DOCKETED	
Docket Number:	19-SB-100
Project Title:	SB 100 Joint Agency Report: Charting a path to a 100% Clean Energy Future
TN #:	240187
Document Title:	Presentation - November 1, 2021 SB 100 Implementation Planning for SB 100 Analysis of NEBs, Social Costs, and Reliability
Description:	Presentation - November 1, 2021 SB 100 Implementation Planning for SB 100 Analysis of Non-energy Benefits, Social Costs, and Reliability
Filer:	Jann Mitchell
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	11/1/2021 12:27:15 PM
Docketed Date:	11/1/2021

Joint Agency Workshop

Senate Bill 100 Implementation: Planning for SB 100 Analysis of Non-energy Benefits, Social Costs, and Reliability

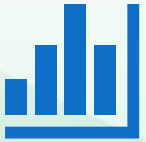
November 1, 2021

Introduction

- Remote meeting consistent with EO N-08-21
- Single session: 1:00 – 4:30
- Ask questions (and up vote) through Q&A feature
- Public comments by November 12, 2021
- Information may be used in 2021 Integrated Energy Policy Report

Agenda

- Opening Comments (1:05-1:15)
- California Perspective (1:15-1:25)
- National Perspective (1:25 – 2:15)
- Considering Non-energy Benefits and Social Costs (2:15 – 3:45)
- Public Comments (3:30 – 3:45)
- Approach to SB 100 Reliability (3:45 – 4:15)
- Public Comments and Closing Remarks (4:15 – 4:30)



Opening Comments

- Siva Gunda, Commissioner, CEC
- Karen Douglas, Commissioner, CEC
- Cliff Rechtschaffen, Commissioner, CPUC
- Darcie Houck, Commissioner, CPUC
- Genevieve Shiroma, CPUC

California Perspective on Integrating Non-Energy Benefits

Aleecia Gutierrez, Director of Energy Assessments Division

Senate Bill 100

Officially titled “The 100 Percent Clean Energy Act of 2018,” Senate Bill 100 (SB 100, De León):

1. Sets a 2045 goal of powering all retail electricity sold in California and state agency electricity needs with renewable and zero-carbon resources.

2. Updates the state’s Renewables Portfolio Standard to ensure that by 2030 at least 60 percent of California’s electricity is renewable.

3. Requires the CEC, CPUC, and CARB to use programs under existing laws to achieve 100 percent clean electricity and issue a joint policy report on SB 100 by 2021 and every four years thereafter.

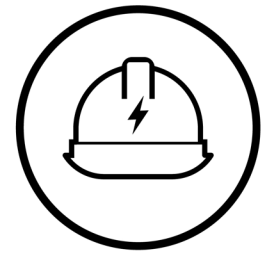
Benefits
of 100% Clean Energy

Improves Public Health

The phaseout of fossil fuel-generated electricity is expected to reduce criteria air pollution and related deaths and illnesses.

Advances Energy Equity

Disadvantaged communities—low-income neighborhoods that have historically suffered poor health, dirty air and other burdens — will reap the highest health benefits from clean electricity.



Restores and Creates Clean Energy Jobs

SB 100-driven growth will restore thousands of clean energy jobs lost during the pandemic and create thousands of new high-quality clean energy jobs.

The 2021 SB 100 Joint Agency Report

The 2021 report is a first step to evaluate the challenges and opportunities in implementing SB 100.

It includes an initial assessment of the additional energy resources and the resource building rates needed to achieve 100 percent clean electricity, along with the associated costs.

The estimates in this report will change over time as additional factors, such as system reliability, land use, energy equity, and workforce needs, are more closely examined.

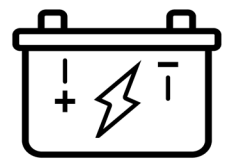
To Achieve Clean Energy

Development Needs To Rapidly Accelerate

Solar & Wind

3X

Solar and wind build rates need to nearly triple*



Battery

8X

Battery storage build rates need to increase by nearly eightfold**

*Based on 10-year average | **Based on 2020

Key Takeaways from Modeling

This initial analysis suggests SB 100 is technically achievable through multiple pathways.

Construction of clean electricity generation and storage facilities must be sustained at record-setting rates.

Diversity in energy resources and technologies lowers overall costs.

Retaining some natural gas power capacity may minimize costs while ensuring uninterrupted power supply during the transition to 100 percent clean energy.

Increased energy storage and advancements in zero-carbon technologies can reduce natural gas capacity needs.

Further analysis is needed.

Recommendations for Further Analysis

1. Verify that scenario results satisfy the state's grid reliability requirements.
2. Continue to evaluate the potential effects of emerging resources, such as offshore wind, long-duration energy storage, green hydrogen technologies, and demand flexibility.
3. Assess environmental, social, and economic costs and benefits of the additional clean electricity generation capacity and storage needed to implement SB 100.
4. Hold annual workshops to support alignment among the joint agencies and continuity between SB 100 reports.

SB 100 Implementation Activities

2021 Joint Agency SB 100 Report published.

2021

Joint agencies will publish 2025 SB 100 report.

2025

Infrastructure, Modeling, Implementation

- Land Use
- Transmission Planning
- Long-Term Reliability Assessment
- Modeling improvements to consider NEBs/Social Costs
- CAISO Exploratory 20-Year Transmission Study

Social Costs and Non-Energy Benefits

Stakeholders recommended the joint agencies integrate the following into SB 100 planning:

- Land Use Impacts
- Public Health and Air Quality
- Water Supply and Quality
- Economic Impacts
- Resilience

Consideration of Non-Energy Benefits in Agency Proceedings

CPUC

- Energy Saving Assistance (ESA)
- Societal Cost Test (SCT)
- CPUC-funded study on air quality impacts
- Societal cost-effectiveness

CARB

- 2022 Scoping Plan Update (social cost of carbon and air quality analysis)

CEC

- 2021 IEPR
- SB49 Flexible Demand Appliance Standards

Incorporation of NEBs and social costs into evaluation of SB 100 scenarios.

CalEnviroScreen 4.0 and DAC Designation

New CalEnviroScreen 4.0 Tool

- Incorporates new data to better reflect environmental conditions and population vulnerability to pollution.

Revisiting DAC designation criteria.

What's Next?

- Monitor federal, state, and local proceedings
- Continue coordination on efforts to quantify and incorporate NEBs and social costs
- Solicit input on future SB 100 modeling to best incorporate NEBs and social costs

National Perspective

- **Alejandro Moreno**
  Deputy Assistant Secretary for Renewable Power, DOE

- **Tony Reames**
  Senior Advisor, Office of Economic Impact and Diversity, DOE

Justice40:
A Data-drive, Place-based Approach to an Equitable & Just Energy Future

Tony G. Reames, PhD
Senior Advisor on Energy Justice
SB 100 Workshop, California Energy Commission
November 1, 2021


THE GRAND CHALLENGE
How do we transform our energy system while ensuring it becomes more equitable and just?

The United States of Energy Insecurity

Energy insecurity is the inability to adequately meet household energy needs (Hernandez, 2016)

Economic Policy

Millions of Americans risk losing power and water as massive, unpaid utility bills pile up

More than 179 million people may be at risk for shut-offs as many state protections end.

The News&Observer

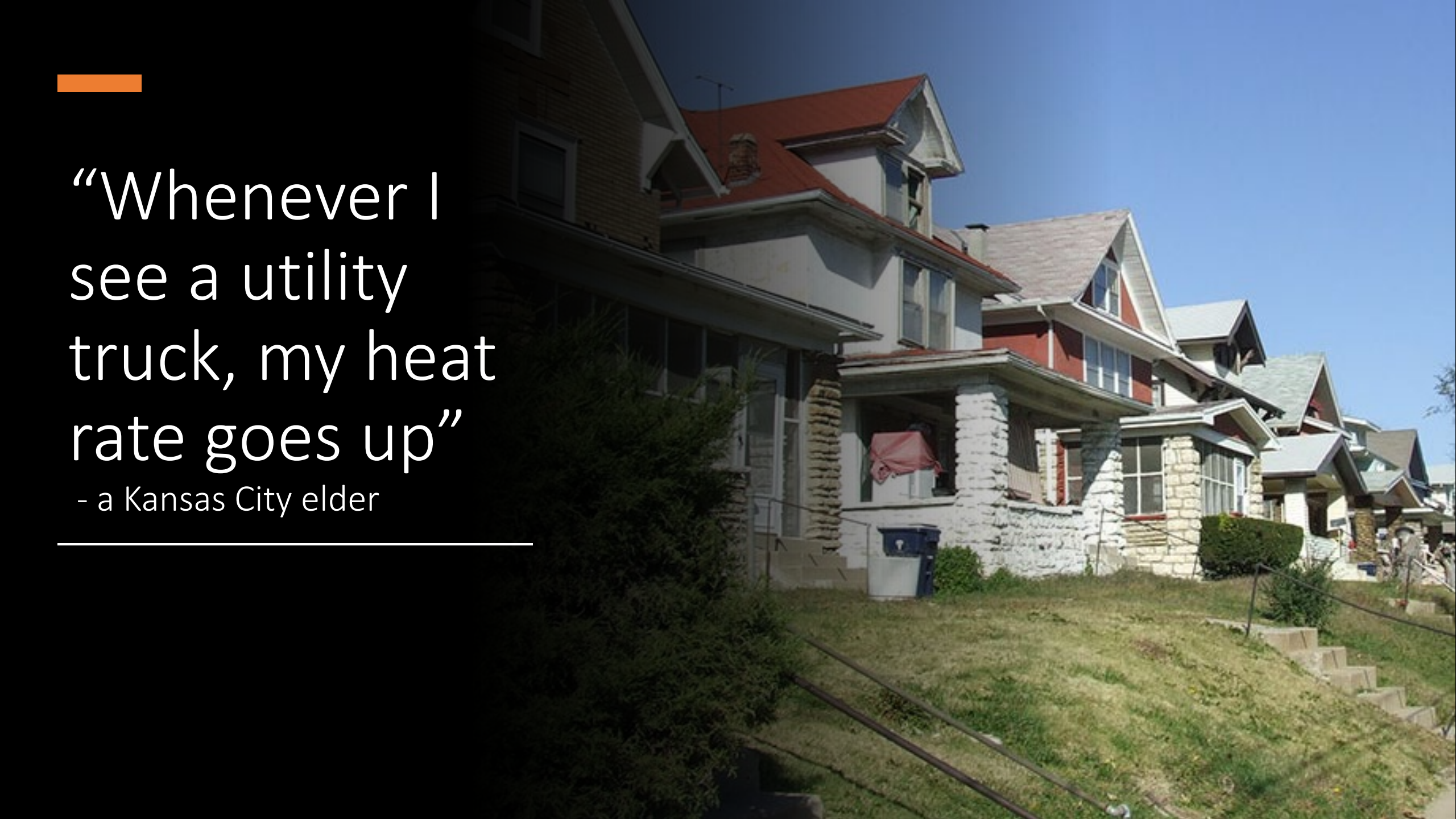
WEATHER NEWS

More than 8,000 without power in North Carolina as winter weather threats continue

