

Building Electrification: Dystopian Novel or an Opportunity for Equitable Action

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California Climate and Energy Forum



Facilitator



Lou Jacobson

Senior Program Manager

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Experience

- Member, City of Eureka Energy Committee
- Member, South Bay Union School District, Bond Citizen Oversight Committee
- Board Member, Center for Environmental and Economic Development
- Director of Fiscal Services, Eureka City Schools
- Director of Demand Side Management, Redwood Coast Energy Authority
- Board Member, Local Government Sustainable Energy Coalition (2018-2021)
- Member, California Energy Efficiency Coordinating Committee (2018-2021)
- Member, Rural and Hard to Reach Working Group, (2014-21), Co-Chair (2018-2019)

Agenda

Chapter
00 | Introductions

We Have Done the
Impossible, and That
Makes Us Mighty

Chapter
01 | Implementation

It's What Plants Crave.
It's Got Electrolytes.

Chapter
02 | Barriers

The Dunes of Arrakis

Chapter
03 | Solutions

Scientists Never Like
to Say 100%

Chapter
04 | Communications

Marcos Inaros

Chapter
05 | Conclusion

Wrapping It Up!

FIREFLY

AUGH - 03-k64-Firefly class

28.12.05 GRAFDISEIGN.CH

A Firefly-class spaceship is shown in flight, viewed from a low angle. The ship is dark and sleek, with a prominent cockpit and various sensor or weapon pods. It is flying over a blue, textured surface that resembles water or a planet's surface. The overall color scheme is a monochromatic blue.

We Have Done the Impossible, and That Makes Us Mighty

Introduction



Energy+Environmental Economics

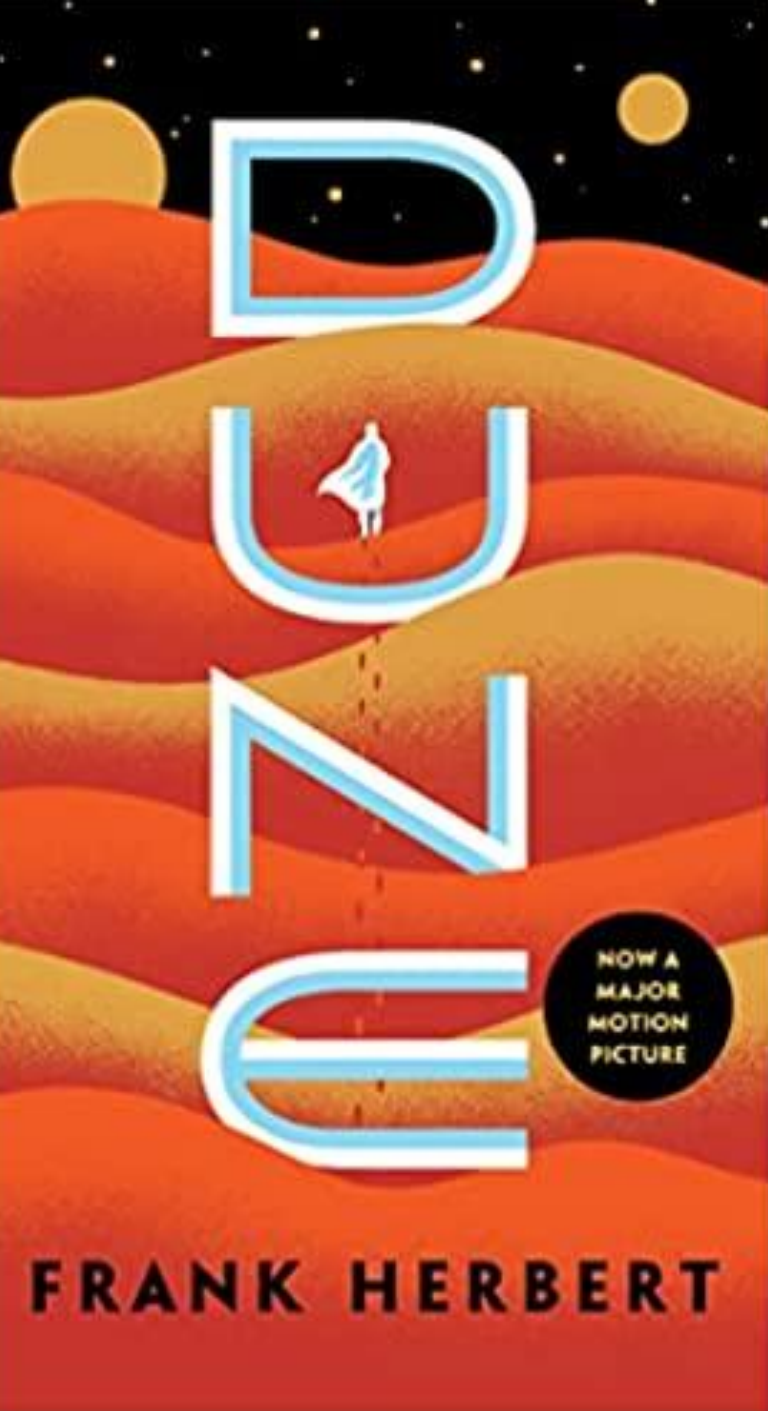
Jessie Knapstein, Senior Managing Consultant

