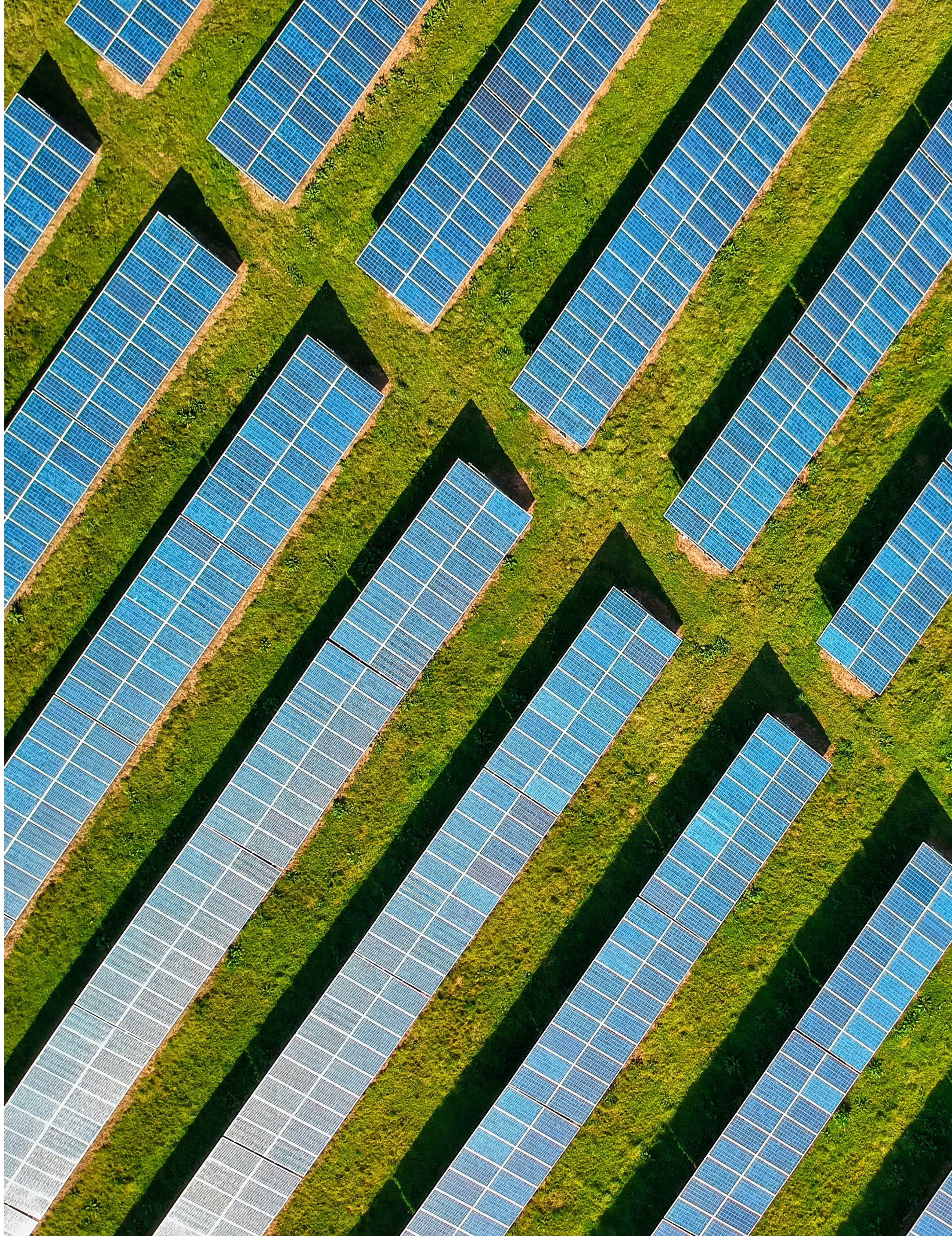
Renewable Energy Markets™ 2022

SITING RENEWABLES TO IMPROVE OUTCOMES FOR COMMUNITIES



Speakers

Reactivate

Utopia Hill

Utopia Hill is the Head of Engineering, Procurement and Construction for Reactivate, which is a community solar platform. She oversees project execution, supplier diversity and workforce development. Utopia previously served as the Vice President, Construction Project Management at Invenergy.

Utopia has been in the industry for over two decades and has experience in wind, energy storage and solar energy projects. Some of her project accomplishments include the ongoing construction of the largest solar project in North America, Samson Solar (1.3 GW), Invenergy's first energy storage project (Grand Ridge Solar 1MW), as well as numerous utility scale renewables projects. She has been responsible for the engineering, procurement or construction of over 10,000 MW of renewables.

Utopia has a degree in Aerospace Engineering from the University of Illinois Urbana-Champaign

