



# ADVANCING ENERGY EQUITY & JUSTICE IN TECHNICAL ASSISTANCE & INTEGRATED GRID PLANNING

**Maui Community Meeting**  
*Efficiency Solutions and Circular Systems Committee*

October 5, 2023

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U.S. DEPARTMENT OF  
**ENERGY**

  
**Pacific Northwest**  
NATIONAL LABORATORY

 **Sandia**  
National  
Laboratories





# Supporting community goals and needs through energy storage and clean energy solutions

## WHY ENERGY STORAGE?

Locational flexibility



Wide applications



Broad uses for storage



## HOW CAN ENERGY STORAGE SUPPORT COMMUNITY GOALS AND ADDRESS NEEDS?



Access



Affordability



Environmental Impact



Social Impact



Decarbonization

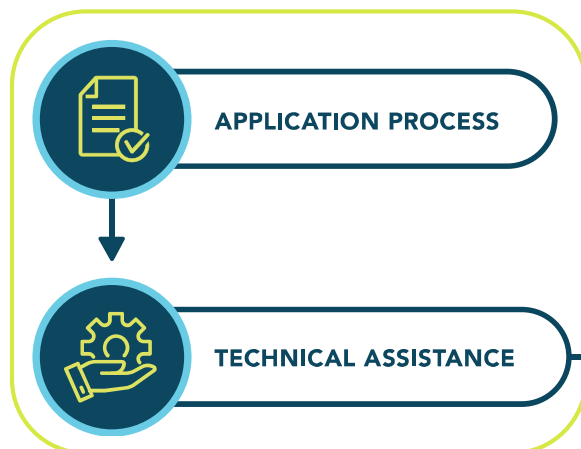


Resiliency

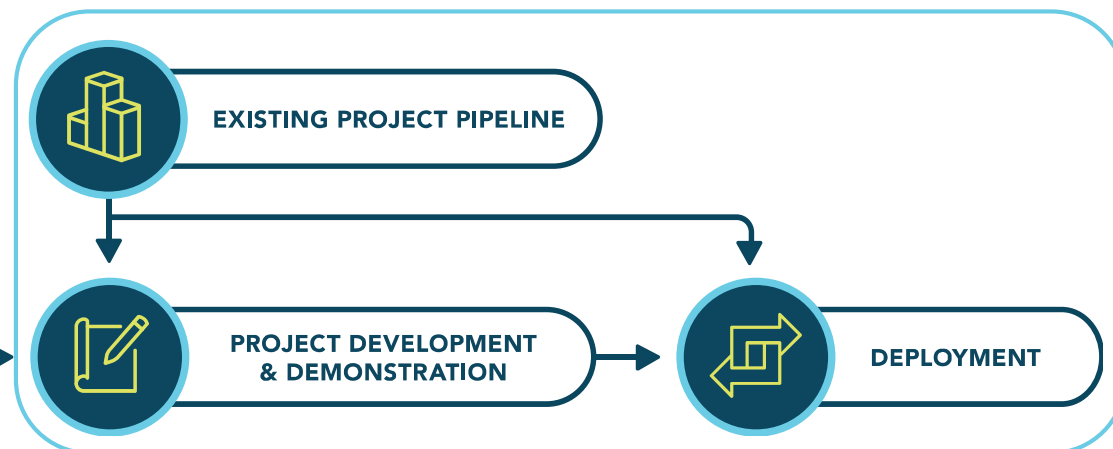