BY SIMONE JASPER AND HAYLEY FOWLER

UPDATED FEBRUARY 18, 2021 4:22 PM

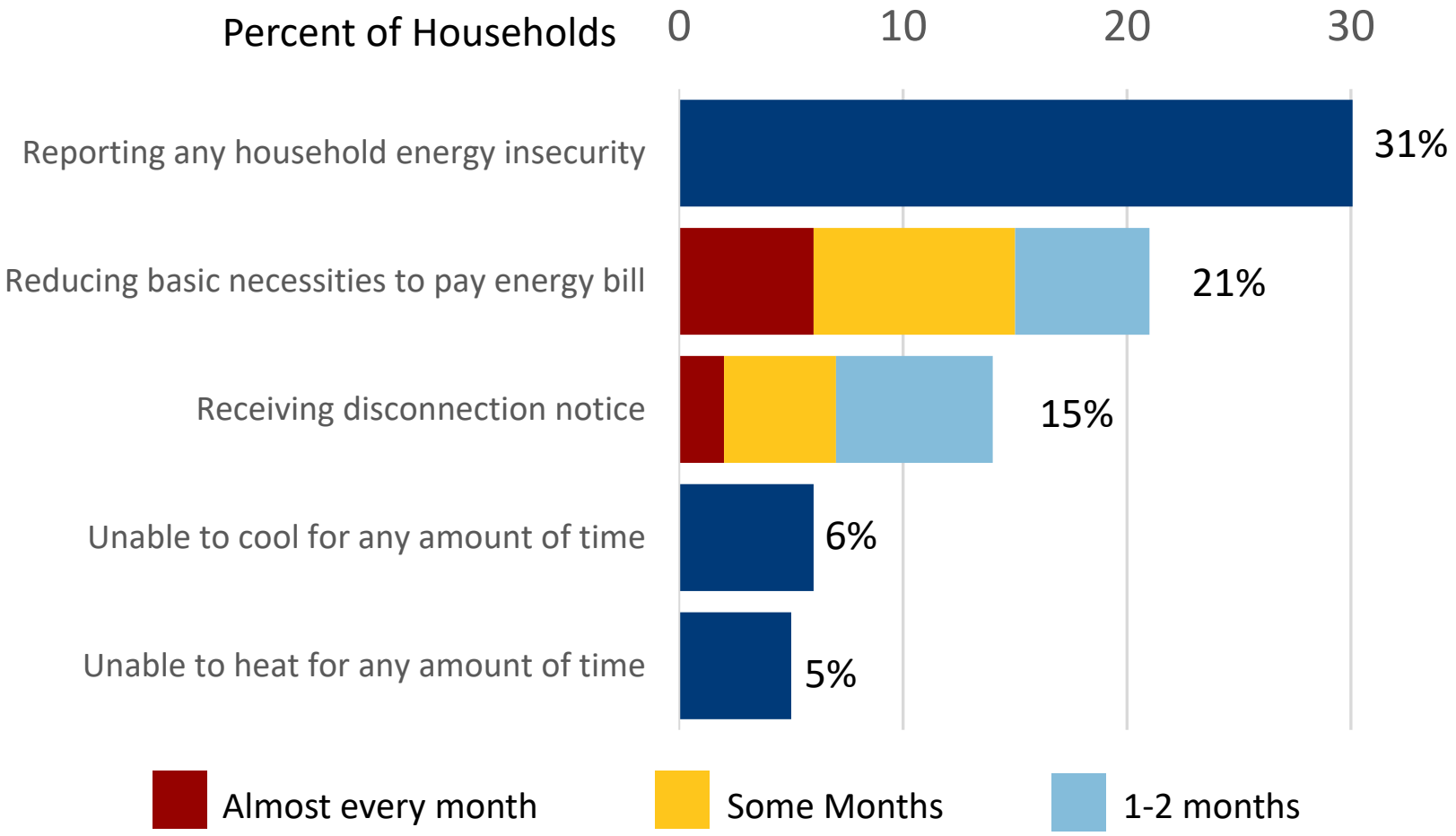
New Jersey grandmother who used oxygen tank dies after power cut off for unpaid bill



“Whenever I see a utility truck, my heat rate goes up”

- a Kansas City elder

Energy insecurity and high energy costs affect nearly 1 in 3 American households

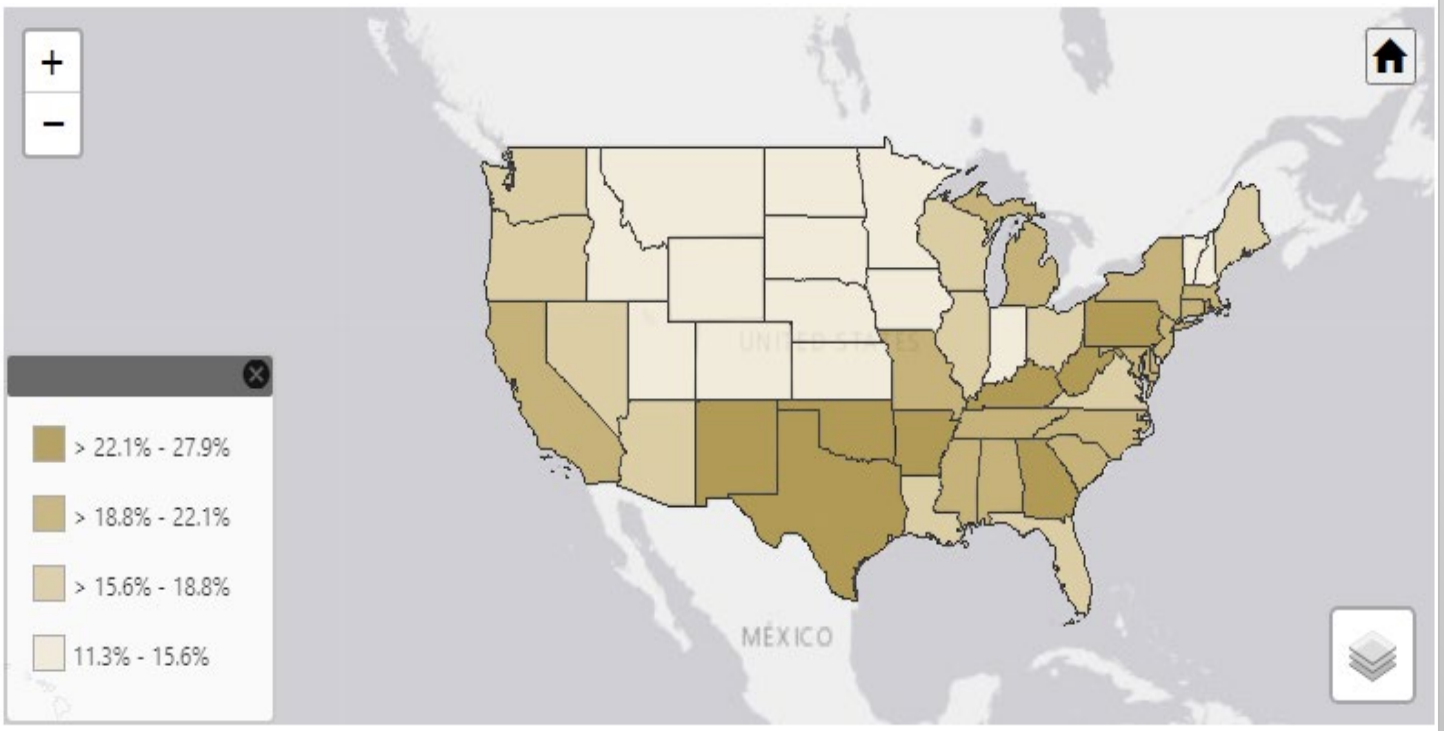


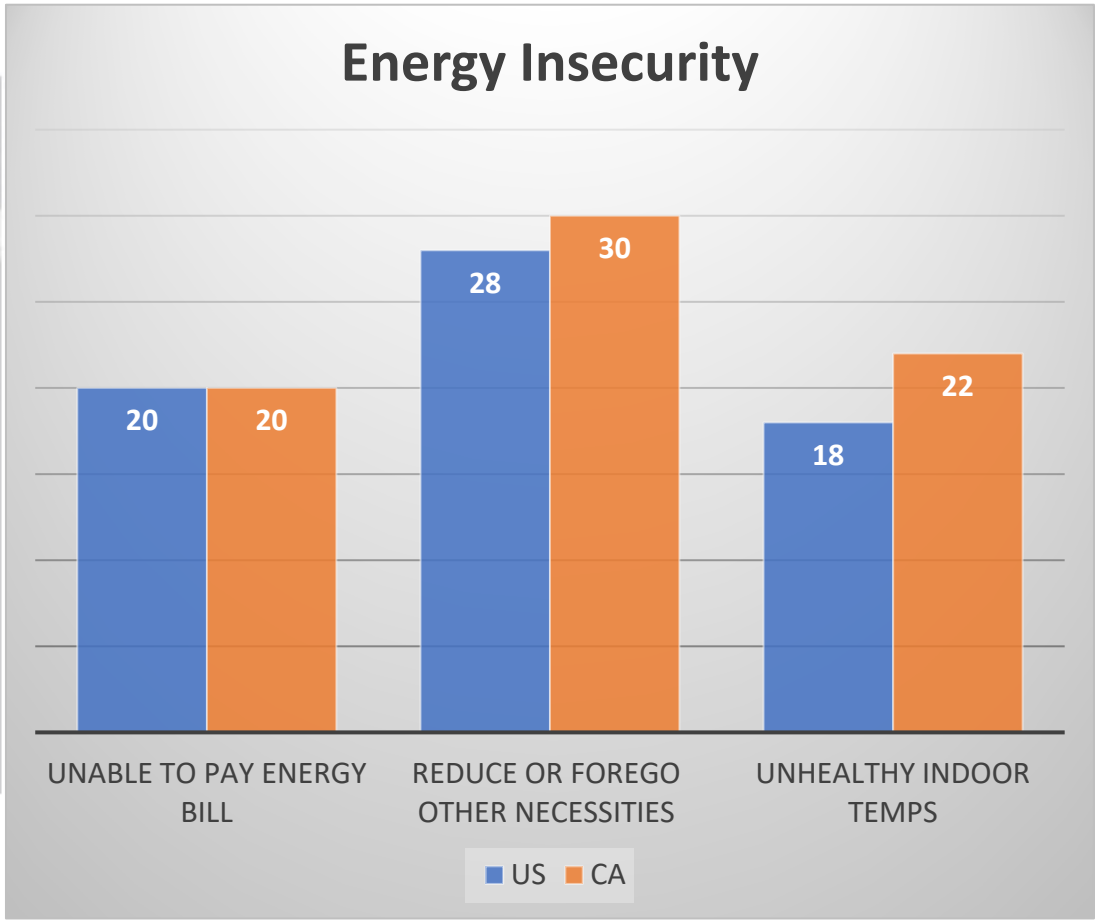
Over **27.8M** households are **energy burdened**
(expend > 6% income on energy)