Environmental Inequality

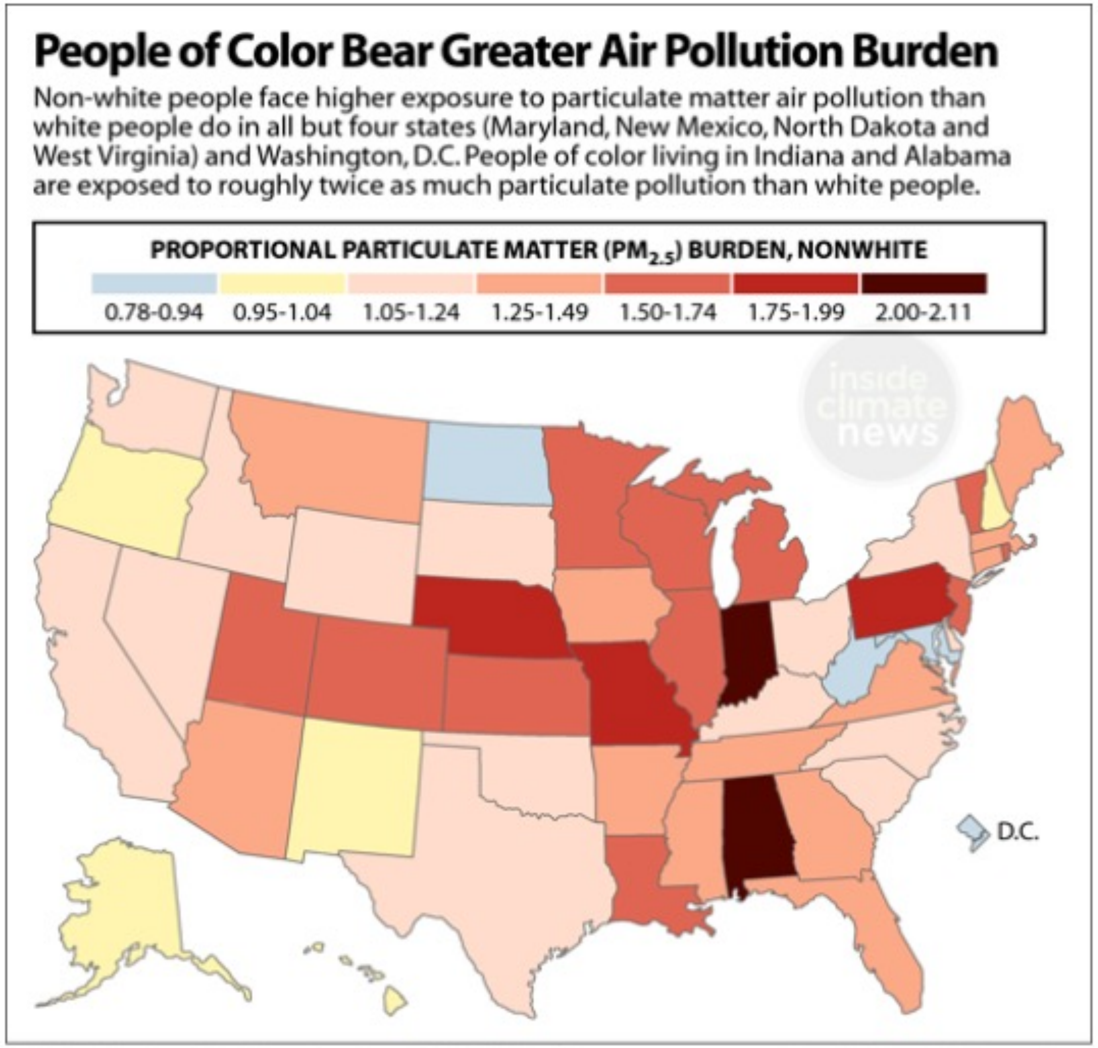
Environmental inequalities intersect three dimensions: social, territorial and, of course, environmental. More concretely, environmental inequalities are the expression of an environmental burden that would be borne primarily by disadvantaged and/or minority populations or by territories suffering from a certain poverty and exclusion of these inhabitants.

Source: https://www.encyclopedie-environnement.org/en/society/environmental-inequalities/

Environmental Inequality Example

The United Nations International Panel on Climate Change's (IPCC) 2013 climate change science report states with "90 to 99 percent certainty" that more frequent and more severe weather events like droughts, intense heat waves, and "more frequent/ intense heavy rainfall events" are a consequence of the climate crisis. And it is communities of color that are bearing the brunt of those events, say many experts.

*Source (Green America, "People of Color Are on the Front Lines of the Climate Crisis")

