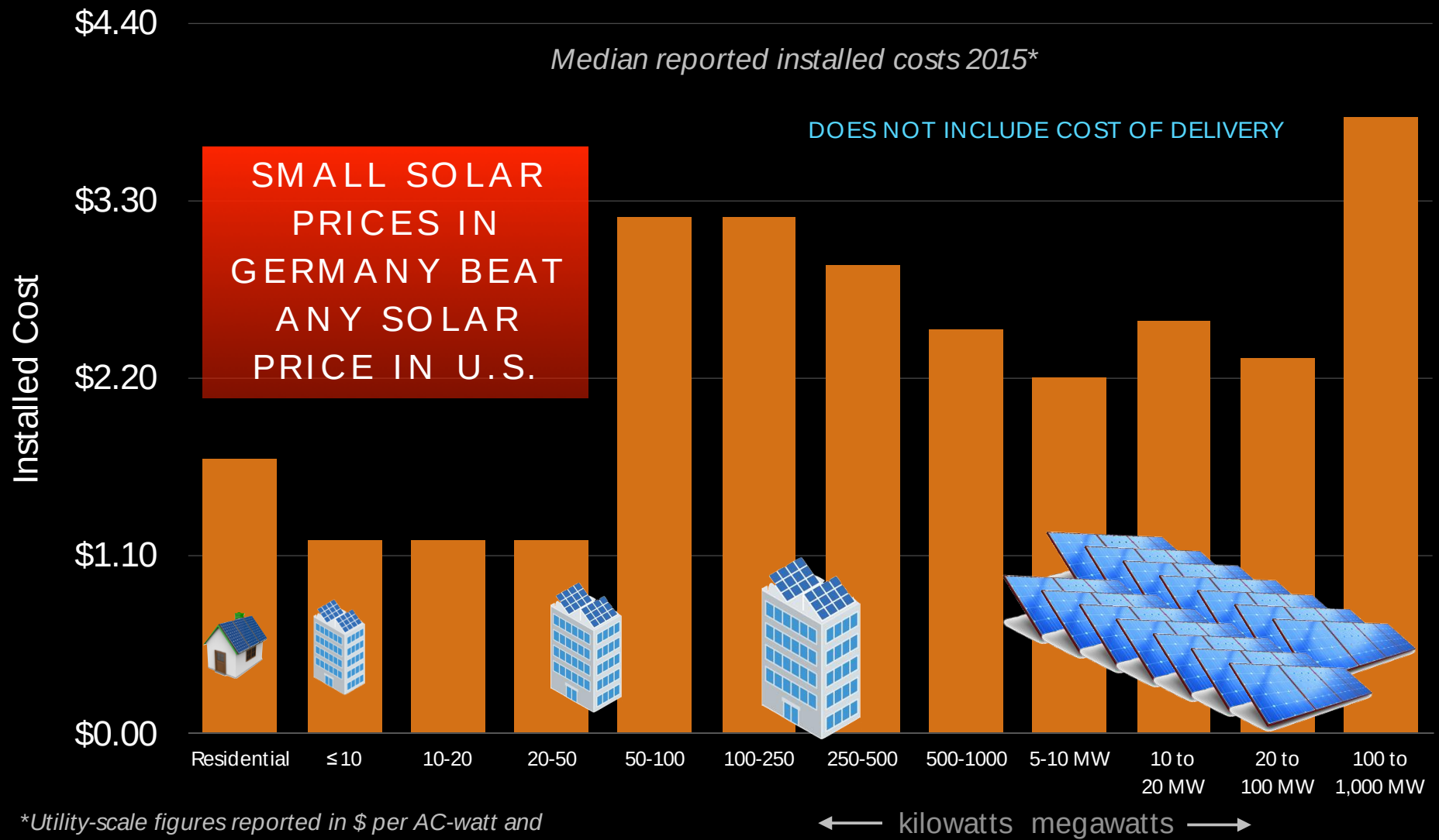
SOLAR COMPETES AT MOST SIZES



Sources: Tracking the Sun IX and Utility-Scale Solar 2015 (SunShot, Berkeley Labs); EIA (2014 data); CPUC (2011); NYMEX (2016); ILSR