Jessie.Knapstein@ethree.com



- + Joined E3 in 2019 where she helps utilities, system operators, and state agencies meet climate goals
- + Experience highlights:
 - Leading a team to conduct analysis for the **California Air Resources Board (CARB) Scoping Plan**
 - Led study with **SMUD** to assess electric sector pathways to carbon neutrality by 2030
 - Led team to model least-cost portfolios to meet **SB100 for the California Energy Commission (CEC)**
 - Led team assessing **Sidewalk Infrastructure Partners' (SIP)** virtual power plant OhmConnect investment
- + Previously, at **PG&E**, led efforts to prepare for climate-related impacts and conducted analysis of climate policy
- + Worked for the **U.S. Department of Energy** on funding and commercializing energy efficient building technologies
- + M.S. in Energy and Resources (ERG) and a Master of Public Policy from the University of California, Berkeley and a B.A. from the University of Florida





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ENERGY
CODE
CONNECT

Jose Buendia

Senior Project Advisor

Southern California Edison

Favorite Dystopian Work: The Hunger Games



Jose Buendia is a Senior Project Manager with Southern California Edison's Building Electrification department. He leads the development of program strategy for achieving California's and SCE's greenhouse gas reduction goals. He has worked with SCE for over a decade on energy efficiency program, and the last few years on clean energy program strategy, development, and planning for a sustainable and cost-effective clean energy future for everyone.

Bio:

Rochelle Butler is the Energy Manager for the San Joaquin Valley Clean Energy Organization (SJVCEO).

Rochelle's primary work is on the Central California Energy Watch (CCEW) Program which provides technical assistance to local governments, special districts, and school districts in the eight-county region of the San Joaquin Valley as well as Monterey County. Technical assistance encompasses energy benchmarking, project pipelining, and advanced project assistance.

Rochelle has over 12 years of experience working in the energy efficiency sector overseeing both residential and public sector programs. As a native to California's San Joaquin Valley, Rochelle has a passion for working in rural, hard-to-reach, and disadvantaged communities.



- ▶ Rochelle Butler, Energy Manager
- ▶ San Joaquin Valley Clean Energy Organization (SJVCEO)
- ▶ Fresno, CA
- ▶ Email: rbutler@pesc.com
- ▶ LinkedIn: <http://linkedin.com/in/rochelle-butler>
- ▶ Favorite Dystopian Movie: The Matrix