Sources: U.S Energy Information Administration (EIA), Residential Energy Consumption Survey (RECS) 2015; LEAD: https://lead.openei.org/

US Census Household Pulse Survey

(September – October 2021)





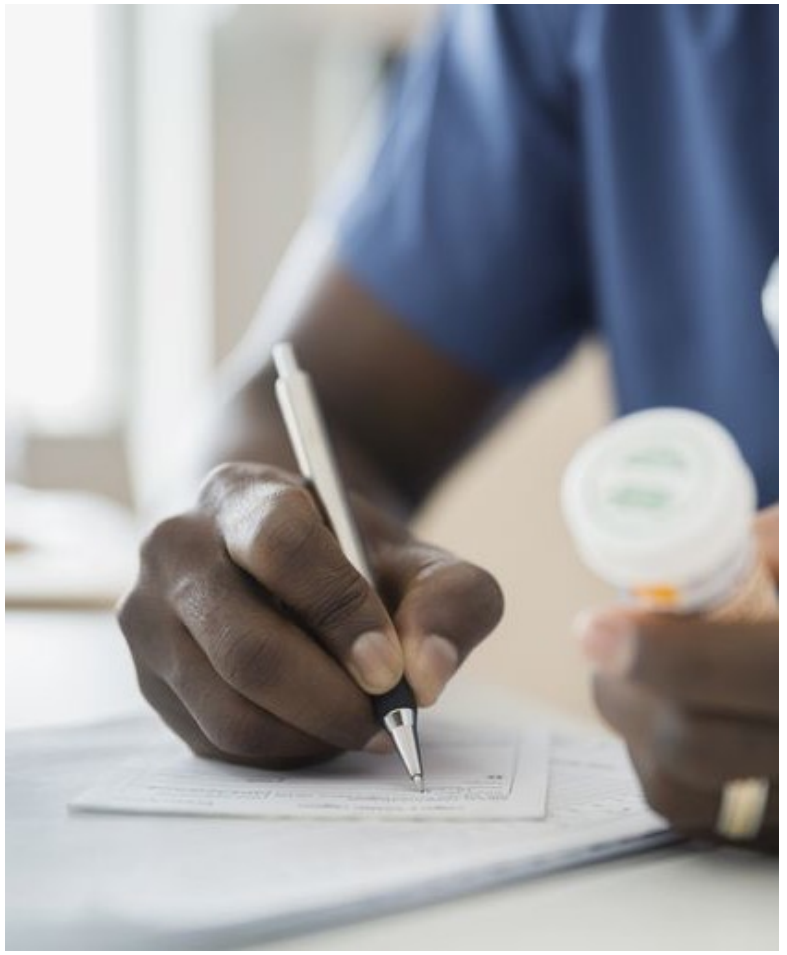
Source: https://www.census.gov/data/data-tools/household-pulse-data-tool.html

Residential Energy Burden & Health

an average **240 more premature deaths per 100,000** people

7% increase in county residents that report experiencing fair or poor health

5-year decrease in county average life expectancy



Reames, T. G., Daley, D. M., & Pierce, J. C. (2021). Exploring the Nexus of Energy Burden, Social Capital, and Environmental Quality in Shaping Health in US Counties. International Journal of Environmental Research and Public Health, 18(2), 620.

What is Energy Justice?

A Just Energy System– an energy system that fairly disseminates both the benefits and costs of energy services, and one that has representative and impartial energy decision-making

(Sovacool & Dworkin, 2014)

Executive Order 14008: Tackling the Climate Crisis at Home and Abroad (1/27/21)

- The Biden Administration has committed to securing environmental justice & spurring economic opportunity for historically marginalized and overburdened communities
- **EO 14008, Sec. 223, established the Justice 40 Initiative**
- Justice40 provides a pathway for equitable deep decarbonization that transforms and builds wealth in historically marginalized and overburdened communities

What is Justice40? In Three Buckets…

40% of overall benefits → of certain Federal investments → must flow to disadvantaged communities

1. How do we define disadvantaged communities (DACs)?

2. How do we define J40 investments?

3. How do we measure and track the benefits of J40 investments?

Interim Implementation Guidance for the Justice40 Initiative. https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf

Defining Disadvantaged Communities (DACs)

- **Community-**
  - either a group of individuals living in geographic proximity to one another
  - a geographically dispersed set of individuals (such as migrant workers or the formerly incarcerated) where either type of group experiences common conditions

Source: Interim Implementation Guidance for the Justice40 Initiative. https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf

Defining Disadvantaged Communities (DACs)

- **Disadvantaged-**
  - Low income, high and/or persistent poverty
  - High unemployment and underemployment
  - Racial and ethnic residential segregation, particularly where the segregation stems from discrimination by government entities
  - Linguistic isolation
  - High housing cost burden and substandard housing
  - Distressed neighborhoods
  - High transportation cost burden and/or low transportation access
  - Disproportionate environmental stressor burden and high cumulative impacts
  - Limited water and sanitation access and affordability
  - Disproportionate impacts from climate change
  - High energy cost burden and low energy access
  - Jobs lost through the energy transition
  - Access to healthcare

Source: Interim Implementation Guidance for the Justice40 Initiative.
https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf

What are Justice40 Investments?

Covered Investments. A Federal investment in one or more of the following categories:

- ✓Federal grant and procurement spending
  (including discretionary budget authority, direct/mandatory spending, and formula funding);
- ✓Financing
  (including credit, loans, and guarantees);
- ✓Programmatic Federal staffing costs
  (e.g., federal pay for staff that provide technical assistance)
- ✓Direct financial benefits
  (including provision of goods and services); and
- ✓Additional federal investments under covered programs as determined by OMB

What are Justice40 Investments?

Covered Programs. A Federal Government program that makes investments in one or more of the following seven areas:

- ✓Climate change
- ✓Clean energy and energy efficiency
- ✓Clean transportation
- ✓Affordable and sustainable housing
- ✓Training and workforce development
- ✓Remediation and reduction of legacy pollution
- ✓Critical clean water and waste infrastructure

DOE Pilot Programs

OFFICE	PROGRAM
Office of Energy Efficiency and Renewable Energy (EERE)	Weatherization Assistance Program
EERE's Solar Technologies Office	National Community Solar Partnership
EERE's Vehicle Technologies Office	Technology Integration (Clean Cities)
EERE's Advanced Manufacturing Office	Industrial Assessment Centers
Environmental Management	Los Alamos

DOE Justice40 Policy Priorities

(1) Decrease **energy burden** in disadvantaged communities (DACs).

(2) Decrease **exposure to pollutants and environmental burdens** in DACs

(3) Increase **parity in clean energy technology access and adoption** (e.g., solar, storage) in DACs.

(4) Increase **access to low-cost capital** in DACs.

(5) Increase **MBE/DBE clean energy enterprise creation** in DACs.

(6) Increase the **clean energy job pipeline and job training** for individuals from DACs.

(7) Increase **energy resiliency** in DACs.

(8) Increase **energy democracy** in DACs.

	Metric	Units
Energy Burden	***Reduction in energy expenditures*** *due to technology adoption*	*Annual energy expenditures (e.g., utility bills, propane gas, gasoline or gasoline equivalent, etc.), before and after program intervention [$]*
	Reduction in energy savings *for HHs, businesses in DACs or that serve DACs*	*[MWh, MMBtu, GGe]*
Environment	***Reduction of local and global emissions*** *for HHs and businesses*	*local emissions (tons of local pollutants (NO_x, SO_2, and $PM_{2.5}$) and greenhouse gas emissions (tons of CO_2 or CO_2 equivalent)*
	Remediation impacts on surface water, groundwater, soil & reduction of legacy contaminated waste	In consultation with DOE programs
Clean energy job pipeline	Total **DOE funding spent on job training programs**	$ spent, % of total spending going to DACs [$, %]
	Number of **hires resulting from DOE job training programs**	# of trainees that received jobs, by location (to understand whether trainee resided in DAC) [#]
	Jobs created as a result of DOE Justice40 relevant programs	# jobs created, clean energy sector or other relevant DOE Justice40 categories, by location (to track whether they are in DACs) [#]
Enterprise Creation	Number of **contracts and/or dollar value awarded to MBE/DBEs** that are based in DACs or serve DACs	Number of contracts; dollar value of contracts, by location (to determine whether in DAC or not) [#, $]
Energy Democracy	**Stakeholder engagement** with DACs	$ spent per DOE program [$]
	Transfer of knowledge, planning tools, data	# of customized datasets and tools provided, # of trainings for these datasets and tools, # of people trained on DOE tools and datasets, and # of hours dedicated to these efforts [#]
	Technical assistance	$ or # of hours spent [#, $]
Increased clean energy access	**Increased access to clean energy** serving DACs	Percent of local electricity generation mix from clean energy that serve DACs [%]

How are we determining how DOE will track Justice40 benefits?