ILSR's ENERGY DEMOCRACY INITIATIVE

SOLAR ECONOMIES OF SCALE



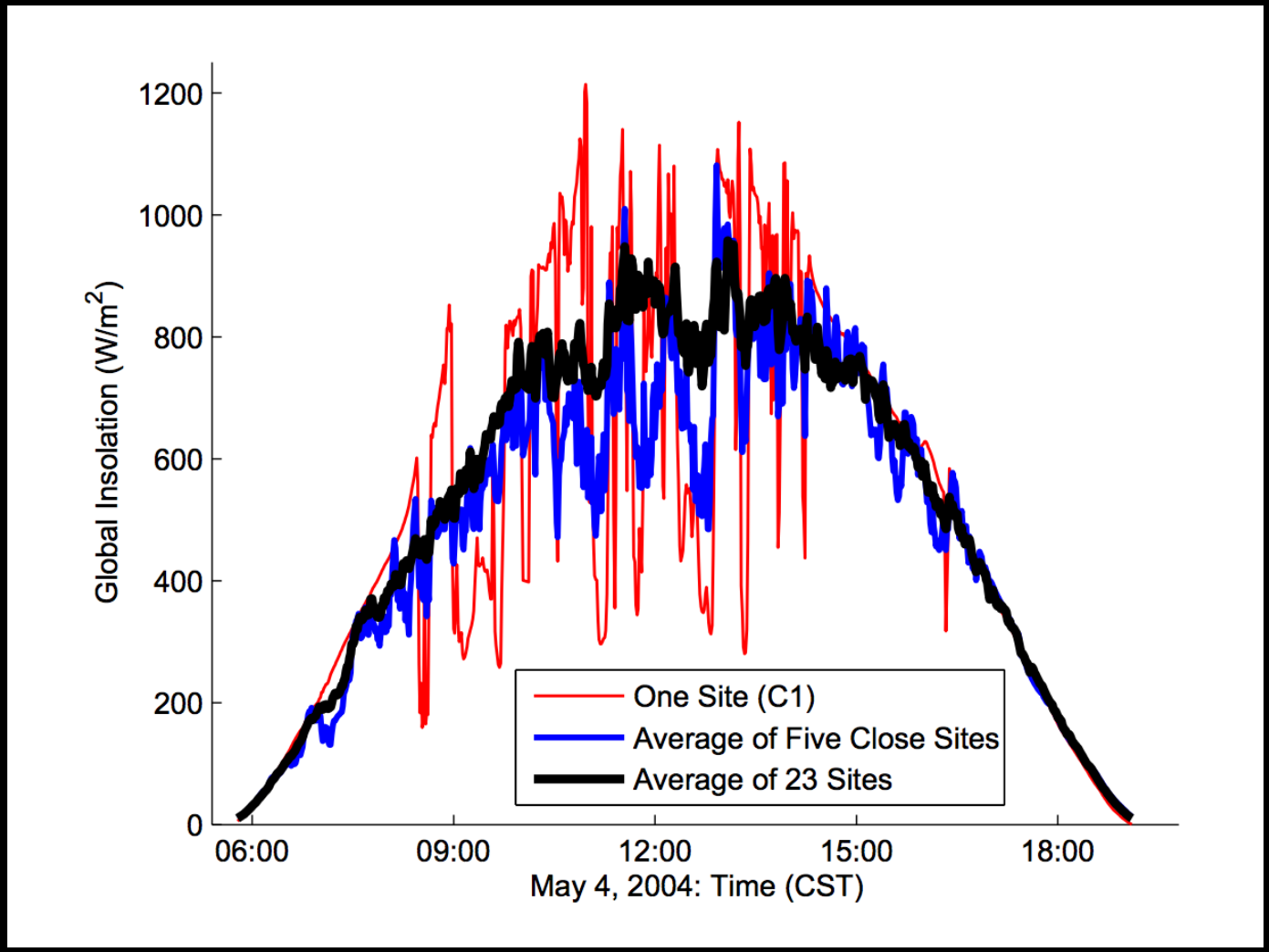
*Utility-scale figures reported in $ per AC-watt and are adjusted down 10%

Sources: Tracking the Sun IX and Utility-Scale Solar 2015 (SunShot, Berkeley Labs)