## Program Phases Linking Technical Assistance with Project Development and Demonstration Assistance

### Phase 1 (PNNL)



### Phase 2 (Sandia)



## OUTCOMES

**Connect** disadvantaged communities with energy solutions that support equitable outcomes

**Demonstrate** the role of energy storage in energy equity

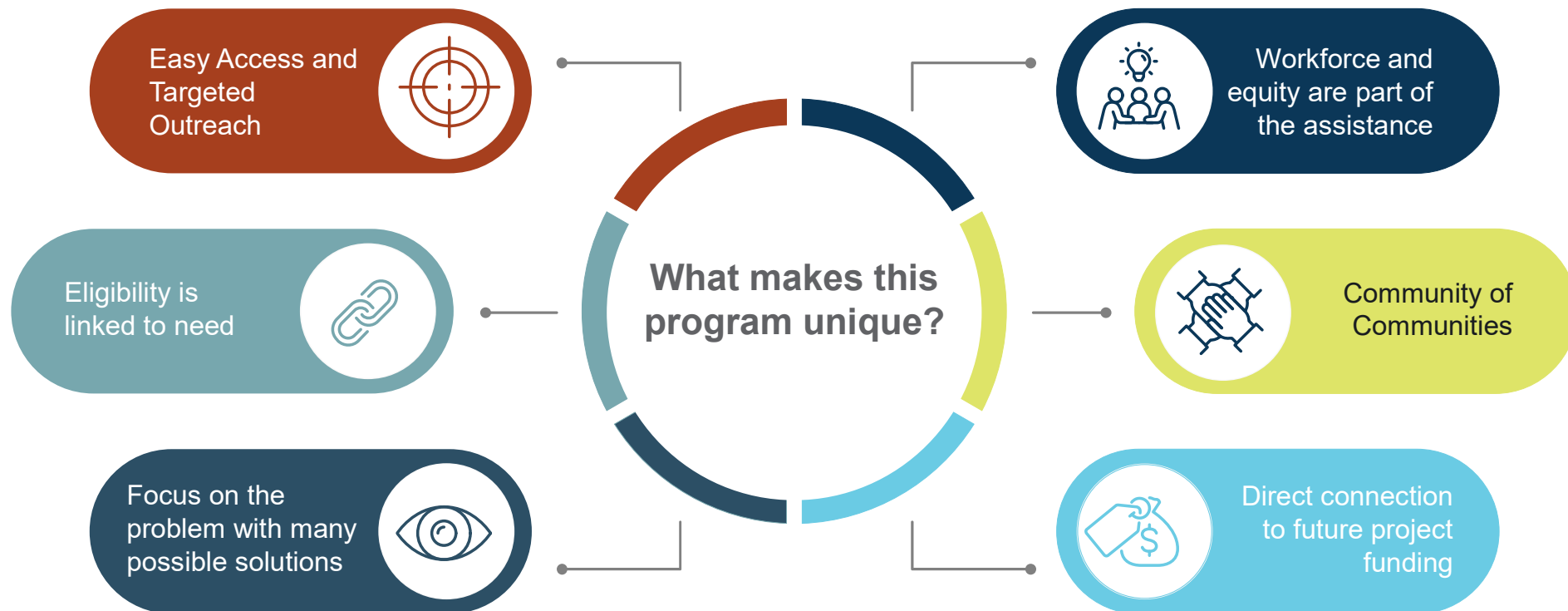
**Develop** methods and metrics to analyze impact of investment on equity

**Report** on lessons learned and best practices to support future work across DOE

**Grow** and strengthen DOE project pipeline



## Energy Storage for Social Equity Initiative integrates equity, workforce, and techno-economic solutions





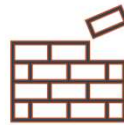
## Centering communities and co-developing technical solutions with equity and workforce goals