J40 Metrics Working Group

J40 Team

Stakeholder engagement & input

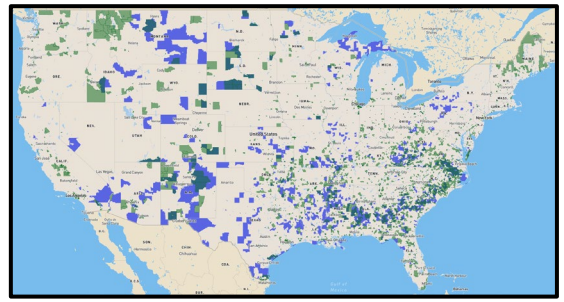
J40 Community of Practice

DOE J40 Investments

×

Benefit Categories (# jobs, energy saved, clean energy access)

=



Benefits going to DACs

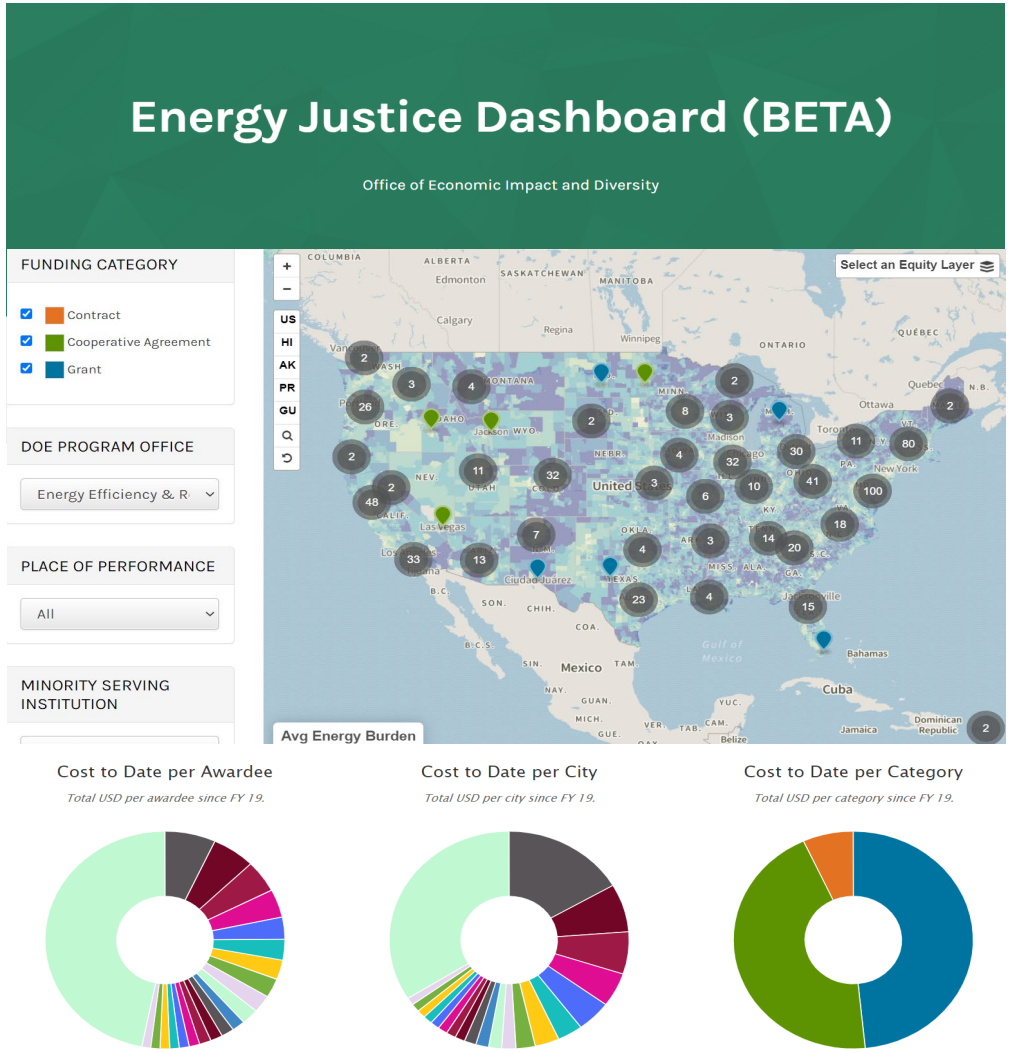
≥ 40%

ALL DOE J40 Benefits

Accountability & Transparency

Energy Justice Dashboard (BETA)

A tool to measure and track DOE progress toward Justice40 and see investments in real time.



www.energy.gov/diversity/energy-justice-dashboard-beta

How Do We Get to Justice40?

A Layered, Collaborative Approach

- **Federal:** R&D, Technical Assistance and deployment support
- **State and Local**: Local planning, Federal $ recipients, regulatory authority
- **Philanthropy & Communities:** Community and MBE/DBE capacity building
- **Private Sector:** Unlock long-term, transformative investment

U.S. DEPARTMENT OF ENERGY

Office of Economic Impact and Diversity

Tony G. Reames, PhD
Senior Advisor on Energy Justice
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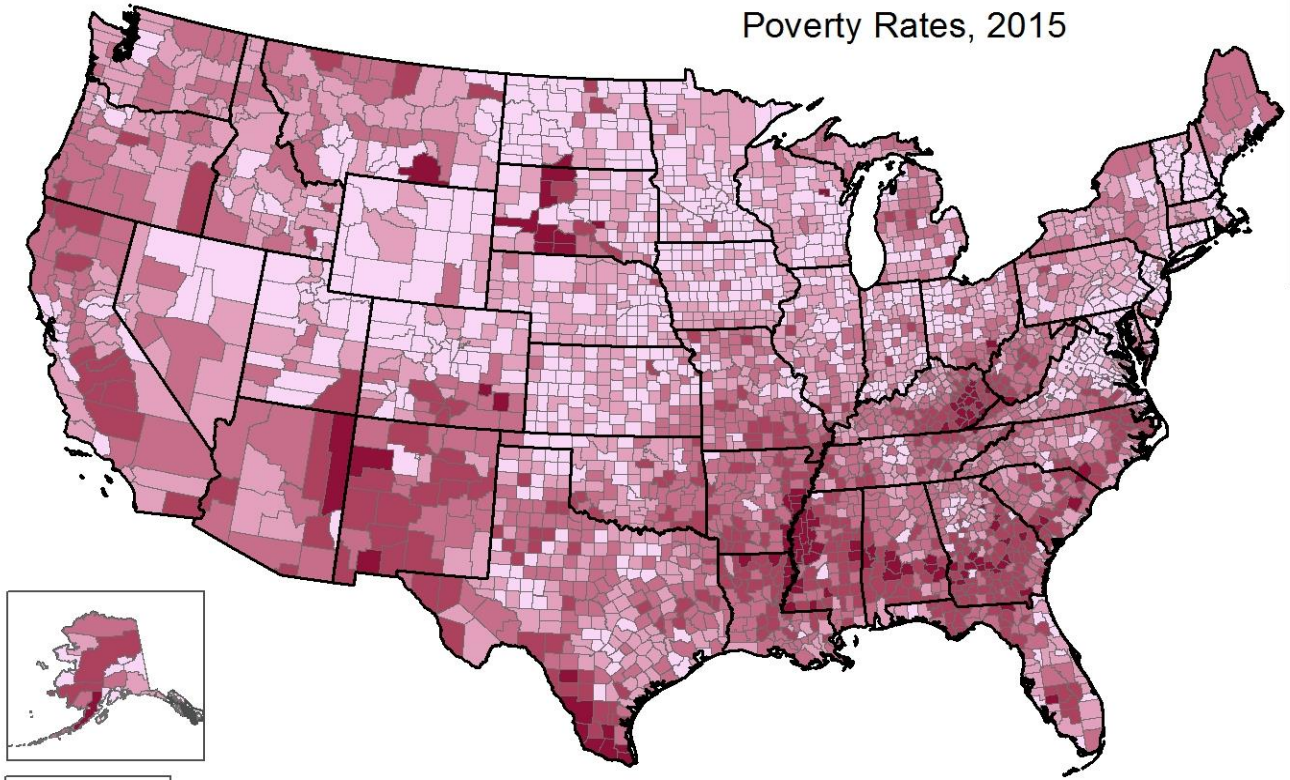
Non-energy Benefits & Social Costs

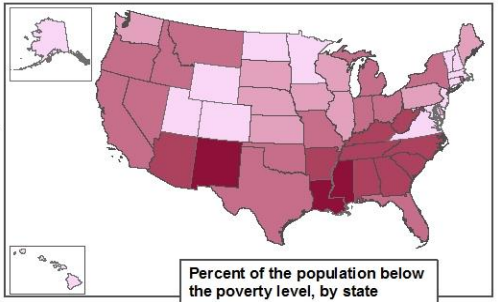
- **Roger Lin**
  California Environmental Justice Alliance
- **Kevin Hamilton**
  Central California Asthma Collaborative
- **Elena Krieger**
  PSE Healthy Energy
- **Lisa Skumatz**
  Skumatz Economic Research Associates

Social Determinants of Health

- **Poverty**
- **Income**
- **Education**
- **Affordable Housing**
- **Access to Care**

Poverty Rates, 2015

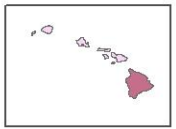




Percent of the population below the poverty level, by state

- 8.4% - 11.5%
- 11.6% - 13.6%
- 13.7% - 16.0%
- 16.1% - 18.7%
- 18.8% - 22.1%

Average: 14.2%
Data classed using natural breaks



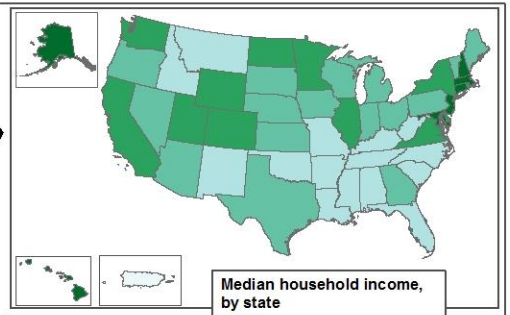
Percent of the population below the poverty level, by county

- 3.4% - 11.7%
- 11.8% - 16.4%
- 16.5% - 21.8%
- 21.9% - 29.9%
- 30% - 47.4%

Data classed using natural breaks

Source: US Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, Dec 2016.
The data provided are indirect estimates produced by statistical model-based methods using federal tax information and data on SNAP recipients.
http://www.census.gov/did/www/saipe/index.html In 2016, for a family of four, the poverty guideline is $24,300.
Color ramp from: http://www.colorbrewer2.org/ Inset maps not to scale.
With a natural breaks classification scheme, class breaks occur where there are gaps in the distribution (i.e., few or no observations).