ENERGY DEMOCRACY INITIATIVE

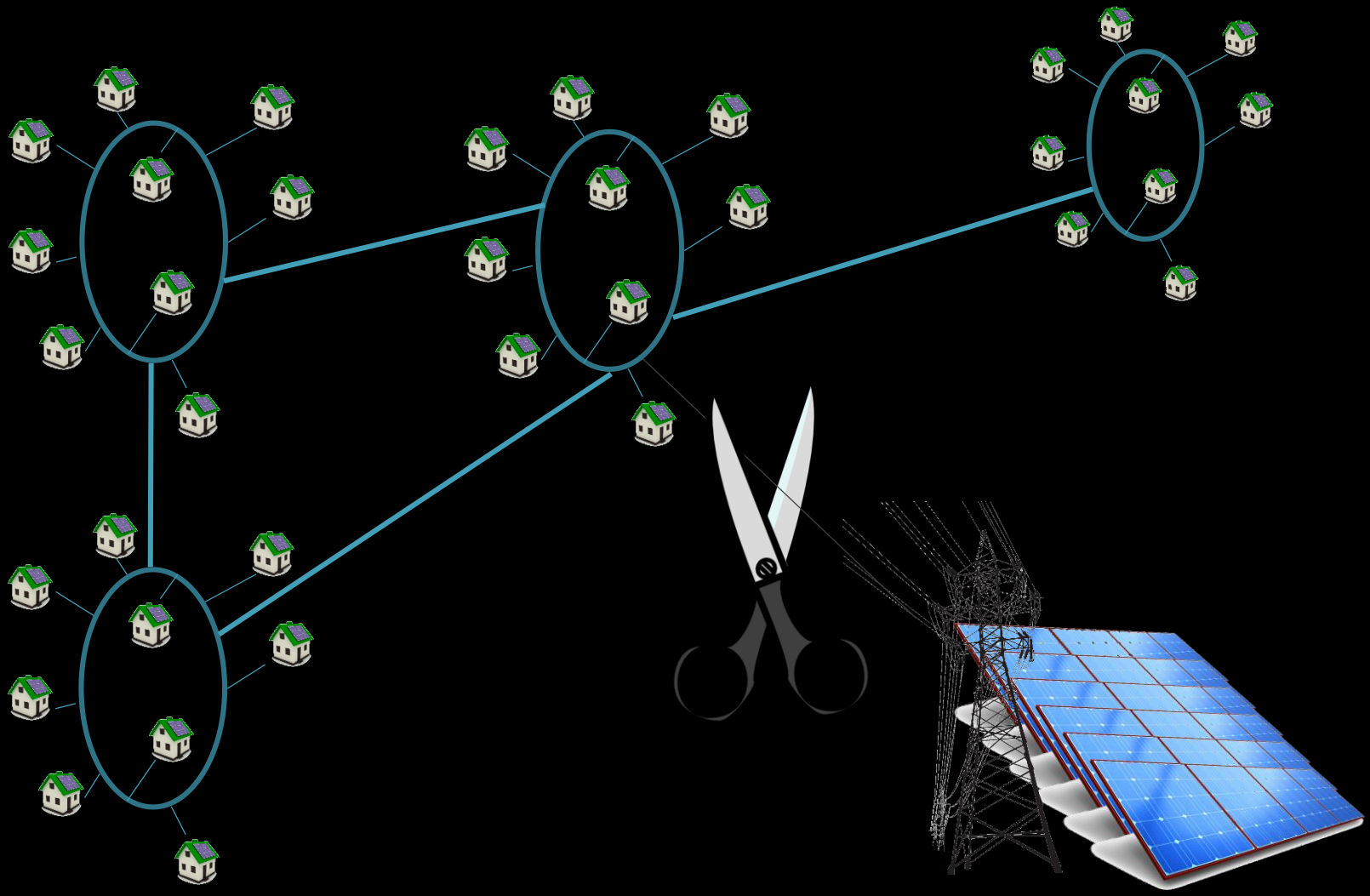
Rooftop shading lowers peak electric load