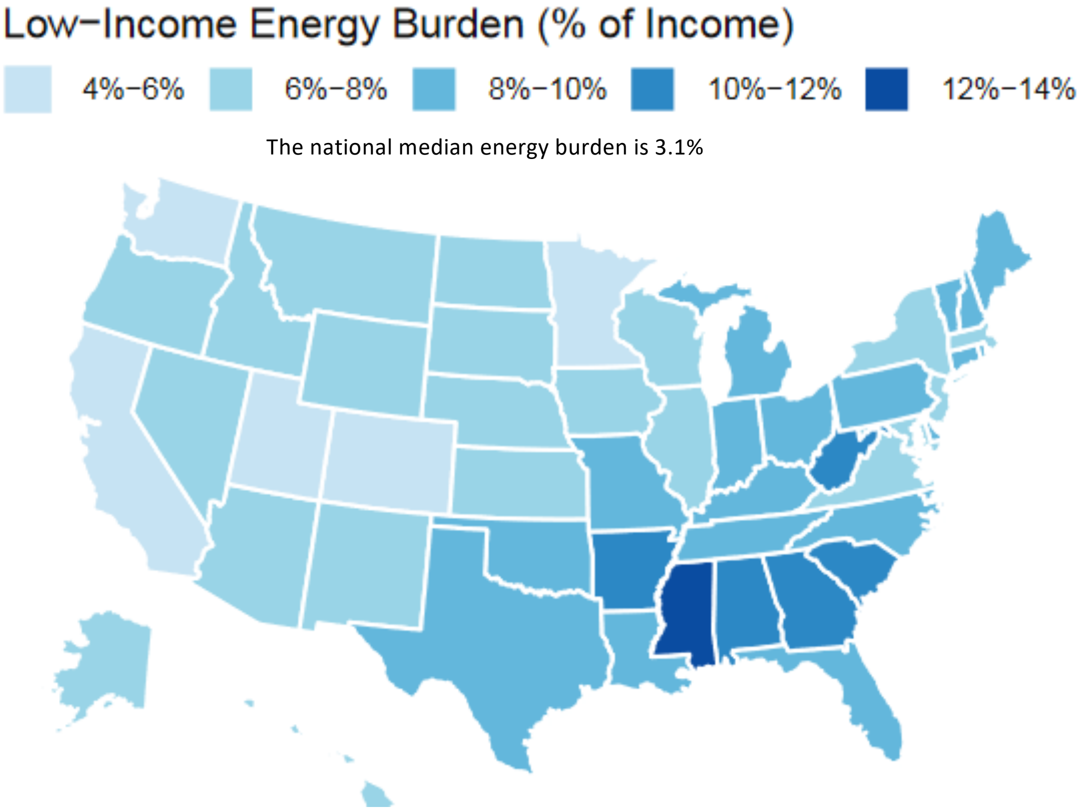


SOURCE: Mikati et al, 2018, American Journal of Public Health

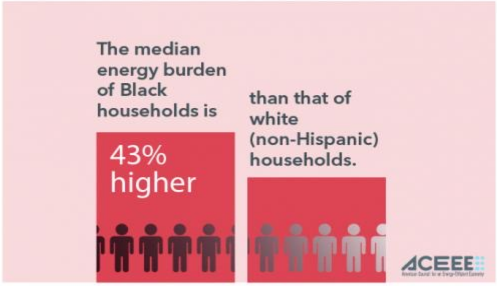
PAUL HORN / InsideClimate News

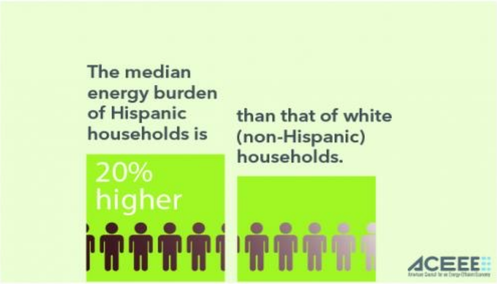
Energy Burden for Low-Income Households

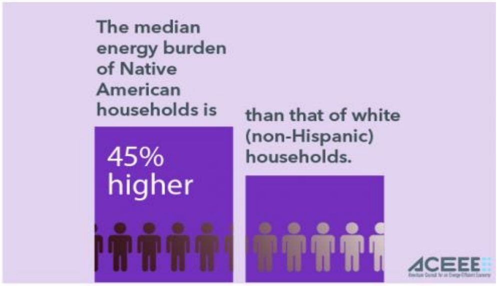
More than **38 million** people in the US live at or below the poverty line, and **30% of Americans live in low-income households**. On average the energy burden of low-income households is 3x higher than the national median[1]. There is also a large disparity between the energy burden between white and non-white households.



The national median energy burden is 3.1%







Sources
1. Department of Energy: https://www.energy.gov/eere/slsc/low-income-community-energy-solutions
2. Energy Burden Map: https://www.energy.gov/sites/prod/files/2019/01/f58/WIP-Energy-Burden_final.pdf
3. Energy Burden by Ethnicity: https://www.aceee.org/energy-burden

Solar Workforce Demographics

The current solar workforce has much work to do to reflect greater diversity and provide more equitable and inclusive work experiences.

- Women just under 30% of solar employees in 2021, (47% of overall U.S. workforce).[1]
- Black employees at 8% of the solar workforce in 2021 (12% of national workforce).[1]
- Hispanic or Latino workers at 20% of the solar workforce compared to 18% nationwide.[1]
- 59K coal jobs at risk by 2030[2]

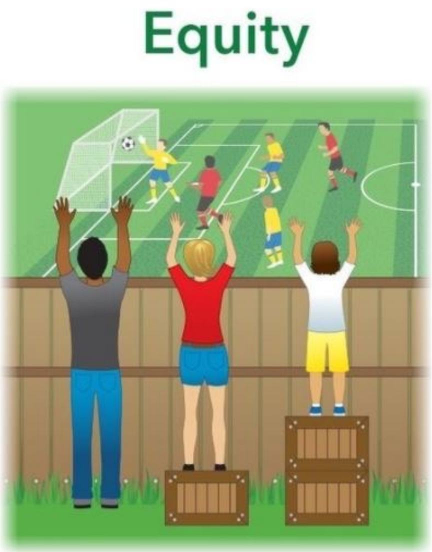
	2019 % of Workforce	2020 % of Workforce	2021 % of Workforce	2021 Jobs
Women	26.0%	29.9%	29.6%	75,491
Hispanic or Latino	17.2%	19.6%	19.8%	50,497
American Indian or Alaska Native	1.2%	1.2%	1.2%	3,060
Asian	8.5%	9.2%	9.2%	23,463
Black or African American	7.7%	7.9%	8.2%	20,913
Native Hawaiian or other Pacific Islander	1.2%	1.3%	1.3%	3,315
White	73.2%	67.9%	72.0%	183,626
Two or more races	8.2%	8.7%	8.2%	20,913
Veterans	7.6%	8.7%	7.9%	20,148
55 and over	10.4%	11.4%	10.9%	27,799
Represented by a Union	-	-	10.1%	25,759

Sources:
1) SEIA National Solar Jobs Census 2021
2) Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization; EIA Annual Coal Reports; ACP data; CBUT-Austin Energy Institute; BCG Analysis *Invenergy Survey

Environmental Equity

Environmental equity describes a country, or world, in which no single group or community faces disadvantages in dealing with environmental hazards, disasters, or pollution.

The assumption that **everyone benefits from the same supports**.



Everyone gets the supports they need, thus producing equity.

Everyone can see the game without supports or accommodations because **the cause(s) of the inequity was addressed**. They systemic barrier has been removed.