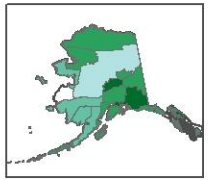
Median Household Income, 2011 - 2015

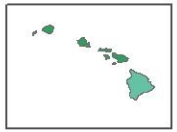


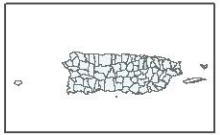
Median household income, by state

- $19,350
- $39,665 - $48,173
- $48,174 - $55,176
- $55,177 - $65,015
- $65,016 - $74,551

Average: $53,958
Data classed using natural breaks







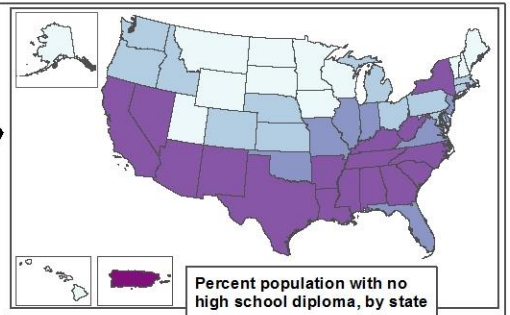
Source: ACS 5-year estimates, 2011-2015, Table B19013.
Color ramp from: http://www.colorbrewer2.org/ Inset maps not to scale.
With a natural breaks classification scheme, class breaks occur where there are gaps in the distribution (i.e., few or no observations).

Median household income, by county

- $10,499 - $34,336
- $34,337 - $45,550
- $45,551 - $57,338
- $57,339 - $75,050
- $75,051 - $123,453

Data classed using natural breaks

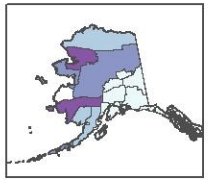
Population Aged 25 and Older with No High School Diploma, 2011 - 2015

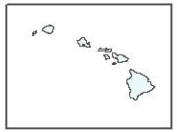


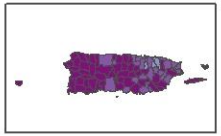
Percent population with no high school diploma, by state

- 7.2% - 9.1%
- 9.2% - 10.9%
- 11.0% - 13.1%
- 13.2% - 18.2%
- 18.3% - 27.0%

Average: 12.0%
Data classed using natural breaks







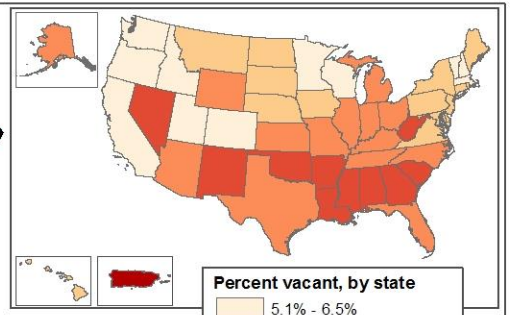
Percent population with no high school diploma, by county

- 1.6% - 9.6%
- 9.7% - 14.4%
- 14.5% - 19.9%
- 20.0% - 27.7%
- 27.8% - 53.7%

Data classed using natural breaks

Source: ACS 5-year estimates, 2011-2015, Table B15003.
Color ramp from: http://www.colorbrewer2.org/ Inset maps not to scale.
With a natural breaks classification scheme, class breaks occur where there are gaps in the distribution (i.e., few or no observations).

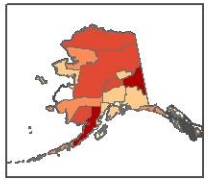
Vacant Housing Units, 2011 - 2015

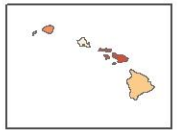


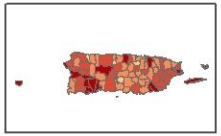
Percent vacant, by state

- 5.1% - 6.5%
- 6.6% - 8.2%
- 8.3% - 10%
- 10.1% - 12.3%
- 12.4% - 15.9%

Average: 8.5%
Data classed using natural breaks







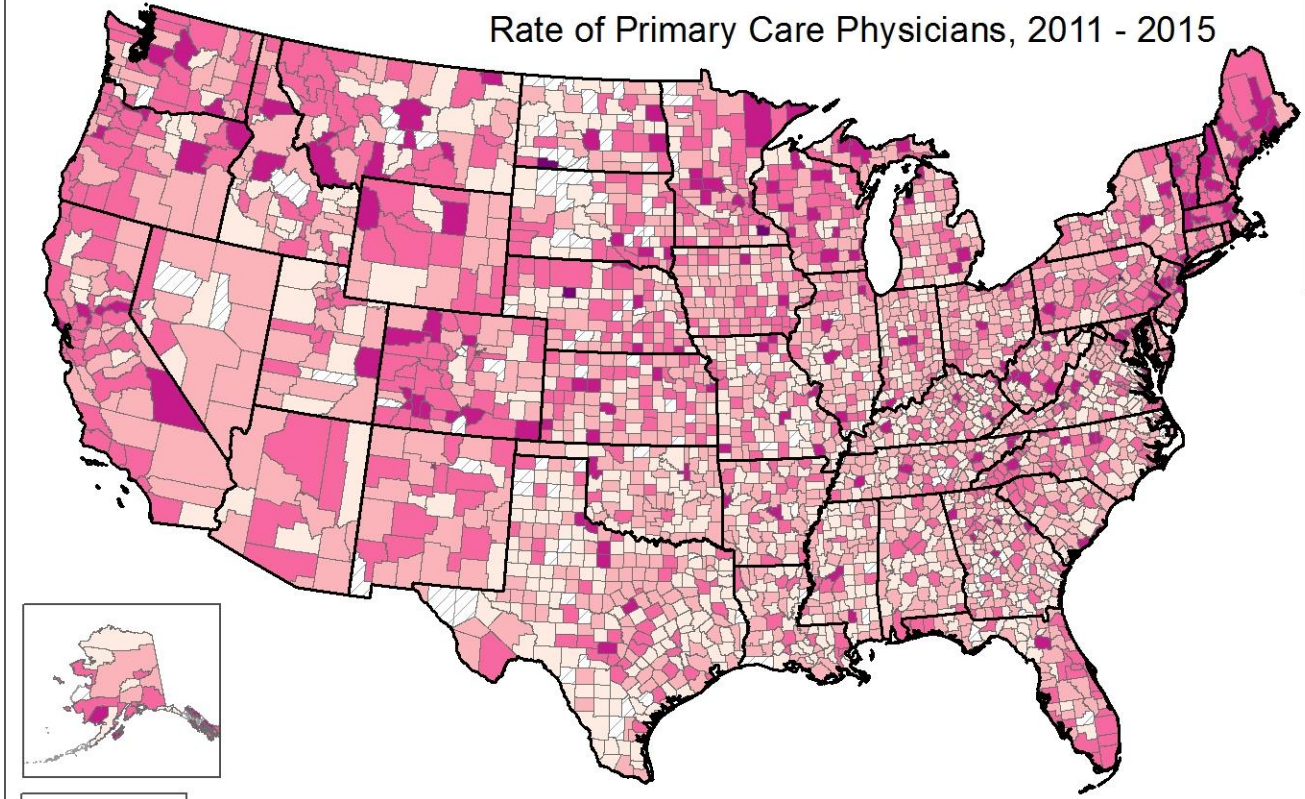
Source: ACS 5-year estimates, 2011-2015, Tables B25004 and B25001.
As used here, vacant housing excludes seasonal vacancy.
Color ramp from: http://www.colorbrewer2.org/ Inset maps not to scale.
With a natural breaks classification scheme, class breaks occur where there are gaps in the distribution (i.e., few or no observations).

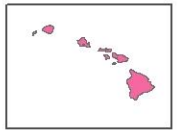
Percent vacant, by county

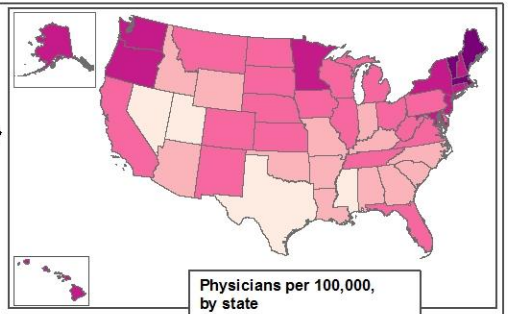
- 1.9% - 7.6%
- 7.7% - 10.8%
- 10.9% - 14.3%
- 14.4% - 19.4%
- 19.5% - 37.8%