Anthony Dominguez, et al. (UCSD) - http://bit.ly/2kzx69N

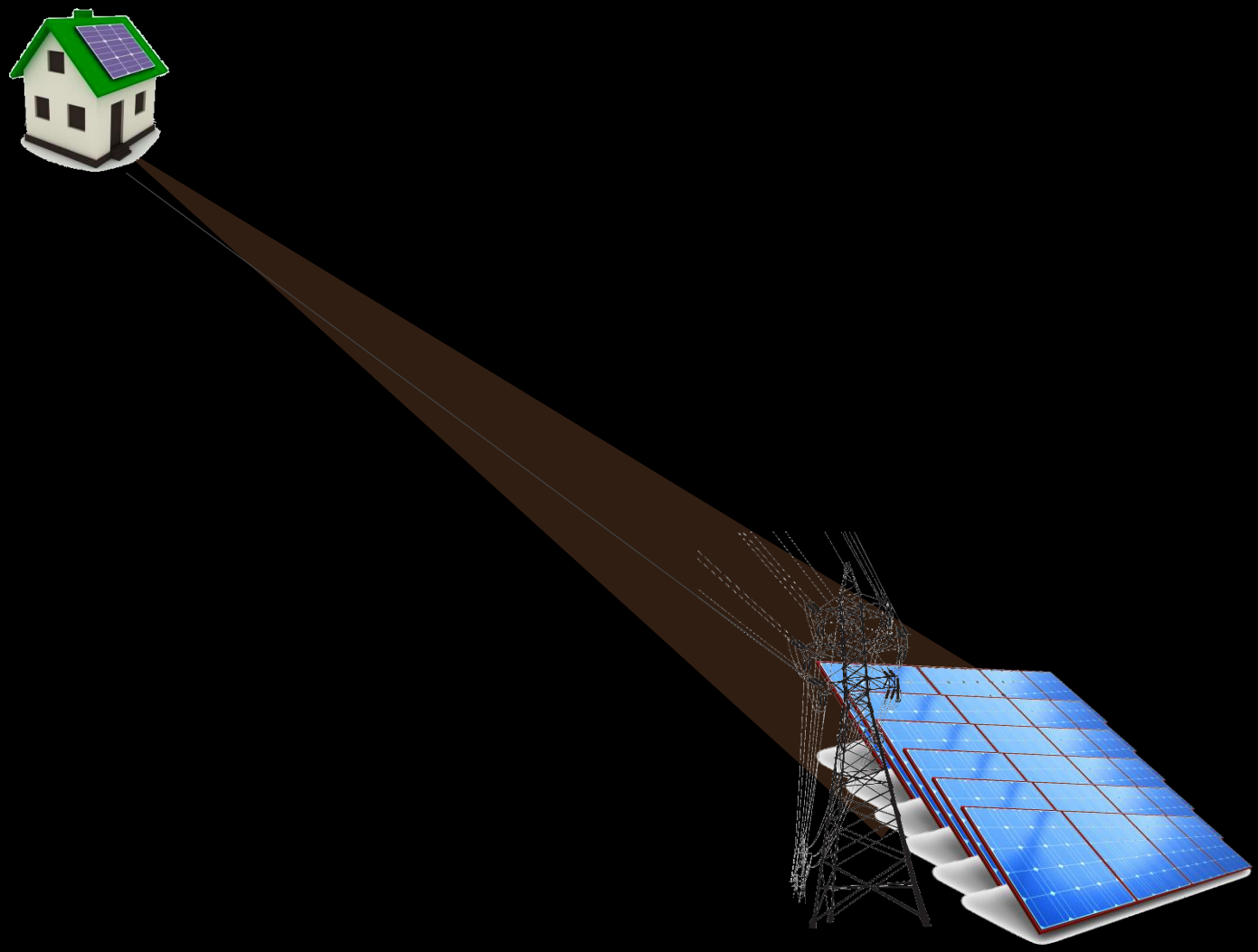


Dispersion reduces variability

Andrew Mills and Ryan Wiser (NREL, 2010) - http://bit.ly/2krJuds



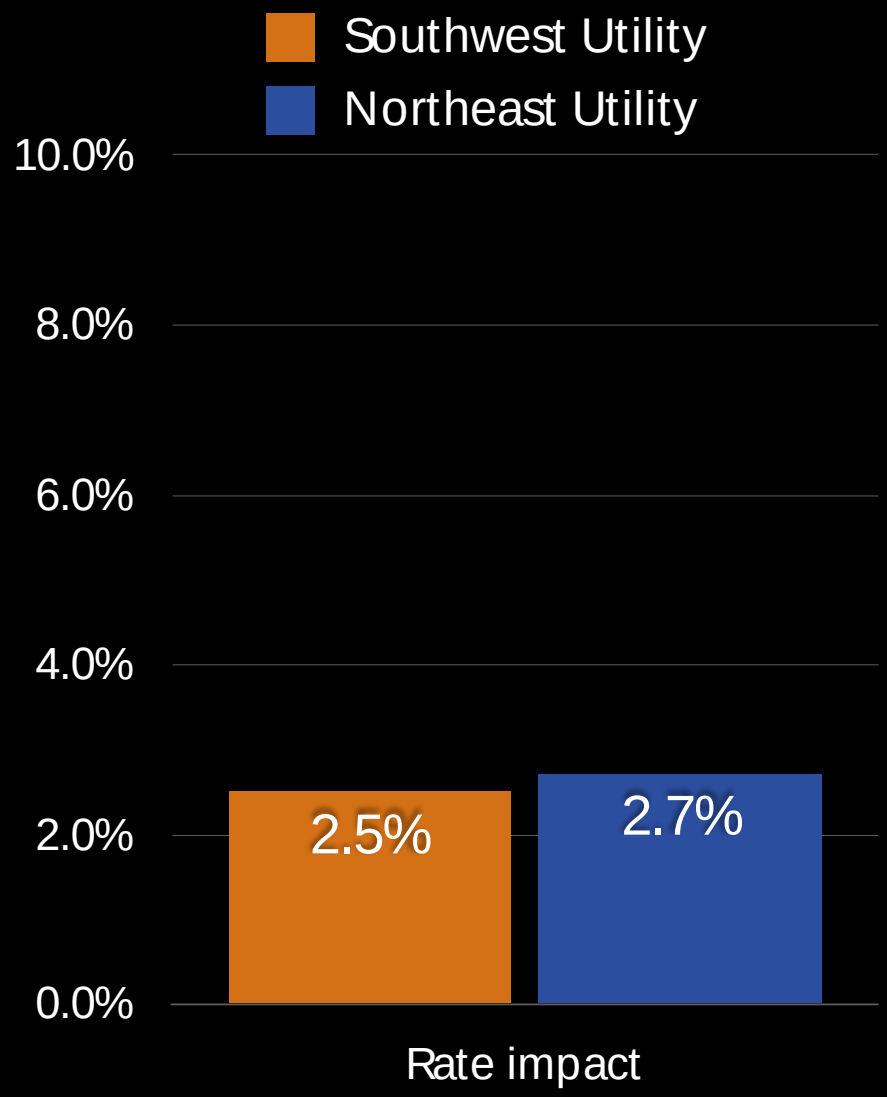
Opportunity: System resiliency



Reduced line losses

BOTTOM LINE

of 10% customer-owned solar



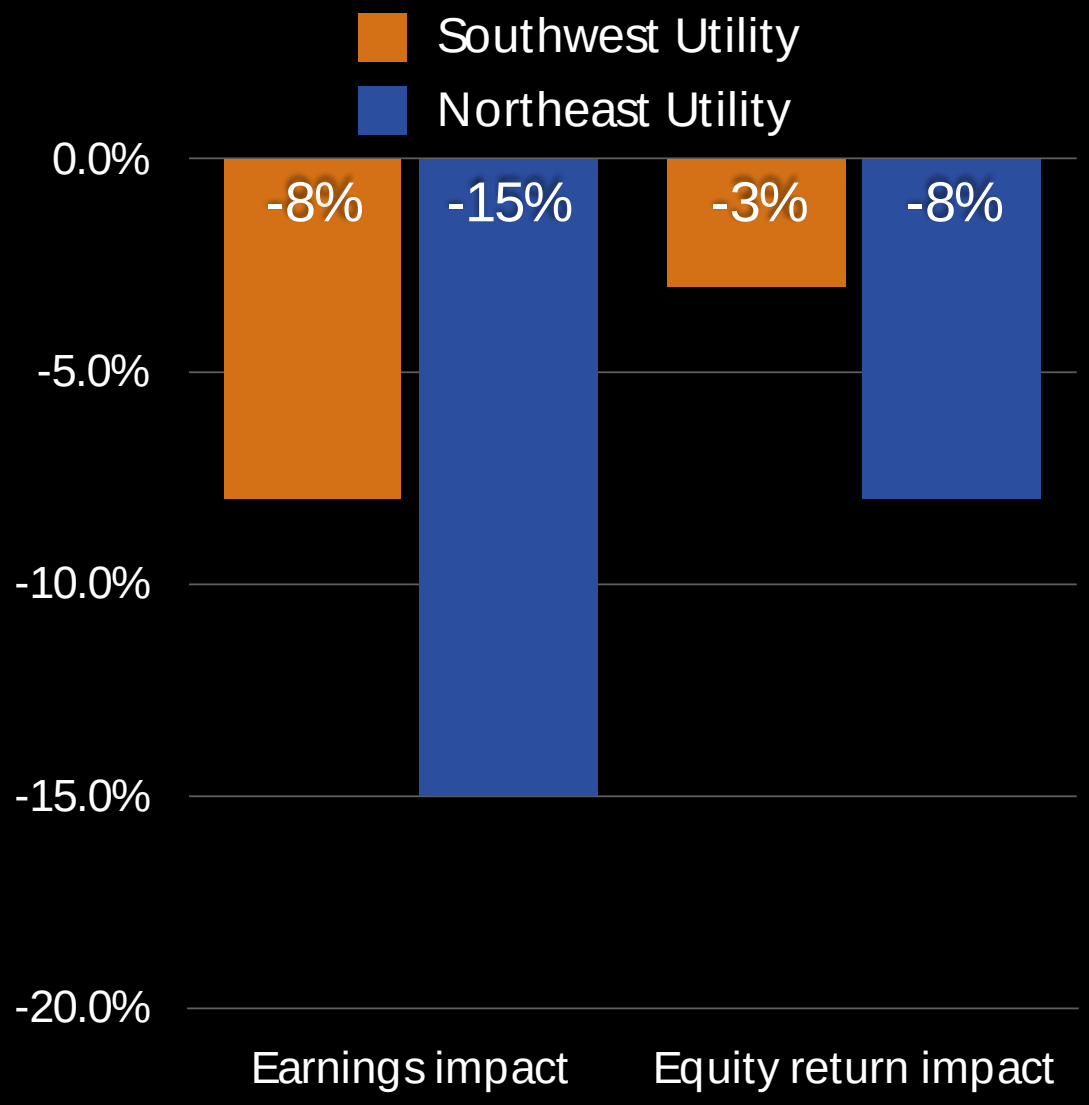
Minimal impact to customer bills

Source: Berkeley Labs, 2014

BOTTOM LINE

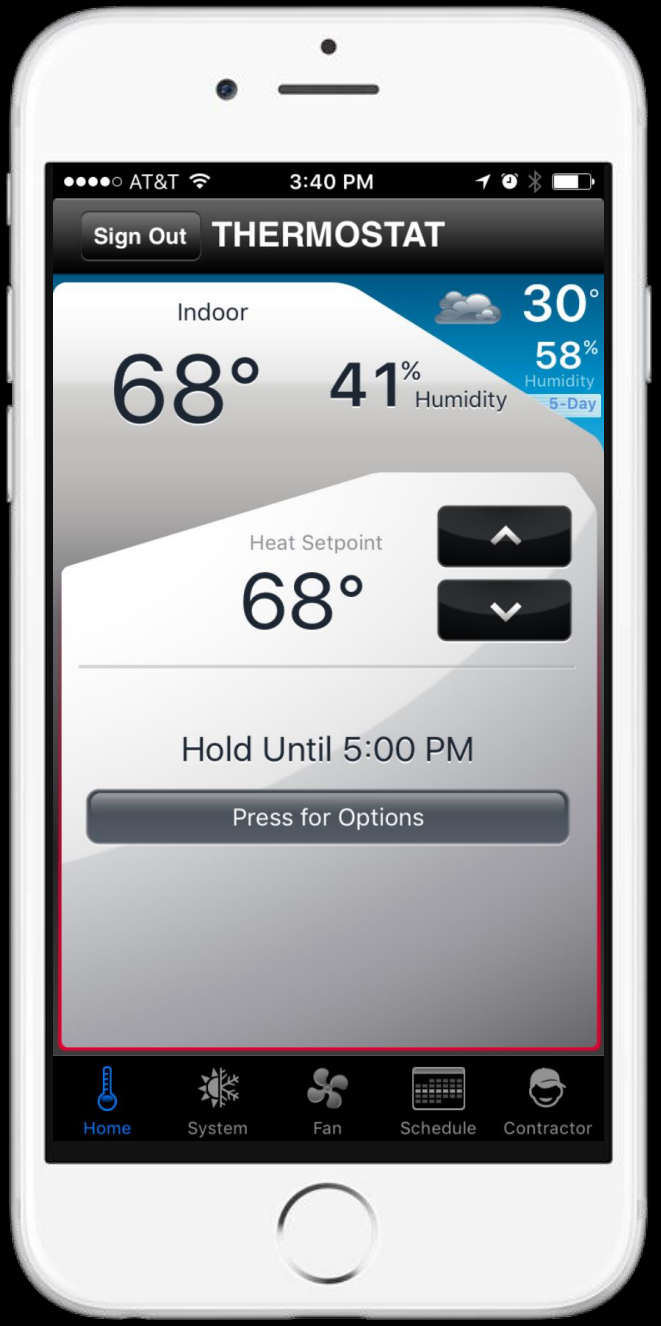
of 10% customer-owned solar

Significant impact for utility earnings



Source: Berkeley Labs, 2014


238
MILES
EPA-ESTIMATED
RANGE


AT&T
3:40 PM
Sign Out
THERMOSTAT
Indoor
68°
41% Humidity
30°
58% Humidity
5-Day
Heat Setpoint
68°
Hold Until 5:00 PM