Center Communities



Benefits flow to  
intended recipients



Build community  
capacity and skills



Knowledge sharing



Microgrids



Off-grid  
Systems



Resilience  
Hubs



PV + BESS for  
Commercial and  
Residential Buildings

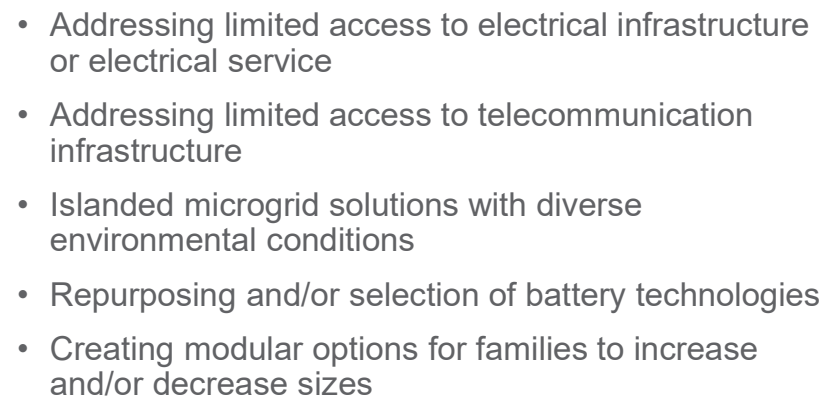


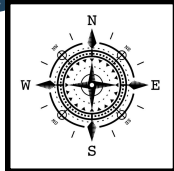


## Ho'āhu Energy Cooperative Moloka'i (Moloka'i, HI)

### Summary scope of work, community needs, and background information

- Regular meetings to build relationships with Ho'ahu Energy Cooperative Moloka'i and scope projects, learn about community goals, interests, and requests
  - Scope of work:
    - Nano-grid, islanded systems analysis that looked at recycled panels (remaining life cycle costs, recycled and new car batteries,
    - Workforce and Equity analysis
    - Energy storage community research (Nani Maunaloa)
    - Funding opportunities and research
    - Community scale microgrid feasibility analysis (Nani Maunaloa)
    - Community weekend meetings and events-presenting on microgrids, system components, answering questions, engaging with HECM
  - **Energy Challenge:** Affordability, resiliency, reliability, energy access
  - **Project Type:** Standalone systems and Microgrid systems (interconnected and shared)
  - **Background Info:** health issues due to diesel exhaust, improve livelihood reliability for homesteads, energy burden, energy efficiency, capacity building
- Additional Notes:
- Due to land ownership uncertainty with Moloka'i Ranch, outside the control of HECM, PNNL worked with HECM to revise the project scope that would still align to support Project Development and Deployment Cost Share selection.
  - HECM was selected in the first round of PDDA (led by Sandia)
  - HECM is leading the prioritization and selection of households for deployment of systems based on their criteria.





## Approach 1- Community interconnected microgrids for Nani Maunaloa that highlight significant shading on homes



### PV Required (Estimation)

- Molokai consumption est./household: Wh/month or kWh/day
- PV size est./household:
- Total PV size: kW

### PV Generation Assessment

- Areas in red limited by shade
- Total available roof area: SQ FT
- Panels square footage:
  - Manufacturers based on output
- Potential power generation:
  - Manufacturer 1= **204.5kW**
  - Manufacturer 2= **285.9kW**





## Approach 2- Address shading on homes through shared microgrids -- requires community and household engagement and agreements supporting the community goals



### Zoning

- 15 Zoning areas of 3 or 4 houses
- Min. required PV generation:
  - 3 Houses: 7.2kW
  - 4 Houses: 9.6kW

Zone	Roof Area	Generation REC (kW)	Generation Canadian (kW)
A1	1590	15.8	22.4
A2	2120	21.4	29.9
A3	2120	21.4	29.9
A4	2120	21.4	29.9
A5	2120	21.4	29.9
A6	1590	15.8	22.4
A7	1060	10.6	14.9
A8	1060	10.6	14.9
A9	1060	10.6	14.9
A10	1060	10.6	14.9
A11	1650	16.6	23.2
A12	890	8.9	12.5
A13	340	3.4	4.6
A14	950	9.6	13.3
A15	1030	10.3	14.5



## Examples of workforce development

### Workforce Development Program

Ho'āhu is a volunteer working group of Molokai community members who are passionate about energy and believe in sharing leadership and decision-making through transparency and inclusion. Ho'āhu's goal is 100% local hiring, and have successfully been able to create a Workforce Development program with hands-on training in general construction, installation, and maintenance of renewable energy systems.