Data classed using natural breaks

Rate of Primary Care Physicians, 2011 - 2015







Physicians per 100,000, by state

- 54.0 - 59.6
- 59.7 - 70.8
- 70.9 - 82.1
- 82.2 - 95.3
- 95.4 - 115.9

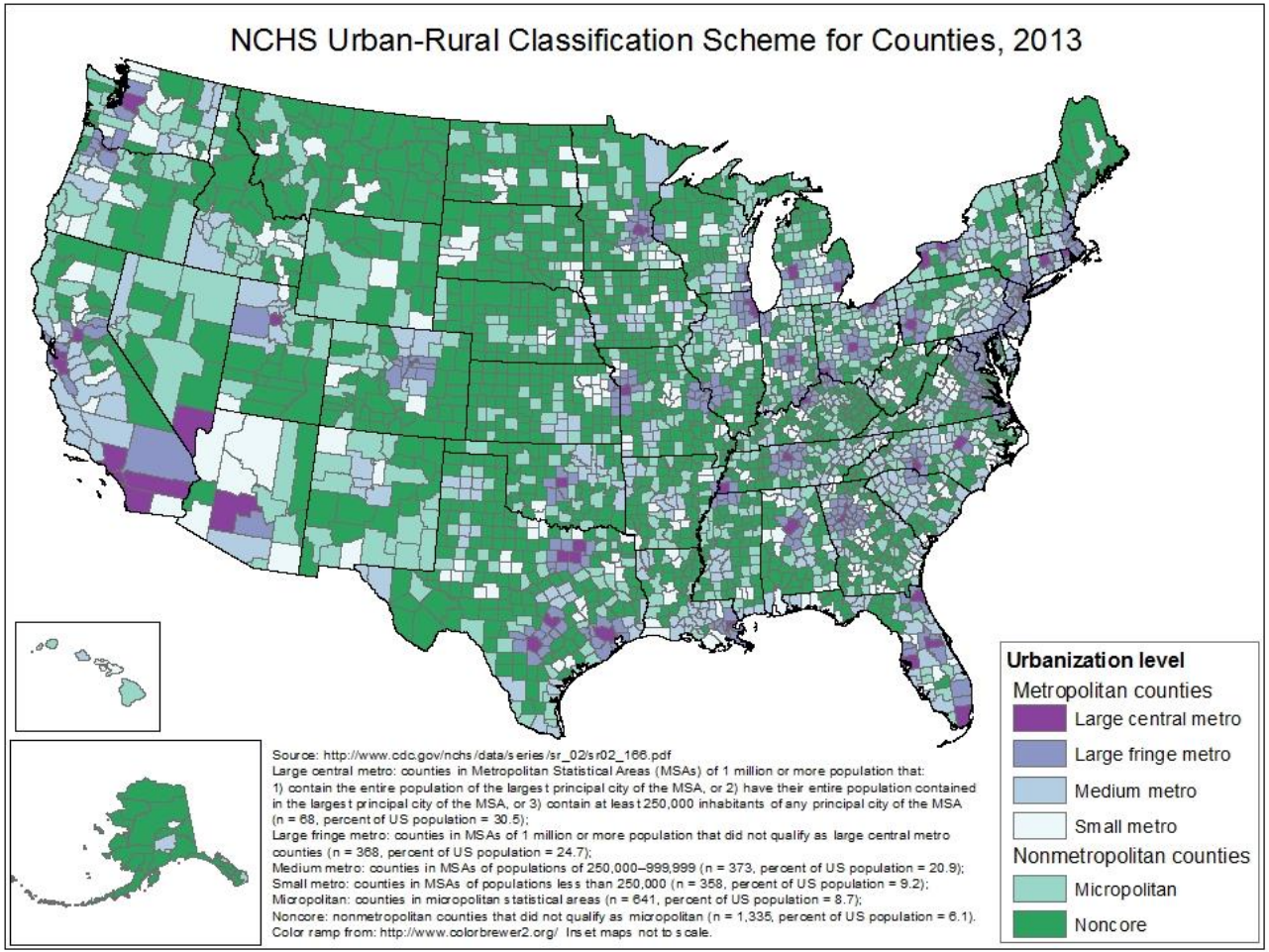
Data classed using natural breaks

Physicians per 100,000, by county

- 0.0 - 35.9
- 36.0 - 65.7
- 65.8 - 106.6
- 106.7 - 211.7
- 211.8 - 469.2
- No data

Data classed using natural breaks

Source: http://www.countyhealthrankings.org/rankings/data
Color ramp from: http://www.colorbrewer2.org/ Inset maps not to scale.
With a natural breaks classification scheme, class breaks occur where there are gaps in the distribution (i.e., few or no observations).


NCHS Urban-Rural Classification Scheme for Counties, 2013
Urbanization level
Metropolitan counties
Large central metro
Large fringe metro
Medium metro
Small metro
Nonmetropolitan counties
Micropolitan
Noncore
Source: http://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf
Large central metro: counties in Metropolitan Statistical Areas (MSAs) of 1 million or more population that:
1) contain the entire population of the largest principal city of the MSA, or 2) have their entire population contained in the largest principal city of the MSA, or 3) contain at least 250,000 inhabitants of any principal city of the MSA (n = 68, percent of US population = 30.5);
Large fringe metro: counties in MSAs of 1 million or more population that did not qualify as large central metro counties (n = 368, percent of US population = 24.7);
Medium metro: counties in MSAs of populations of 250,000–999,999 (n = 373, percent of US population = 20.9);
Small metro: counties in MSAs of populations less than 250,000 (n = 358, percent of US population = 9.2);
Micropolitan: counties in micropolitan statistical areas (n = 641, percent of US population = 8.7);
Noncore: nonmetropolitan counties that did not qualify as micropolitan (n = 1,335, percent of US population = 6.1).
Color ramp from: http://www.colorbrewer2.org/ Inset maps not to scale.

Lisa A. Skumatz, Ph.D.
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SERA

NEBs, HARDSHIP, EQUITY, ADDERS, AND TBL FOR INVESTMENTS

26 years in Energy Efficiency Evaluations, Non-Energy Benefits, and Hard-To-Measure Effects
www.serainc.com

5 minutes on Using NEBs to inform better decision-making (SERA for CEC Workshop, 11/1/21

SERA

Topics

Applying NEBs** principles to B/C and public investments

1. What are Net NEBs? B/C
2. Hardship NEBs & status
3. Equity metrics
4. Adders
5. TBL
6. What is best / What is feasible?

About the Speaker

- Pioneer / 27 years in monetizing NEIs/NEBs
- Methods, measurements, testimony for clients across North America & internationally
- Comprehensive NEBs Database (43,000 entries, from 500+ studies) & “NEB-It” model (100+ NEBs); statewide models, utility, regulator and intervenor and testimony work
- 60+ NEB publications, 75+ NEB program projects
- Metrics & oversight work / lead in 3 states

***NEIs=NEBs=co-benefits=Multiple Benefits
Names in decreasing order of quality***

WHAT ARE NEBS?

SERA

NEIs / NEBs

- Low income, 1994
- Policies: started with Hardship and equity goals

Net NEIs/NEBs =

- **Dollar values of positive & negative effects**
- **Beyond energy savings**
- **From measures / interventions / investments**
- **Accruing To *utilities, society, and participants***

WHY MEASURE NEBS?

Add into Corrected Numerator

(ALL Benefits /all costs)

- Monetize to take seriously, integrate
- For B/C to make better decisions
- Also policy, goals progress, program refinement, marketing…

NEBs & HARDSHIP

SERA

*Problem - **How do you monetize "hardship"?***

Hardship

- Financial?
- Quality of Life?
- Home safety / security / preservation
- … and what the "state" of hardship measurement?

NEBS MEASURED 4 MAIN WAYS:

- Direct
- Secondary calcs (incl. financial)
- Third party models (COBRA, Implan, RIMS)
- Surveys

Survey Measurement

Surveys, models, computations

Numbers

Words / Labeled Relative Scaling*

WTP/WTA

What SERA brought to the table - innovating To make it feasible

COMPREHENSIVE LIT REVIEW ➔DATABASE ➔MODEL…

SERA

1,800
1,200
765
500
160
43,450

SERA NEB-It Database

SERA NEB-It Model

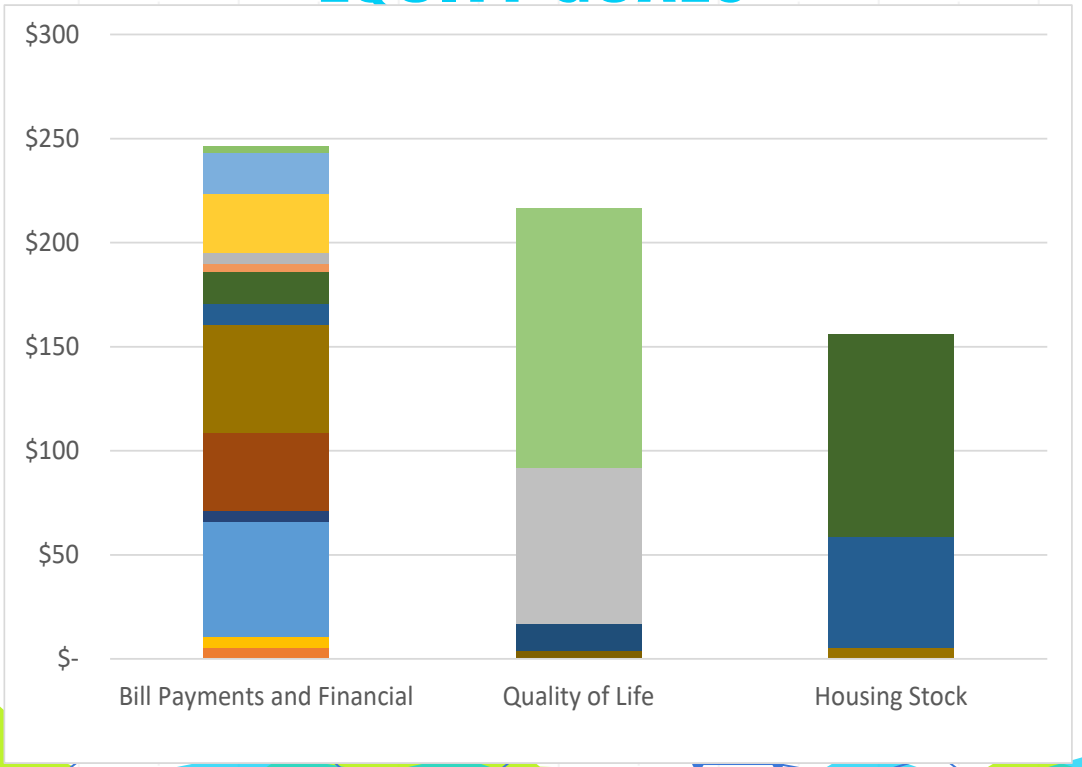
100
500

Ready to use ➔

➔*numbers, program, policy advice*

- *Well grounded, 50+ publications, academic, stronger performance
- **Specialized language, methods used; simplified here