Environmental Justice (EJ)

Is the fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations, and policies.

Government Code 65040.12 (c) (SB 115, Solis, 1999)

Reactivate

Reactivate delivers energy solutions to underserved communities. **We believe renewable energy should benefit everyone** We seek to create positive social and environmental impact by collaborating with local partners to deliver renewable energy benefits to underserved people and places. We do this through investments in Community Solar, Small Utility Solar and Next Gen Projects.

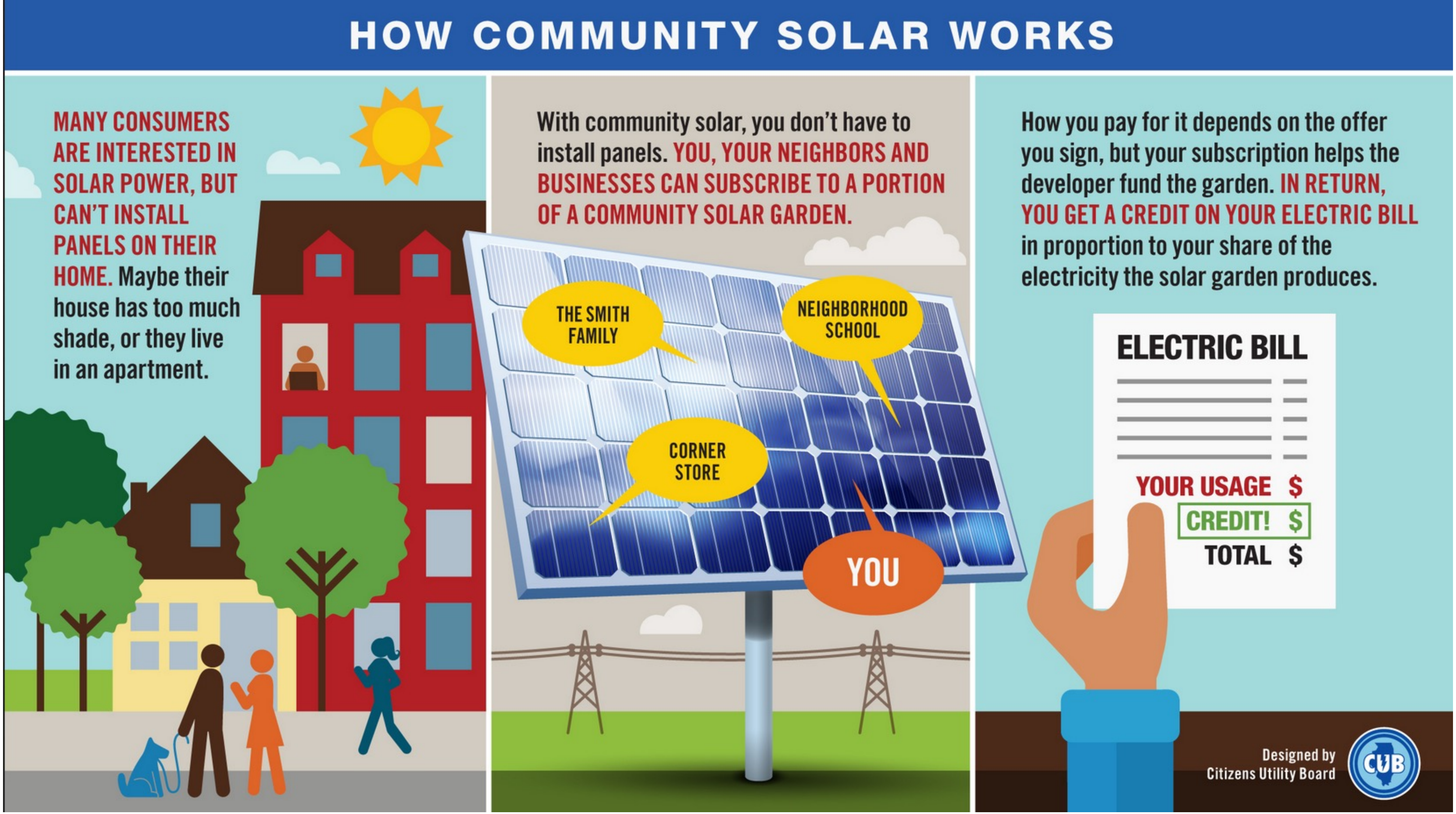
COMMUNITY SOLAR

SMALL UTILITY-SCALE SOLAR

NEXT GEN PROJECTS

TARGETED APPROACH TO IMPACT WITH DISTINCT 2030 GOALS

- Develop **3GW** of renewable energy for **LMI communities**
- Provide **100K LMI** households clean energy & provide LMI households over **$50 million** in energy savings
- Enter into **100 contracts** with MWBEs
- Facilitate workforce training for **2,500** traditionally underserved workers



Source: https://www.citizensutilityboard.org/community-solar-illinois/

Site Planning Considerations

- **Develop programs and tools to improve how to work with citizens who live in impacted communities**
- **Manage social implications on land use and economic impacts to the communities where projects are located.**
- **Think critically about how to meet the needs of local populations to ensure your project creates benefits not harm toward ensuring everyone has a safe and healthy environment in which to live, work, and play.**

Siting to create community benefits

Social → Economic → Environmental → Project

Social

Locate projects to ensure equitable access for LMI and Energy Transition communities

Provide community education on technology used at the project

Make critical community facilities less vulnerable to power outages from extreme weather events and other electricity disruptions

Economic

Make community investments

Execute contracts with MWBEs

Energy bill saving for local Subscribers

Workforce Training to local community

Environmental

Reduce GHG Emissions

Vegetation Management
- Pollinators
- Drainage/Runoff improvements
- Agrivoltaics
- Carbon Sequestration