Jaime Alonso

Executive Director, Inland Empire Region

Favorite Dystopian Novel: Parable of the Sower, Octavia Butler



**It's What Plants Crave.
It's Got Electrolytes.**

CCEC: Building Decarbonization

Emissions, Electrification, & Challenges

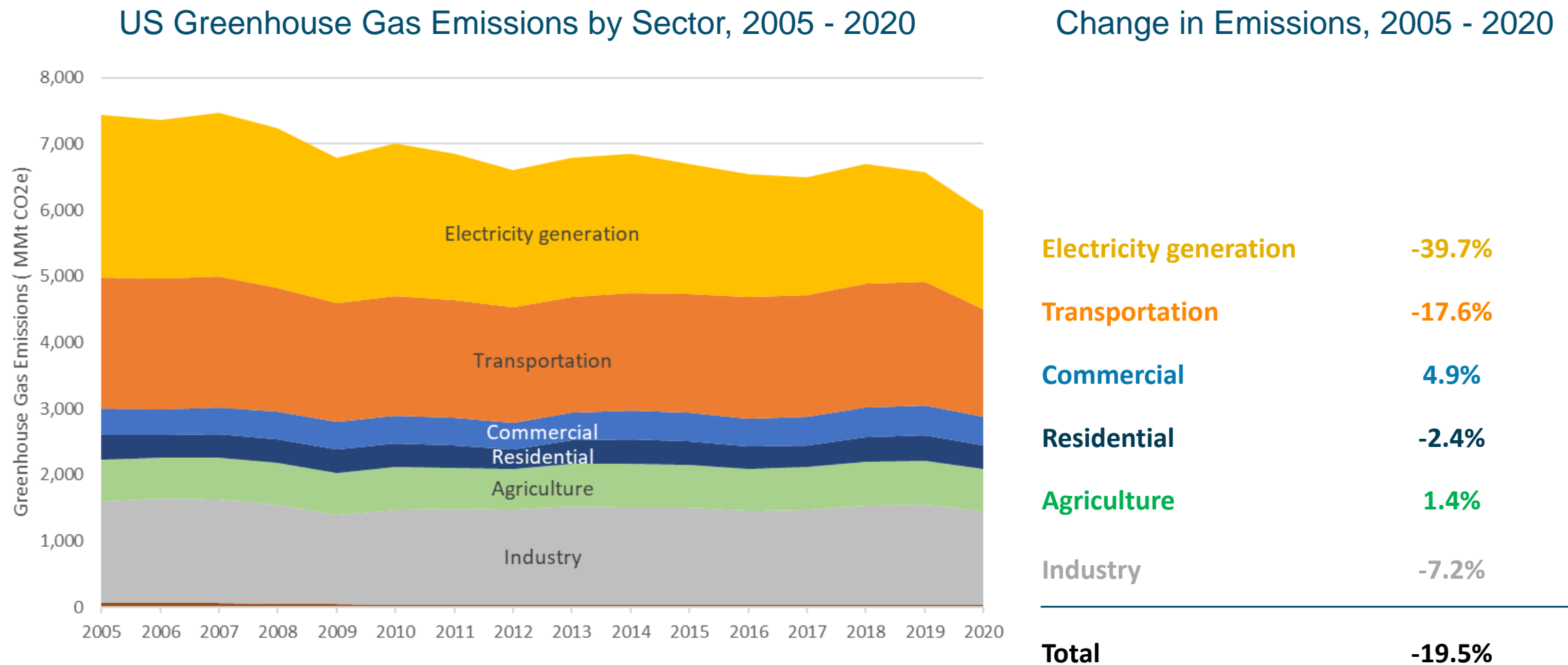
September 21, 2022



Energy+Environmental Economics

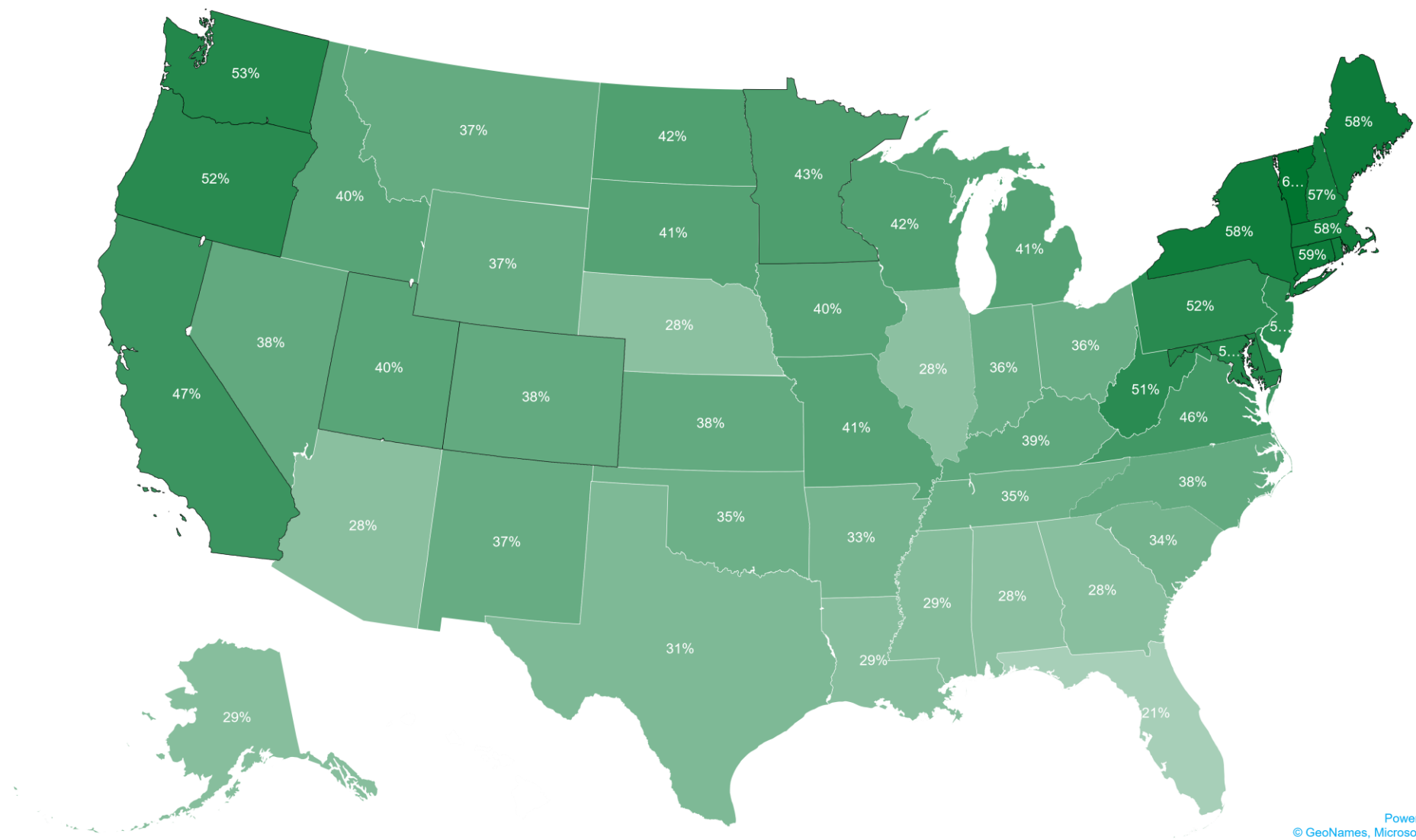
Jessie Knapstein, Senior Managing Consultant