NEBS REFLECT HTM 'HARDSHIP' & "DEEPER" EQUITY GOALS



AND NEBS MAP TO CAUSES OF HARDSHIP BENEFITS

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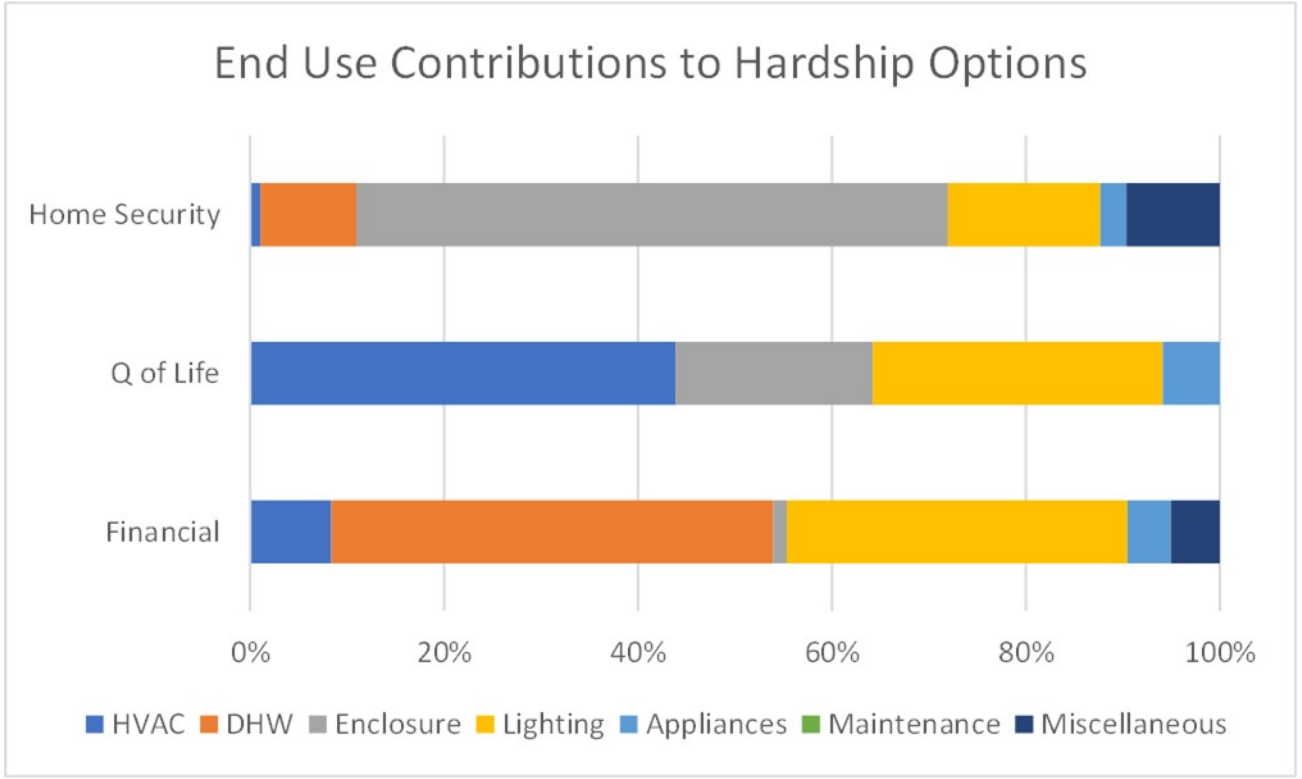


UTILITY EQUITY METRICS

UTILITIES FOCUSING ON EQUITY IN ACCESS (PARTICIPATION)

3 states we work in-depth in…

Residential (LMI) & commercial (Sm/Location)

Decide disadvantaged / at risk area(s)

Up front, census-block-group-based

Comparisons, goals, ratios

GOING BEYOND ACCESS

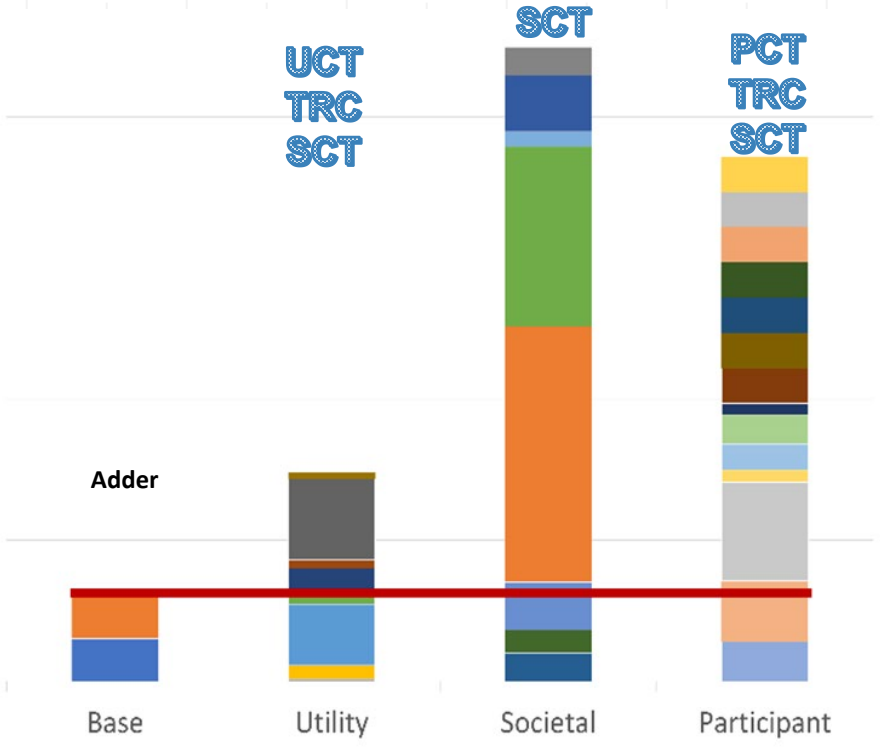
Access isn't use; utilities are adding savings ratios

BUT - DEEPER METRICS TO IMPACTS

NEBS for effects on the households (energy and saving aren't internalized effects)

…. But NEBs are.

CONSIDER "ADDERS" IF MEASUREMENT CONSIDERED TOO HARD, ONEROUS, OR UNCERTAIN
Existing Low Income State Cost Tests



Typical 30% LI adder➔

Two dozen states now Include NEBs in cost tests…

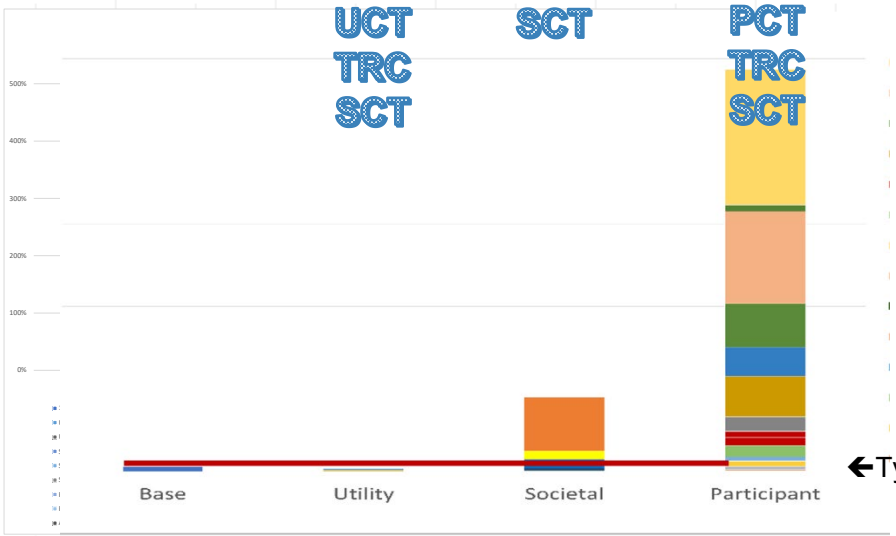
Pros & Cons to adders

Include only those NEBs relevant to your cost test…

Ranked by decreasing reliability score moving "up" the bars…

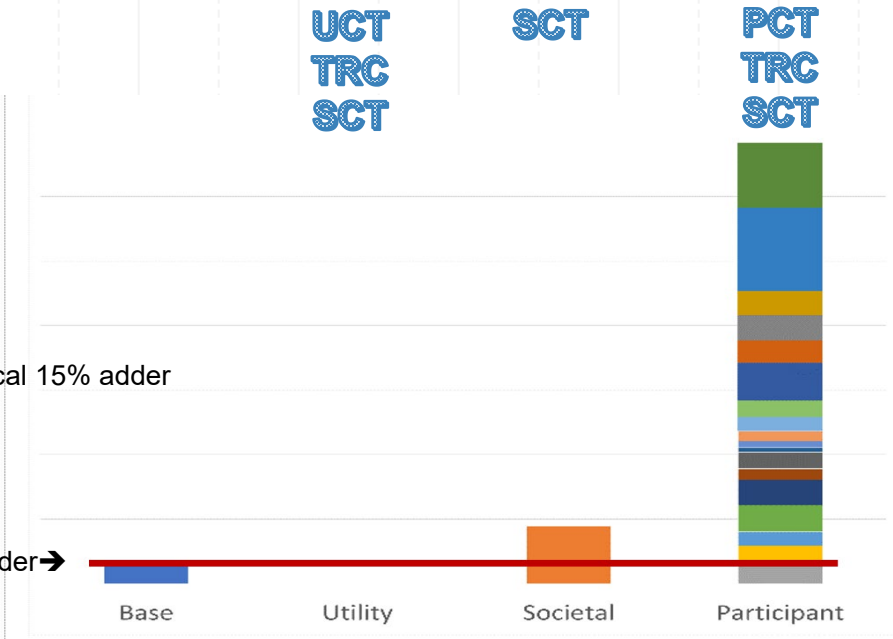
RESIDENTIAL & COMMERCIAL ADDER COMPARISON

SERA



←Typical 15% adder

Adder



Typical 15% adder➔

Current adders are too conservative and don't reflect current literature; Research can fix that for "types" of investments

Ranked by reliability…

TBL ANALYSIS INCLUDING SOCIAL – USING NEB APPROACHES

SERA

TRIPLE BOTTOM LINE (TBL)

Econ + Environment + Social

- Economics easy
- Environmental pretty easy (COBRA, Avert, etc.)
- Social – usually embarrassing
- ➔Commonly hand-waving, lists, case studies, even in sophisticated reports

Cities / states *should* be including – citizens / social and longer term are reasonably within their mandate