Press for Options
Home
System
Fan
Schedule
Contractor

“ There is one great advantage that must follow regulation, and that advantage is protection"

NARUC

Winter Committee Meetings

Committee On Energy Resources & the Environment

The True Costs of Rooftop Solar

Brian H. Potts

Perkins Coie LLP

PERKINSCOIE
COUNSEL TO GREAT COMPANIES

Solar Is A Touchy Subject

- Everyone seems to have a strong opinion.
- My thoughts:
  - *The Hole In The Rooftop Solar Panel Craze*, Wall Street Journal (5/17/15)
  - *Might As Well Go Green Yourself*, The Weekly Standard (4/16/15)
- But Many Disagree, And That's Ok:
  - *The Hole In Brian Potts' WSJ Critique of the Solar Panel Craze*, Huffington Post (5/27/15)
  - *We Need To Support All Types Of Solar: Utility-Scale, Rooftop, Community and More*, EDF/Forbes (5/20/15)

Society's Love Affair With Distributed Generation Isn't New

- **Most power now is generated centrally at large plants**
- **But it wasn't always that way!**
- **Back when power generation was a new thing, we used distributed generation**
- **But over time, we learned that economies of scale make more sense**
- **We still have lots of older, smaller power plants in inefficient places**
- **Are we making the same "mistake" again?**

UTILITY- SCALE SOLAR

- LCOE - $.05/.06 kWh in some areas (nationwide average $.13/kWh)

ROOFTOP SOLAR

- Overall LCOE can be 2 to 3.5 times higher
- But fully financed systems in many large cities range from $.03/kWh to $.14/kWh