US GHG Emissions Show Little Progress in Buildings



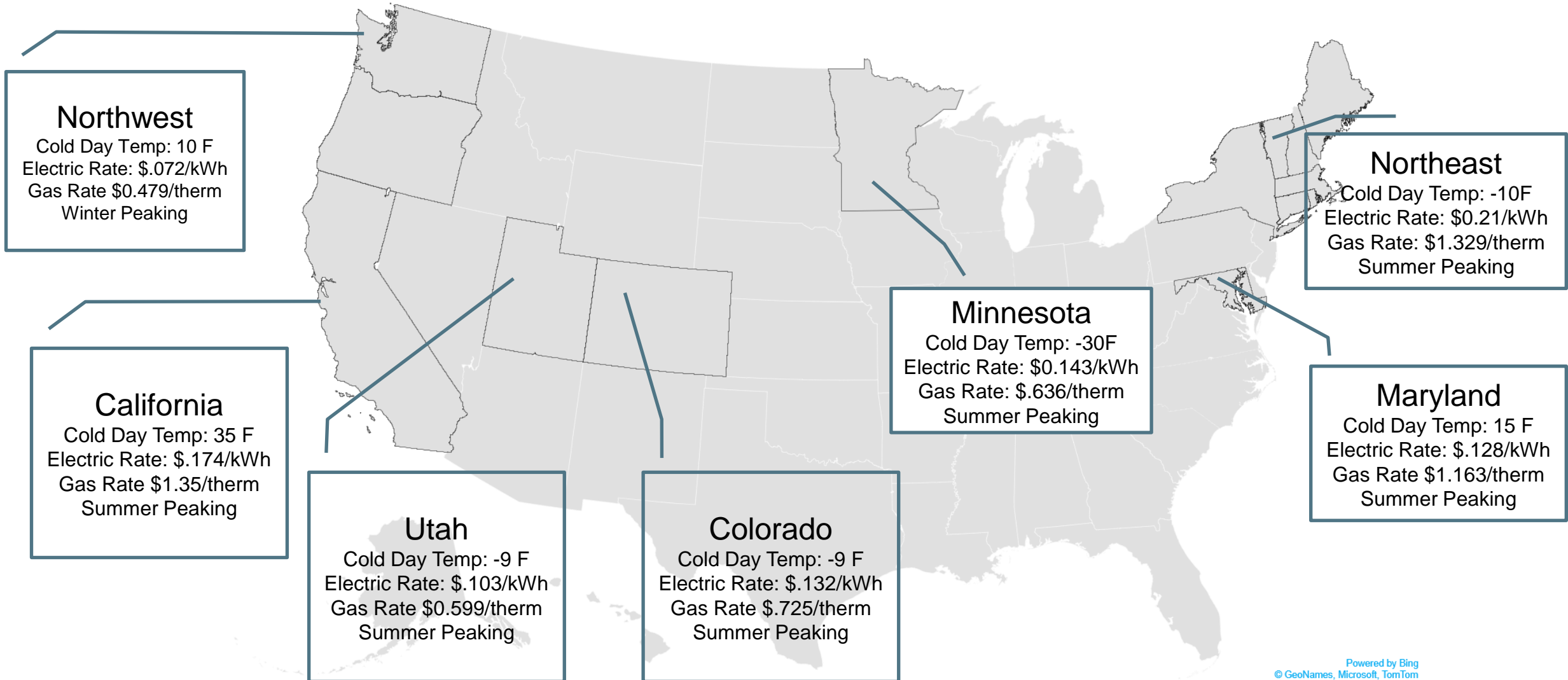
Lifecycle GHG Savings from Electrification are Universal

Residential Heat Pump Space and Water Heating (2020 – 2035) vs. Nat Gas and Fuel Oil Shares



Powered by Bing
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State by State View: Local Context Matters



Decarbonizing Buildings is a Massive Undertaking



Flickr/Ron Reiring

USA Residential Stock

- 66M Fossil Space Heaters¹
- 62M Fossil Water heaters¹
- \$750B Replacement Cost²
(\$550B Incremental Measure Cost)

Funding

- \$9B Inflation Reduction Act³
- \$8.4B National EE Spending⁴

Sources:

1. EIA RECS 2020
2. Estimated from DOE NEMS Costs
3. Rewiring America, July 2022
4. ACEEE 2020 National Scorecard

BIG BROTHER



IS WATCHING YOU

2022 Energy Code

- Launching January 1st, 2023
- Significant changes coming to a theater near you!
 - Single Family
 - Nonresidential... and
 - Multifamily – **WHOLE NEW CHAPTER!!!**

Heat Pumps – The Stillsuit of California

Becoming the new standard for many building types

- **Single Family** - heat pump water or space standard
- **Multifamily** - heat pump space heating standard
- **Nonresidential** - heat pumps standard for schools, offices, banks, libraries, retail, grocery





Electric Ready Required – The Shimmer

- Single Family homes will be required to be “electric ready” and will include:
 - Electrical circuits for space heating, water heating, cooking/ovens, and clothes dryers.
 - Electrical panel, branch circuits, and transfer switch for battery storage.
 - Dedicated circuits and panels to easily convert from natural gas to electric in the future.