Renewable Energy Development Benefits for Host Communities

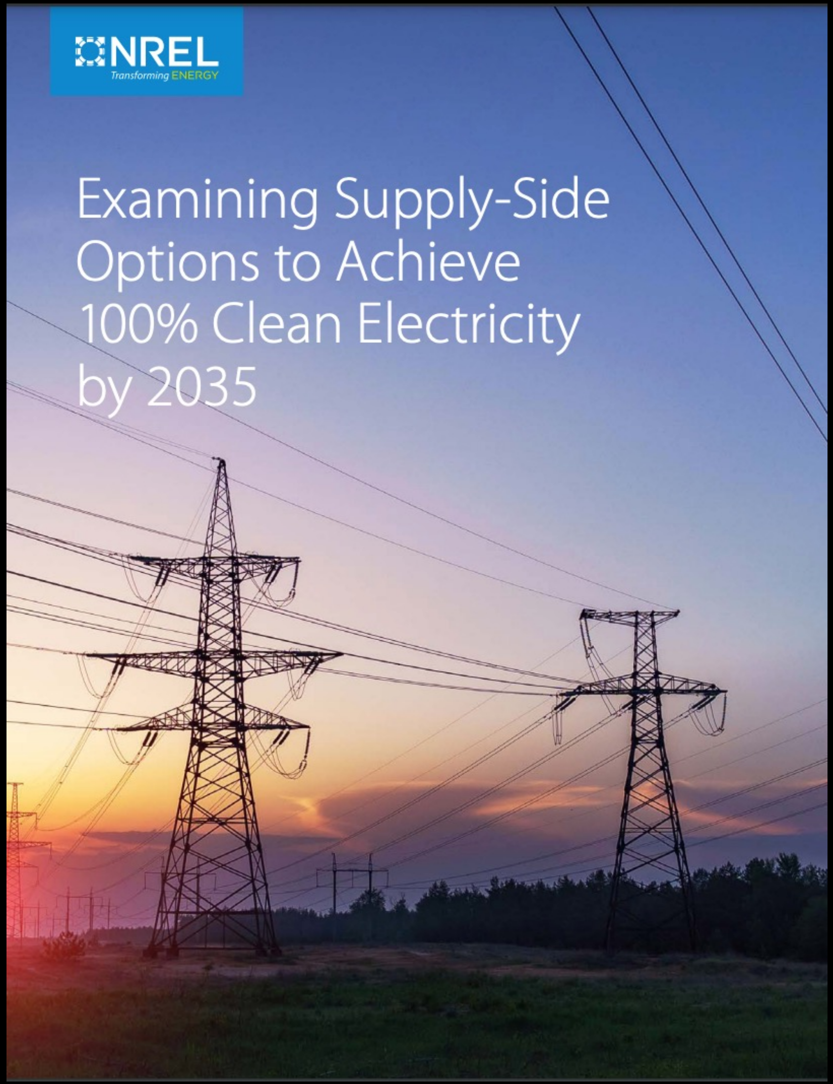
GREAT PLAINS INSTITUTE
Better Energy.
Better World.

Val Stori (She/Her)
Senior Program Manager

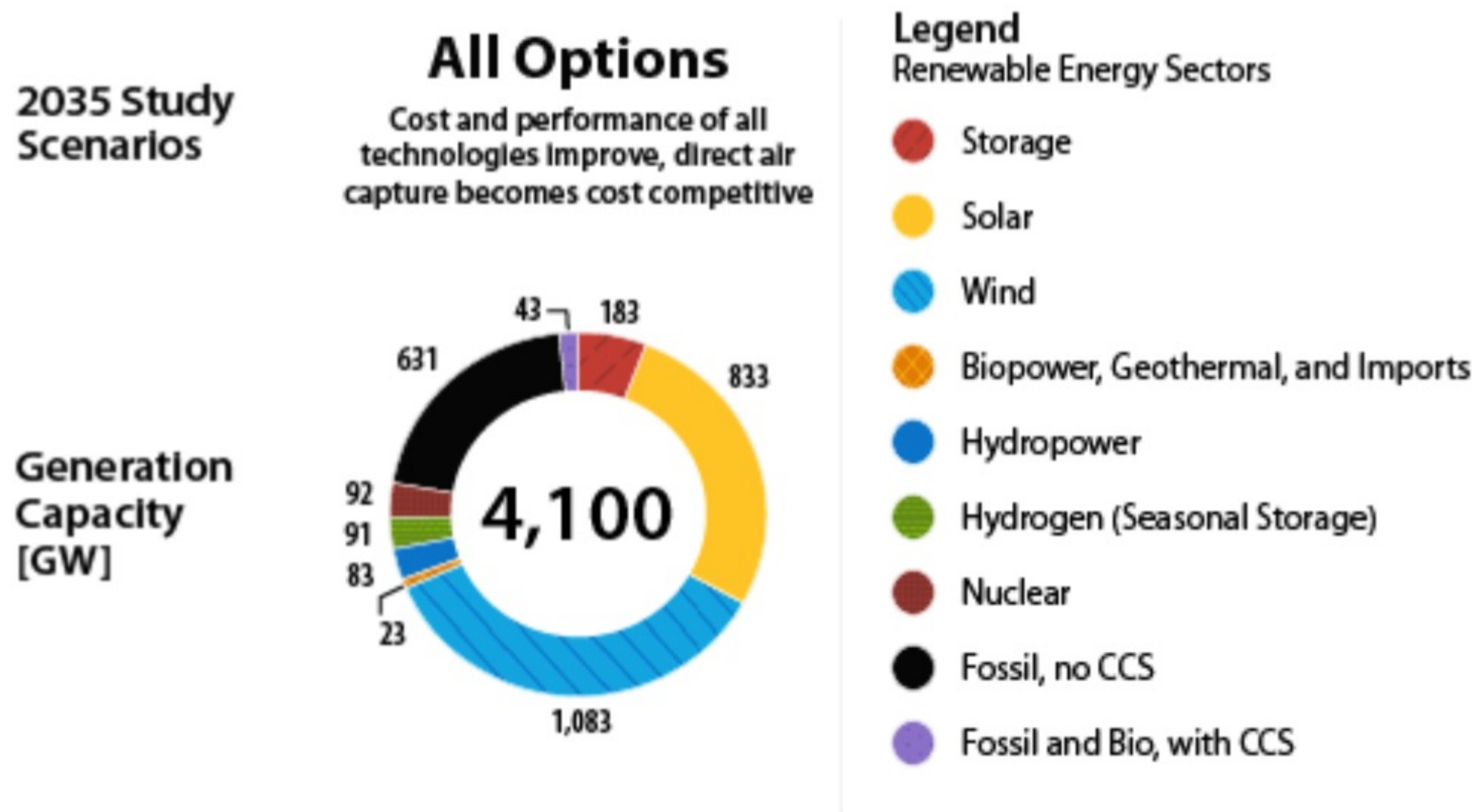
Transforming the energy system to benefit the economy and the environment