FOSSIL FUELS

- Natural gas/coal LCOE approx. $.05–.08/kWh

Five Hidden Rooftop Solar Subsidies

Federal Tax Credits

State and Local Tax Incentives

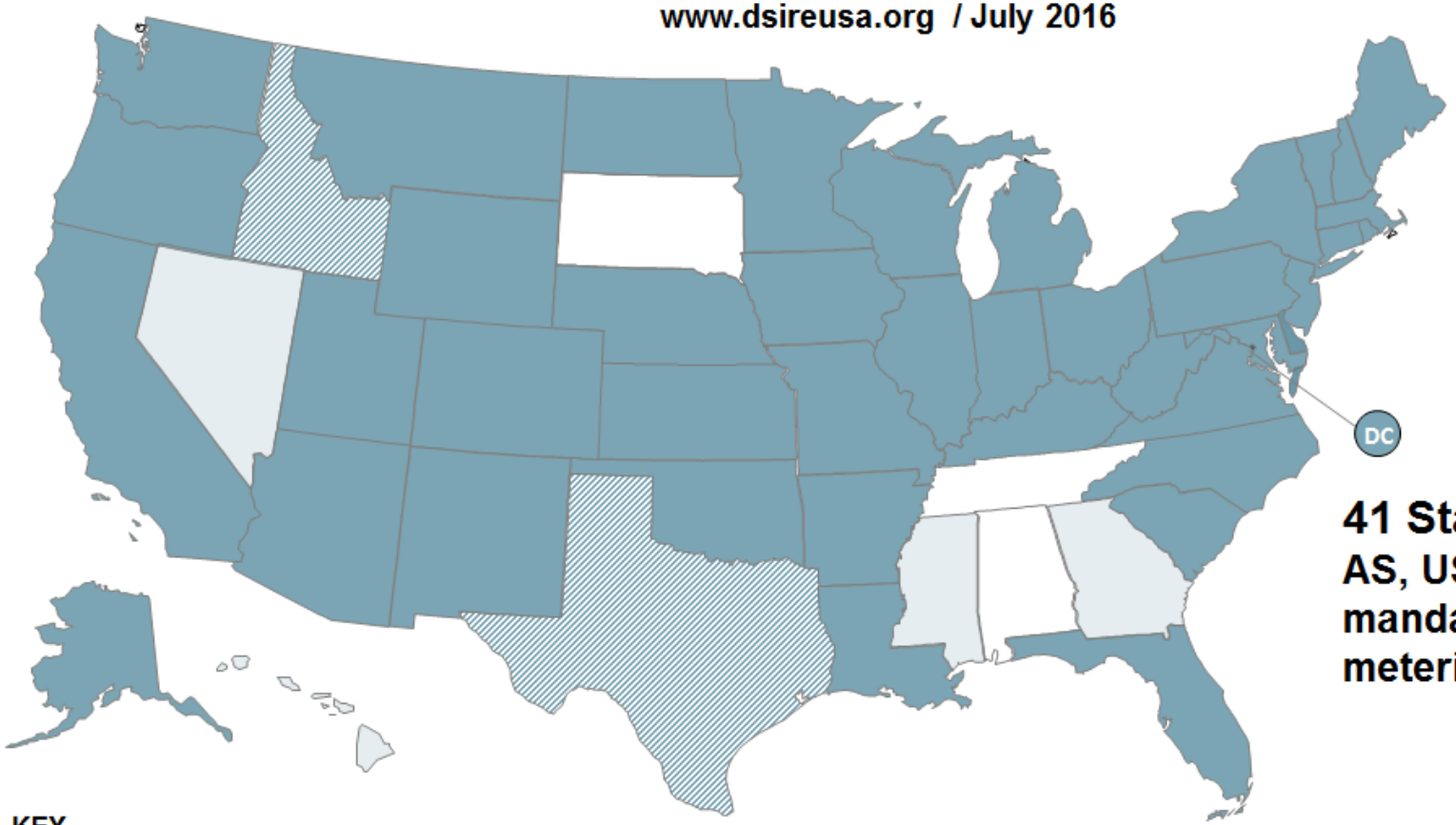
Net Metering

Renewable Mandates

Climate Regulation

Net Metering

www.dsireusa.org / July 2016



41 States + DC, AS, USVI, & PR have mandatory net metering rules

KEY

- State-developed mandatory rules for certain utilities (41 states + DC+ 3 territories)
- No statewide mandatory rules, but some utilities allow net metering (2 states)
- Statewide distributed generation compensation rules other than net metering (4 states + 1 territory)

U.S. Territories:

AS	PR
VI	GU

The Utility Argument In Five Lines

1. Utilities make long-term capital investments
2. The fixed costs are passed on to ratepayers primarily through a variable-use charge
3. These charges vary based on usage
4. Ratepayers going “off the grid” or purchasing less electricity as a result of DG avoid paying variable charges but they still use the grid
5. Cost burden shifts to other ratepayers

Rooftop Solar Advocate Arguments

- Rooftop solar subsidies < fossil-fuel subsidies
- Peak shaving
- Climate costs
- Savings in transmission/distribution costs
- Utilities fear customers going "off grid"