Solar and Storage Expanded Harnessing Desert Power!

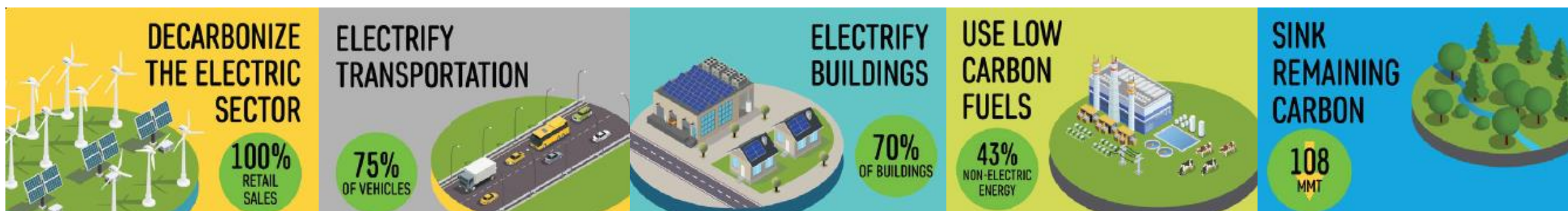
2022 Energy Code extends solar and introduces battery storage standards to the following building types:

- High-rise multifamily (apartments and condos)
- Hotel-motel
- Tenant space
- Office, medical office, and clinics
- Retail and grocery stores, Restaurants
- Schools
- Civic - theaters, auditoriums, convention centers



Pathway 2045 – Blueprint for Decarbonization

Carbon neutrality is achieved through deep decarbonization of electricity, transportation and building electrification, and the use of low-carbon fuels



As the grid gets cleaner, so too does everything plugged into it
...but none of this happens without millions of individual customer decisions

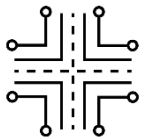
Read more: **[Edison.com/pathway2045](https://www.edison.com/pathway2045)**

SCE's Building Electrification Application

In December 2021, SCE filed a \$677M application with the CPUC seeking approval for new Building Electrification (BE) Programs

Motivation

Equity and Affordability



Prioritize vulnerable customers' adoption of future technology



Increased electrification improves overall affordability

The Building Gap



BE Critical to CA GHG Reduction



Urgent action needed to avoid missing goals

Application Highlights

4 Year Portfolio

- 2024-2027
- Retrofits:
 - 250k heat pumps
 - 65k electric panel & circuit upgrades

Marketing and Outreach

- Cities and CBOs
- Equity communities
- Contractors and Installers



Residential

Single and Low-rise MF

BE ReadySM Home Assessment

Home Readiness
Bill Impacts

Upgrade Subsidies • Kickers for ESJ customers

Heat Pumps
Water Heaters
Electric Panels & Circuits



Non-Residential

HVAC/Technical Assistance for small/medium/large enterprises

Additional incentives for businesses in equity communities

Southern California Edison

Reach Code Assistance

- SCE regularly provides assistance with developing reach codes to local governments in SCE service territory at no cost
- Technical assistance such as cost-effectiveness studies, ordinances language, and advice on navigating the ordinance adoption process.
- Help addressing common questions such as affordability and reliability
- Foodservice Technology Center offers free induction cooking workshops for both residential and commercial customers



Seasons Kitchen, a Malaysian street food restaurant, recently visited SCE's Foodservice Technology Center to try out an induction wok.

Impacts

Specific to rural and
disadvantaged communities

- ▶ The Grid
- ▶ Affordability
- ▶ The Propane Consideration
- ▶ Who Will We Leave Behind?