GREAT PLAINS INSTITUTE
Better Energy.
Better World.

100% carbon-free electricity sector by 2035 and net-zero GHG emissions economy-wide by 2050



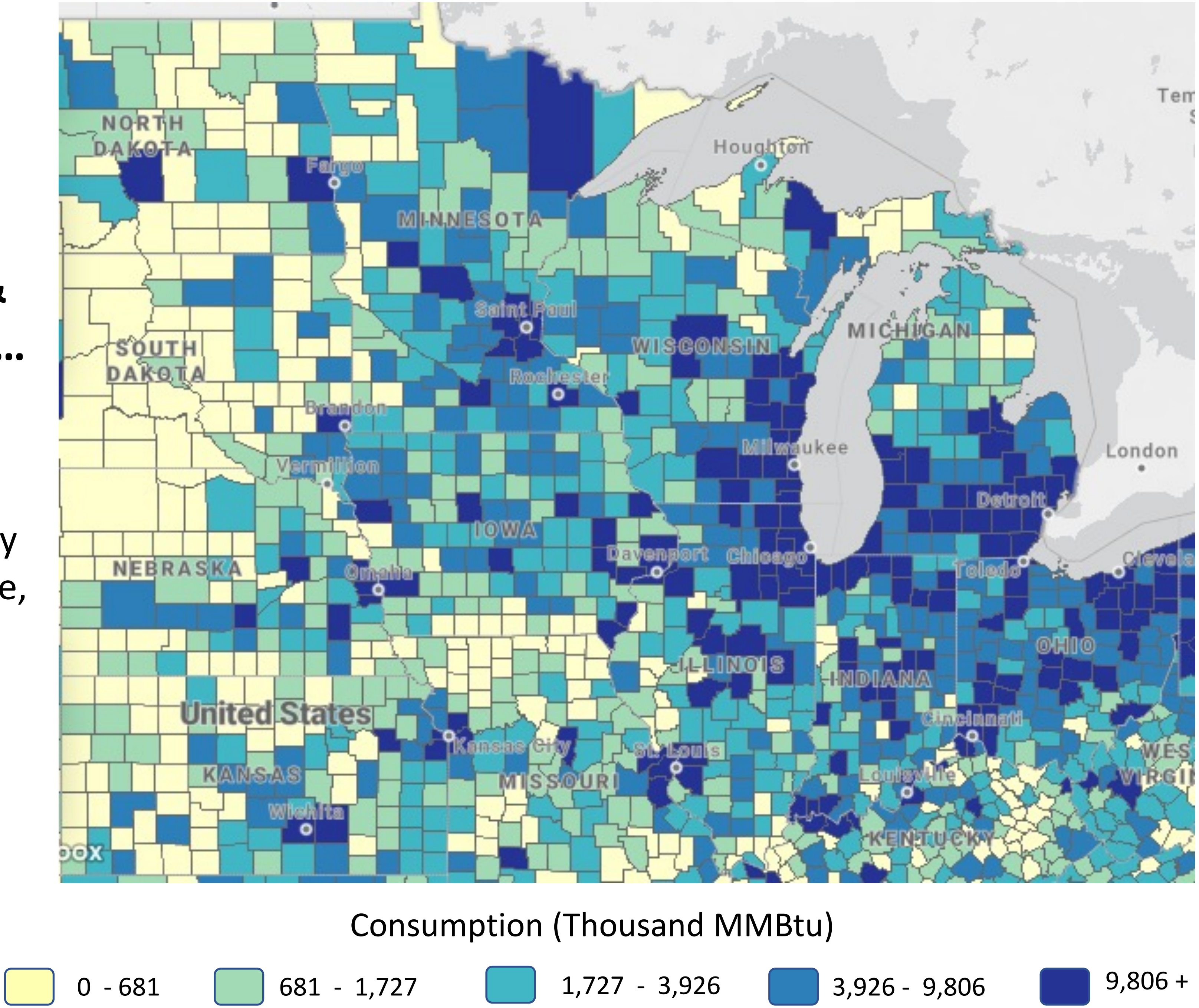
- To achieve 100% goal, we will need a combined 2000 GW of wind and solar by 2035
- This amounts to an additional 40–90 GW of solar on the grid per year and 70–150 GW of wind per year by the end of the decade.