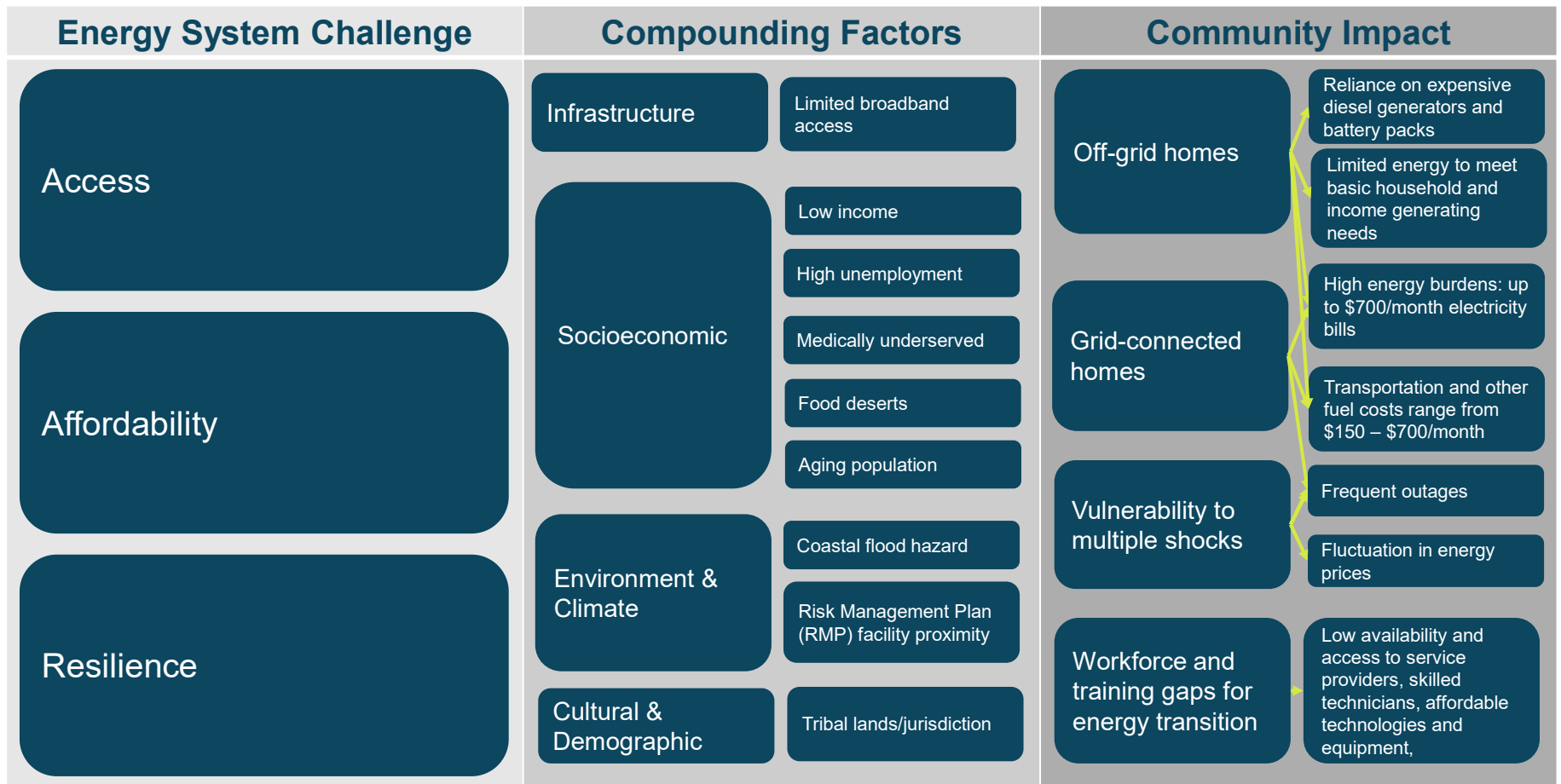


HECM's workforce is led by **Liliana Napoleon**

- Removed barriers (ex: education, age)
- Partnered with Makah Learning Center
- OSHA Training
- ASU Microgrid Classes and Training
- Review of entry requirements for specific jobs (electricians, plumbers, carpenters)
- Meet goal to hire all local residents for installations and maintenance