SOCIAL PART OF TBL

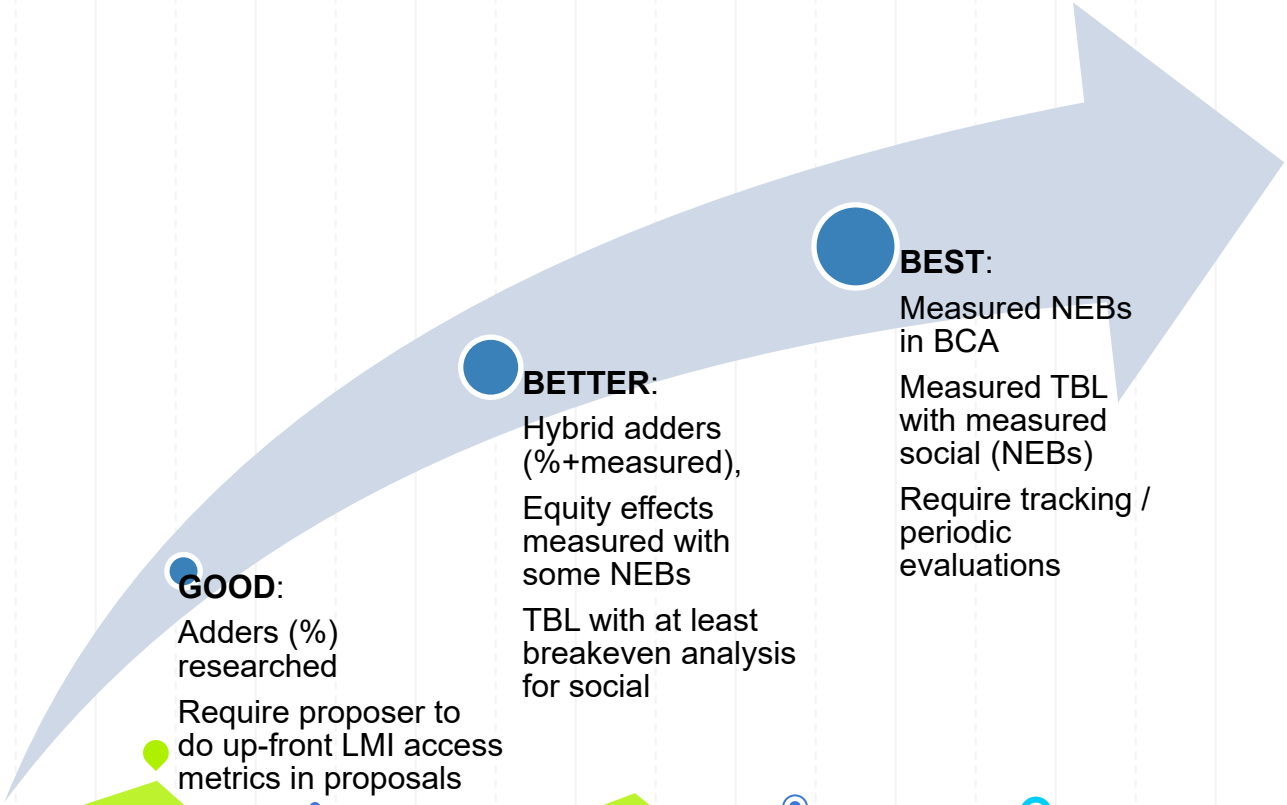
Applying NEBs approach

SERA Steps (applied to previous projects)

1) *ID the investment(s) and status quo / baseline*
2) *Focus groups in the field to understand inventory & prioritize positive/negative effects*
3) *Specially-worded and analyzed survey to group(s) to MONETIZE; cover wide topics reasonably*
4) *Add as social element in the TBL roll-up for investment(s)*
5) *OR at least add breakeven analysis*

SERA examples: city recycling example, utility undergrounding, transportation investment, etc.

WHAT TO DO / WHAT IS FEASIBLE?



The measurement methods & test perspectives are well-explored.

43,450 & NEB-It Model

Valuing Hard-to-Measure (HTM) Effects For Decision-Making for 26 years…

THANKS!

Questions?

Lisa A. Skumatz, Ph.D. and Ann Vander Vliet

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www.serainc.com

Public Comment

- Zoom
  - Use the “raise hand” feature to make verbal comments
- Telephone
  - Dial *9 to raise your hand
  - *6 to mute/unmute your phone line. You may also use the mute feature on your phone
- When called upon
  - Your microphone will be opened
  - Unmute your line
  - Spell your name and identify your organization, then start your comment

SB 100 Modeling

November 1, 2012

Mark Kootstra
Mark.Kootstra@energy.ca.gov

Analysis Over Different Planning Horizons

Operational Timeline (within a year)

- Reliability and contingency focused.
- Fewer unknowns, fewer opportunities to adjust.

Resource Adequacy Timeline (up to 3 years ahead)

- Reliability and short-term procurement focused.
- Modest unknowns, some opportunity to course correct.

Planning and Procurement Timeline (up to 10 years ahead)

- Procurement and policy compliance focused.
- Growing uncertainty, growing opportunity to respond and incorporate flexibility.

Climate Goals Timeline (10-25 years ahead)

- Focused on planning to achieve long terms policies and identifying long term solutions.
- Significant unknowns and uncertainty, greatest opportunity to enact major changes, requires flexibility in plans.

Longer time horizons increases:

- ***Uncertainty***
- ***Opportunities***
- ***Flexibility***

Purpose of Modeling

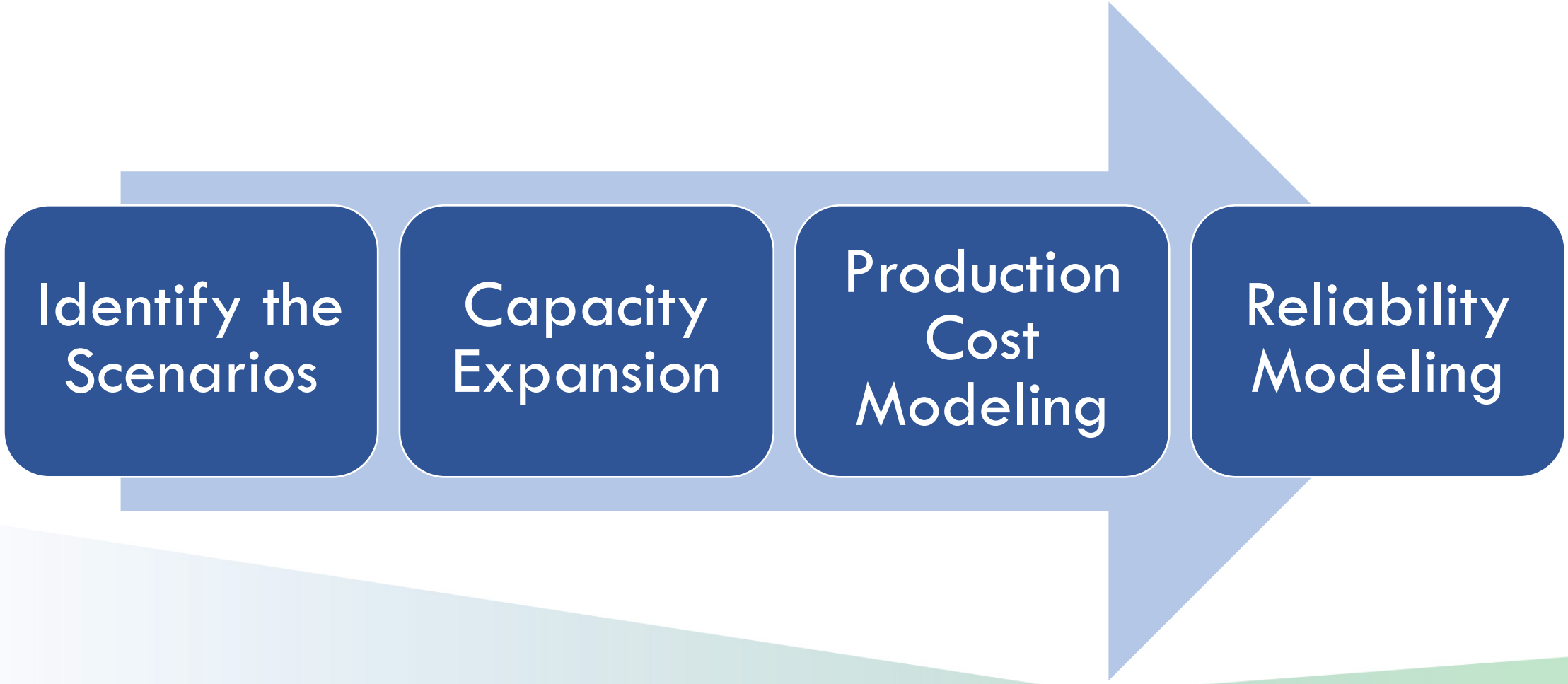
Support the development of California's Electricity grid to that it will:

1. Be reliable
2. Handle high electrification
3. Meet climate and other policy goals
4. Be affordable and equitable
5. Be implemented by 2045

Policy Scenarios and Sensitivities

1. Demand changes (electrification, winter peaks)
2. Emerging zero-carbon technologies (how and when can the help)
3. Acceleration of distributed energy resource adoption
4. Increased/decreased thermal retirements
5. Accounting for nonenergy benefits

Modeling Picture



Schedule of Stakeholder Engagement

Now	• Help us identify scenarios analyze with models that will advance the conservations and inform decisions.
Soon	• Integrate and align our analytical approaches to address key questions and analysis needed.
Q3/4 2022	• Multiple stakeholder meetings on the modeling environment. • Goal: Help us shape and improve the modeling environment.
Q2 2023	• Joint agencies: Present the draft SB 100 Analytical Plan. • Stakeholders: Help us finalize the plan and core assumptions.
Later	• Joint agencies: Present draft and final SB 100 modeling results. • Stakeholders: Suggests modifications, identify limitations, and comment.
2024	• Final Report Effort

Specific Asks

1. What reliability questions do you have?
2. What other questions do you have? Can modeling help?
3. What are the most important nonenergy benefits to consider, and how should they be incorporated into electricity supply models?
4. What recent and ongoing modeling work should we be referencing and engaging with?
5. How can we best foster engagement on the modeling and build trust.

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