Location, Location, Location…

End markets/demand centers are disconnected physically, socially, & economically from land-rich areas…

- Rural communities host the energy future, and the energy benefits flow to urban areas.
- Siting consequences to host community affect natural resources, economic base, community character.
- Transmission buildout exacerbates perceived rural/urban divide.



National Renewable Energy Laboratory. “Net Electricity and Natural Gas Consumption," *State and Local Planning for Energy*, accessed 12/29/2020, https://gds.nrel.gov/slope.

Climate Co-Benefits

Solar development has many community benefits. You're probably familiar with some. But let's dig a little deeper into "co-benefits."

". . . most policies designed to address GHG mitigation also have other, often at least equally important, rationales."

(IPCC Fourth Assessment 2007)

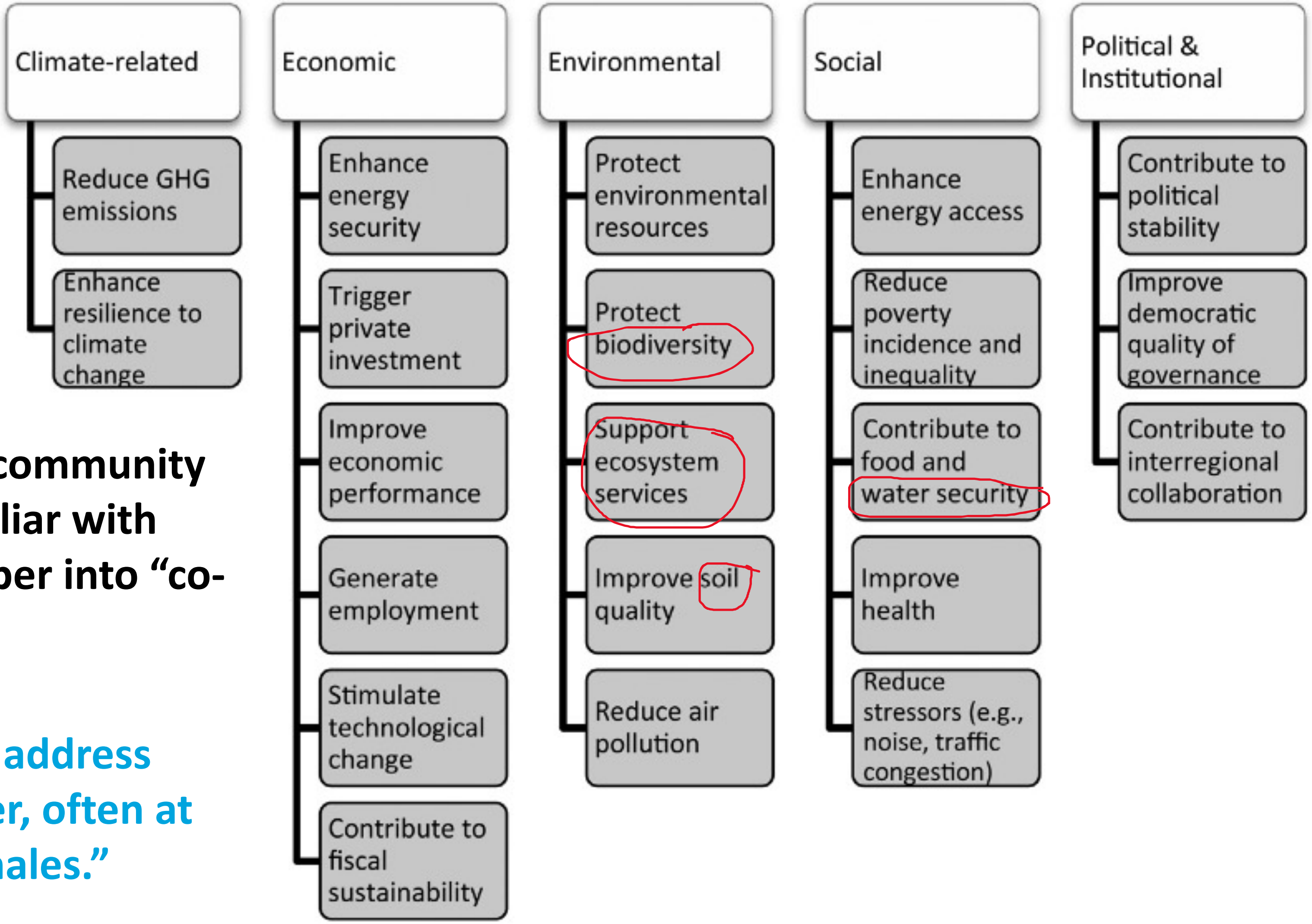


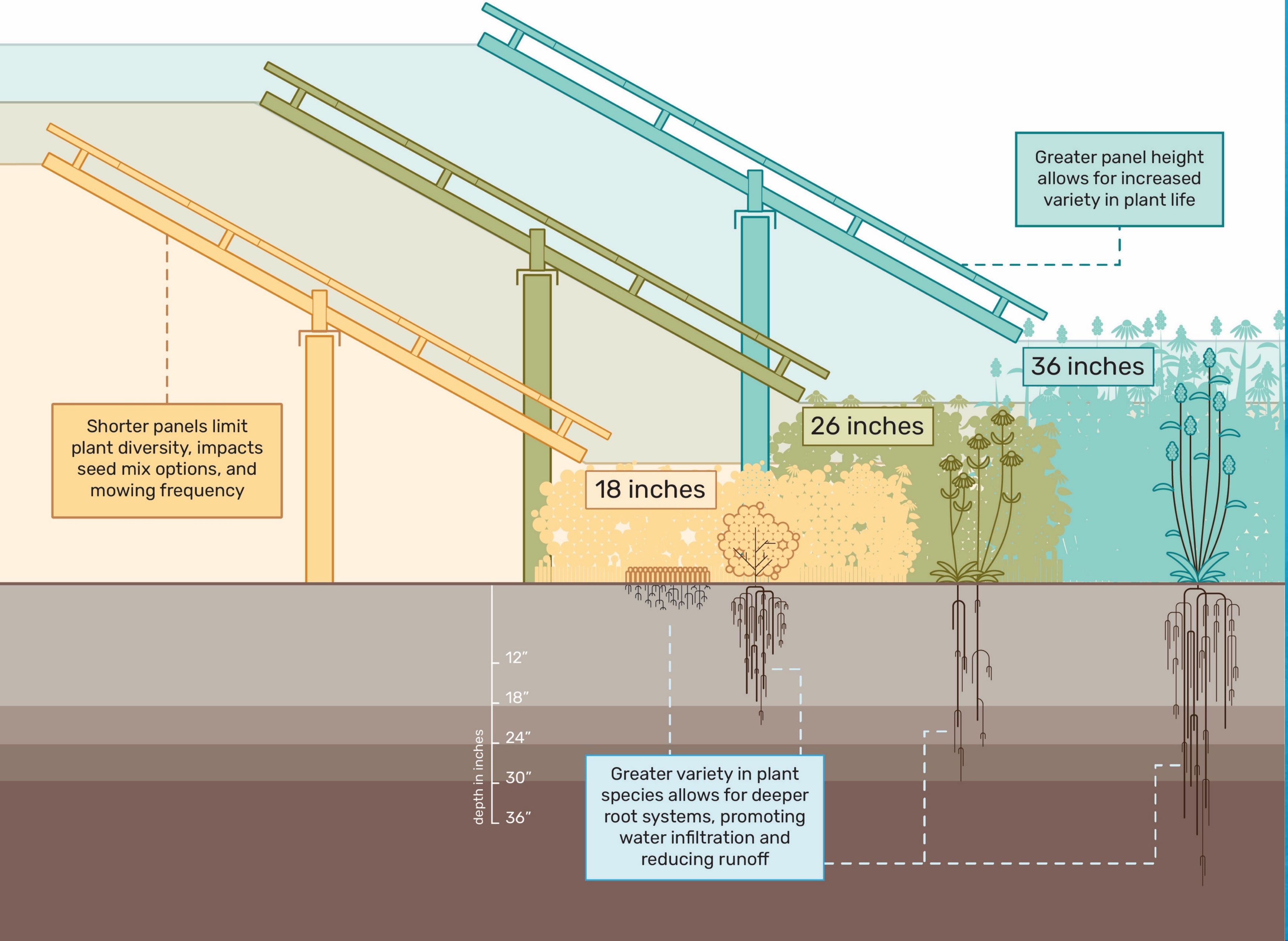
Fig. 1. Types of co-benefits.

Source: Mayrhofer J. Gupta J., The Science and politics of co-benefits in climate policy, Environmental Science and Policy, Elsevier, 2016

The Co-Benefit Approach to Solar Development

If you restore watershed functions, enhance habitat, diversify agriculture, protect drinking water supplies… Does it matter that it's a solar farm? These benefits accrue to host communities and could eliminate expensive system upgrades for municipal wastewater or stormwater management infrastructure.

Field tests at the InSPIRE test site in Minnesota, *Photo Credit: NREL Flickr InSPIRE Minnesota Album*



PV-SMaRT:

Assessing existing stormwater and water quality permitting practices and standards for solar developments and using science-based research to develop best practices in solar site design and stormwater permitting.

What are we protecting?

Photo credit: Brian Ross

Natural Resource Protection Priorities

- ✓ **Ecological function** are services provided by natural systems that sustain communities or ecosystems (watersheds/ hydrologic function, pollination, forest or other biomass growth).