## Challenges and Community Impact







## **Socioeconomic and demographic, energy infrastructure, and environmental indicators to support the Moloka'i community in strategic plans, funding, and goals**

### **Socioeconomic and Demographic Indicators**

- People of Color by State Percentiles
- Low Income by State Percentiles
- Unemployment Rate by State Percentiles
- Less than High School Education by State Percentiles
- Under Age of 5 by State Percentiles
- Over Age 64 by State Percentiles

### **Energy, Infrastructure, and Environmental Indicators**

- Environmental Protection Agency (EPA) Cleanups in My Community (CIMC)
- Low-Income Energy Affordability Data (LEAD Tool)
- Environmental Justice Screening and Mapping Tool (EJScreen)- Medically Underserved
- Households with Limited Broadband
- Food Deserts
- Environmental Justice Screening and Mapping Tool (EJScreen) –Risk Management Plan Facility Proximity
- Coastal Flood Hazard

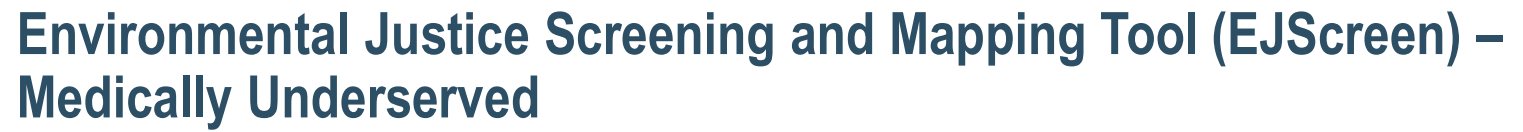




## Department of Energy Justice40 Disadvantaged Communities by Census Tract

- Disadvantaged Communities (DACs)
- Tribal Lands / U.S. Territories

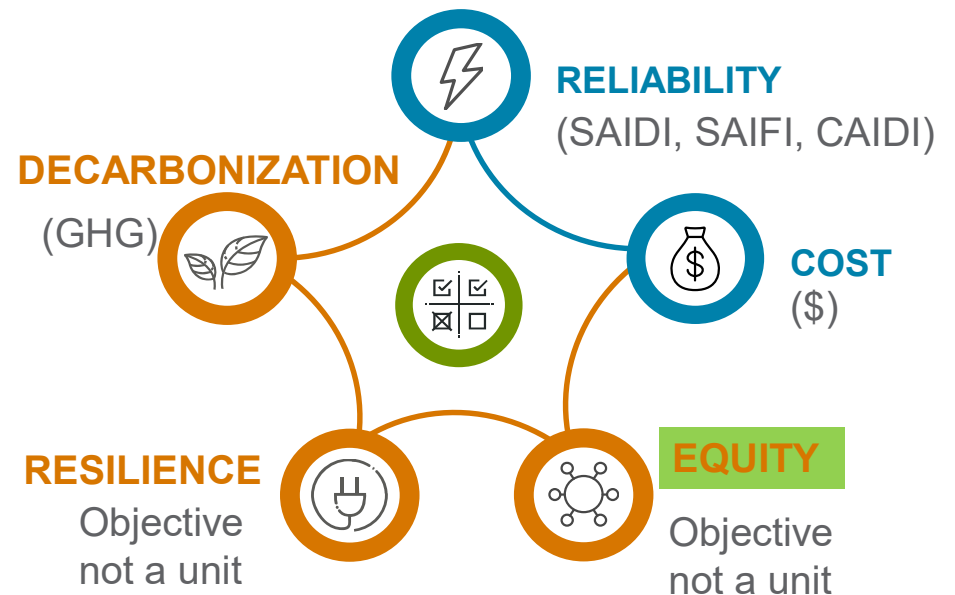






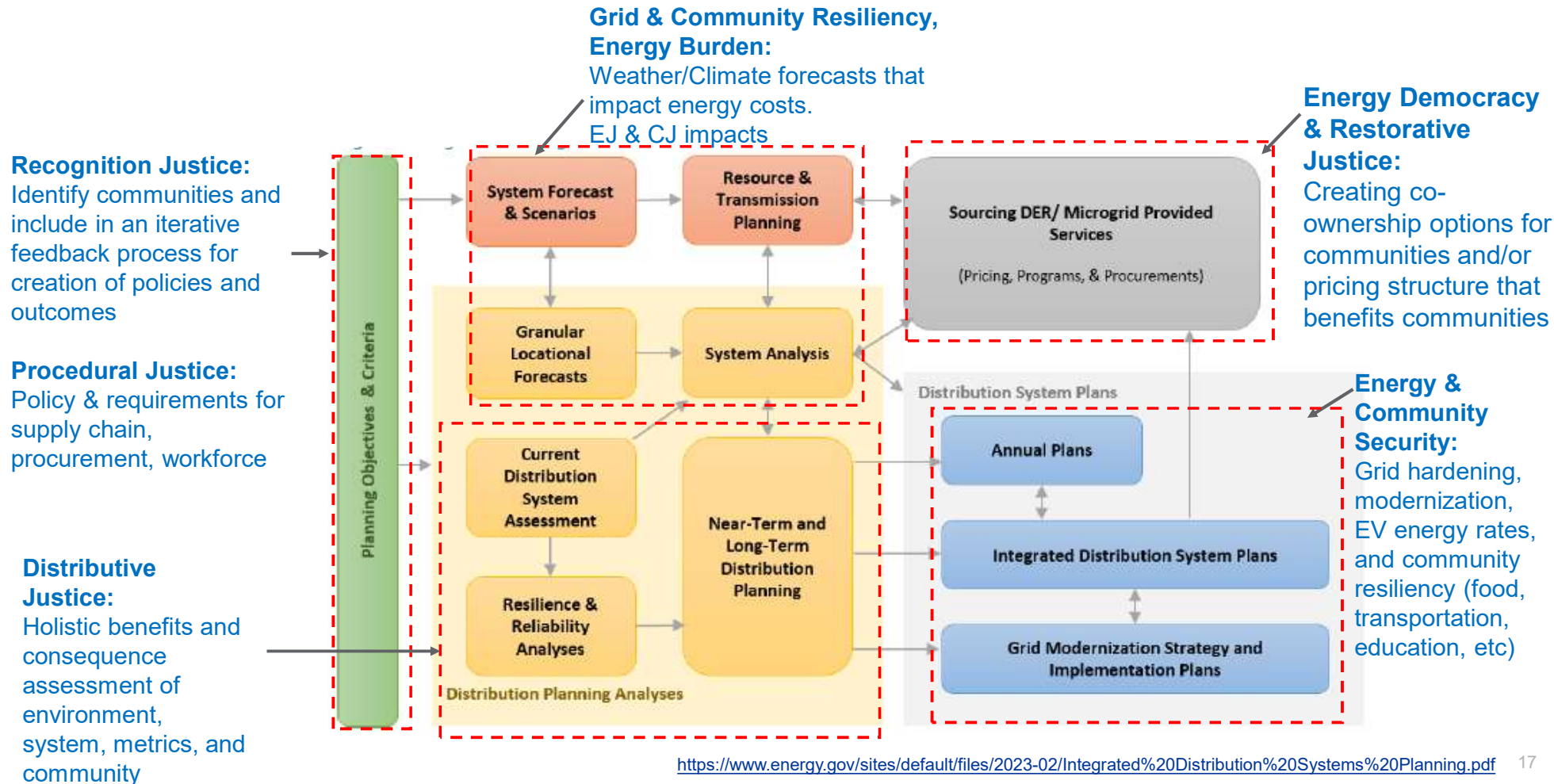
## Advancing Emerging Objectives in Grid Planning

- Traditionally electric grid planning strives to maintain **safe, reliable, efficient, and affordable** service for current and future customers.
- As policies, social preferences, and the threat landscape evolve, additional considerations for power system planners are emerging, including **decarbonization, resilience, and energy equity and justice**.
- Relative to traditional objectives, these emerging objectives are not well integrated into grid planning paradigms.