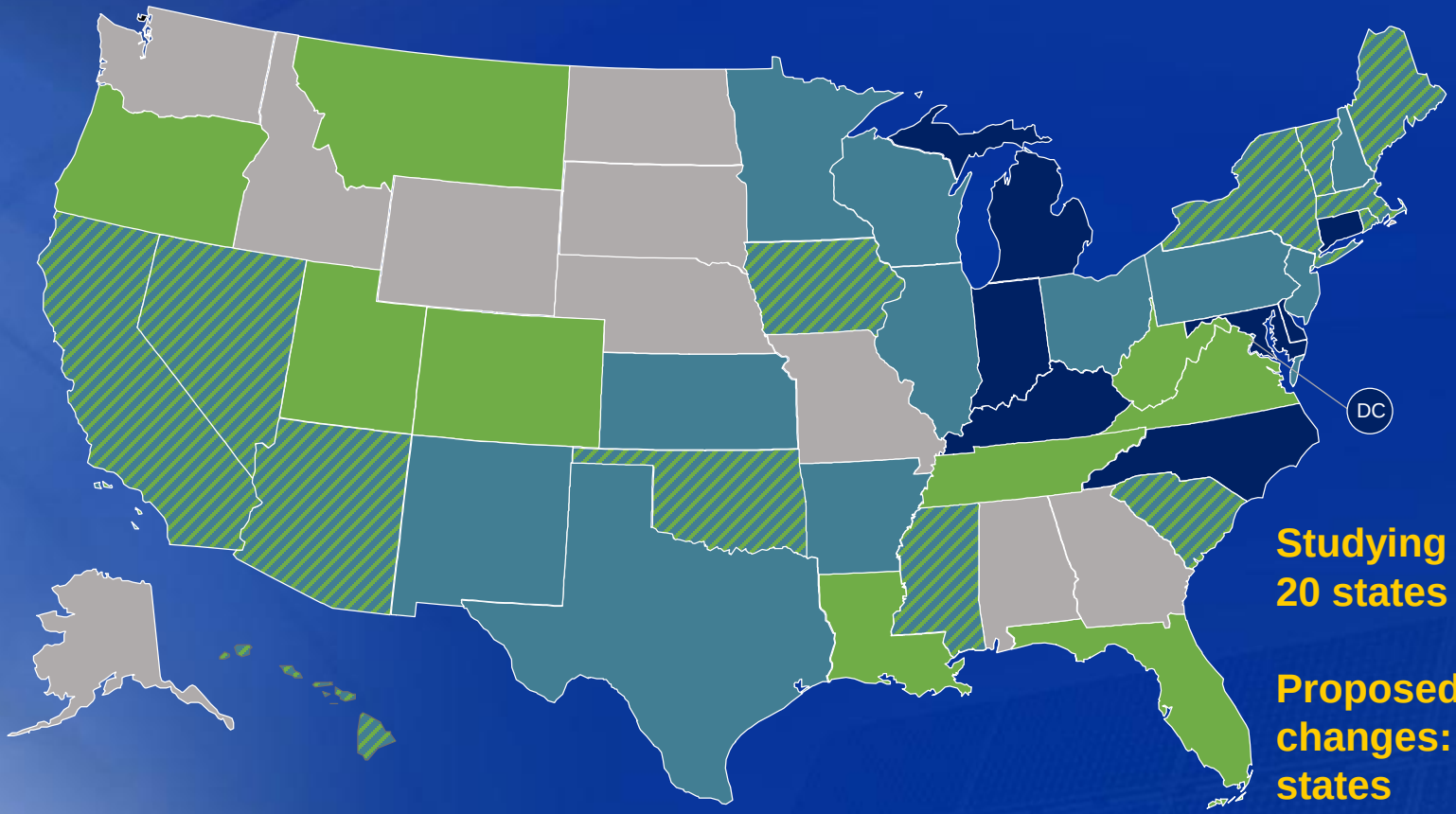
Recent State Policy Changes

Table 1. Summary of Policy Actions (Q3 2016)

Policy Type	# of Actions	% by Type	# of States
Residential fixed charge increase	44	38%	25 + DC
Net metering	31	26%	22
Solar valuation or net metering study	17	15%	15 + DC
Community solar	10	9%	9
Residential solar charge	9	8%	7
Third-party ownership of solar	3	3%	3
Utility-led rooftop PV programs	3	3%	3
Total	**117**	**100%**	**42 States + DC**

Note: The "# of States/ Districts" total is not the sum of the rows, as some states have multiple actions.

Net Metering Studies and Proposed Policy Changes



Studying NEM: 20 states

Proposed policy changes: 24 states

Sources: Inskeep et al. (February 2015); NC Clean Energy Technology Center and Meister Consultants Group (April 2015; August 2015)

- Policy change proposed/ enacted
- Studying net metering or the value of solar
- Both
- No recent action

NARUC

Winter Committee Meetings

Committee On Energy Resources & the Environment