- ✓ **Water quality** for the lakes, rivers and streams that provide water sources, recreation, and habitat. Perennial ground cover reduces runoff, soil conservation, wetland and waterway buffers.
- ✓ **Habitat** areas including beneficial species (pollinators), game species (pheasants), threatened or endangered species, and threatened eco-systems (oak savannahs)
- ✓ **Agricultural** opportunities with diversified income stream for agricultural operators, co-located ag production, pollinator benefits for nearby crops
- ✓ **Recreation and viewsheds** economic and cultural activities that add qualitative and quantitative value.

Photo credit: Brian Ross

If you remember one slide …

1. In the energy system of the future, nearly everyone will be host community.
2. Most communities will have some land use jurisdiction over large-scale solar development.
3. If sited and designed appropriately, large-scale solar can provide local benefits to host communities - consistent with community priorities, resources, and development plans.

Thank you!

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GREAT PLAINS INSTITUTE

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Photovoltaic Stormwater Management Research and Testing (PV-SMaRT)
Barriers and Best Practices

Resources section, https://www.nrel.gov/solar/market-research-analysis/pv-smart.html

Photo from Great Plains Institute by Katharine Chute

Draft Best Practices
For Solar Projects

1. **Practice site design for disconnection.** Incorporate infiltration areas into array layout and design.
2. **Take a green infrastructure approach.** Maximize use of native and deep-rooted naturalized vegetation in a diverse mix of vegetative cover.
3. **Use low-impact development (LID)** construction techniques, mitigate for soil compaction.
4. **Design array to sustain vegetative cover** and infiltration. Use array design to allow self sustaining vegetation cover under and between arrays.
5. **Adopt solar-specific mitigation of runoff** under special (more challenging) site conditions.
6. **Look beyond the design storm.** Include estimates of stormwater infiltration capacity in excess of AHJ minimum standards for design storms.