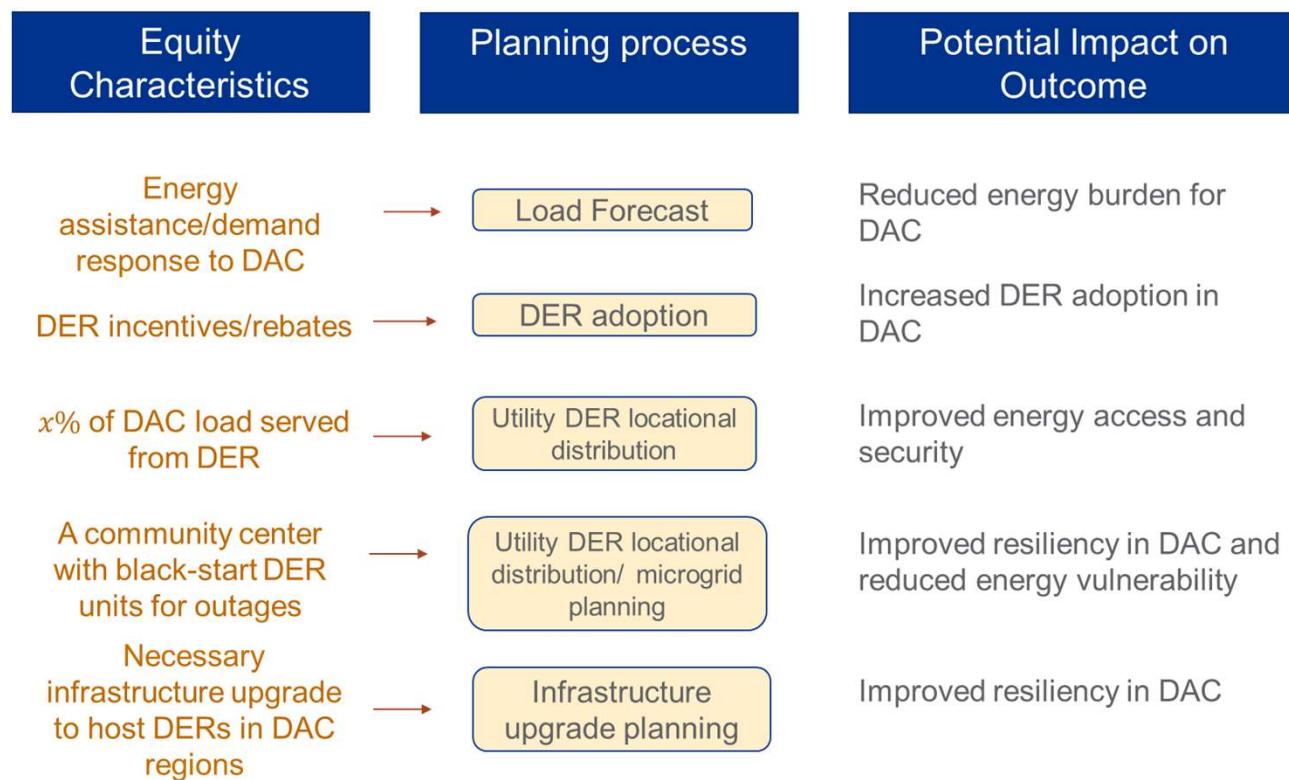




# Incorporating Equity & Resilience within Distribution System Planning (DSP)

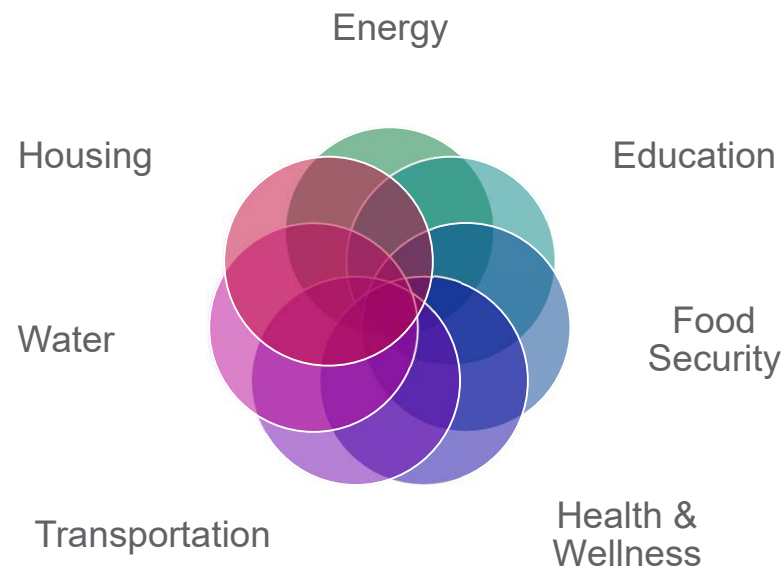


## Modeling Equity in the Distribution System Planning Process

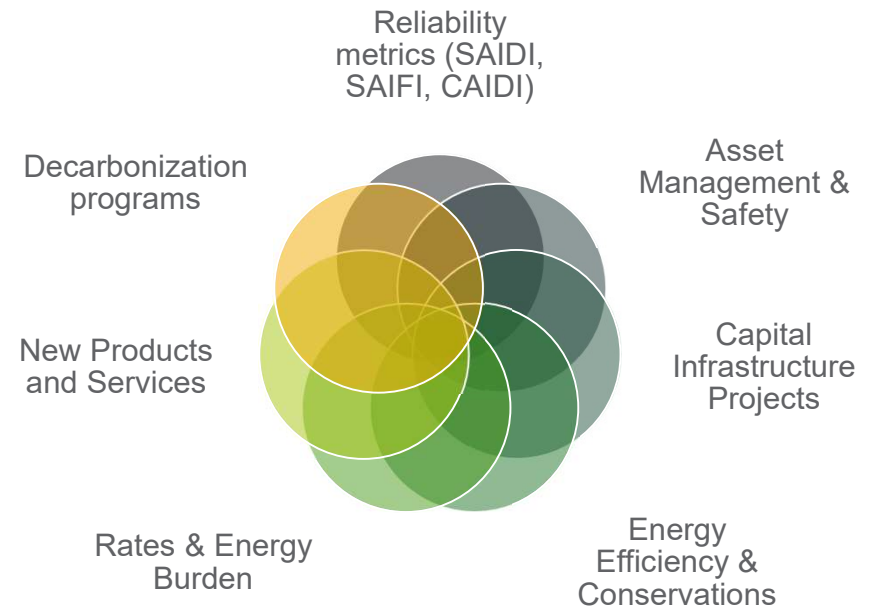


# Intersection of community, state, utility, and agency goals and identification of gaps

## Example attributes of a healthy community



## Example State and Utility objectives and priorities



# THANK YOU

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## ESCS Committee

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**From:** Yoshimura, Jennifer <jennifer.yoshimura@pnnl.gov>  
**Sent:** Wednesday, October 4, 2023 10:04 PM  
**To:** ESCS Committee  
**Subject:** PNNL Maui Community Presentation 200523  
**Attachments:** Maui Community Meeting\_Oct 5 2023\_PNNL Final.pdf

You don't often get email from jennifer.yoshimura@pnnl.gov. [Learn why this is important](#)

Hi Ellen,

Attached is my presentation for tomorrow's Maui Community meeting highlighting PNNL's work for Energy Storage for Social Equity and Grid Planning (if we have a chance to get to those slides).

Kind regards,  
Jen

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