The Grid

California Climate Plan to increase electricity consumption by 68%

- ▶ SJV grid cannot support an all-electric load
- ▶ Timeline for new businesses to come online in SJV communities?
 - ▶ 18-24 months (up to 3 years)
 - ▶ Stifles employment opportunities
 - ▶ Economic growth

Affordability

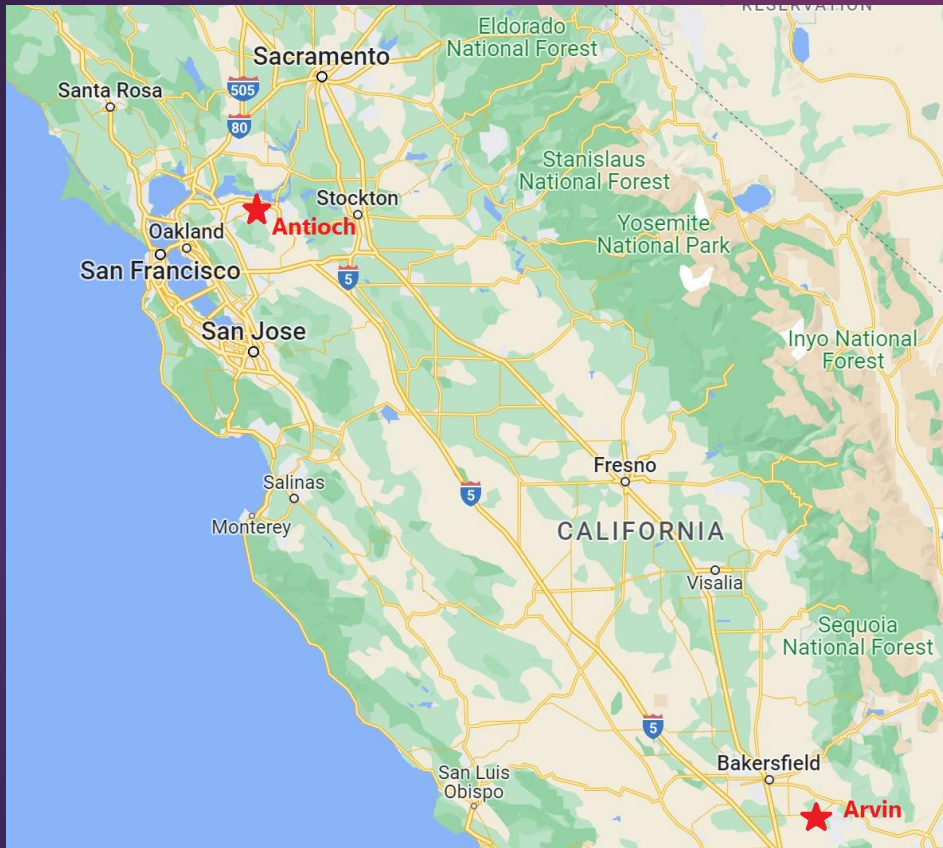
Rate-payer \$\$ to support the total effort

- ▶ Transformation of the entire state is required and will likely be funded by ratepayers
- ▶ Example: San Joaquin Valley Proceeding R.15-03-010
 - ▶ Pilot for electrification in low-access communities
 - ▶ High cost per home (all costs for fuel switching, bill protection, etc.)

Affordability

Example:

Avg. Monthly Expenses in Arvin, CA vs. Antioch, CA



Monthly	Rural	Non-Rural
Avg. Household Income	\$3,313	\$6,686
Median Gross Rent	(\$938)	(\$1,911)
Avg. CA Water Utilities	(\$77)	(\$77)
Avg. Food Cost	(\$1,202)	(\$1,284)
Transportation (fuel, insurance, maint.; AAA)	(\$397)	(\$681)
Avg. PG&E Bill	(\$177)	(\$172)
Healthcare (premiums and co-pays)	(\$1,152)	(\$1,152)
Totals	<u>(\$630)</u>	<u>\$1,409</u>

Customers that cannot afford it will bear the cost of higher utility bills.

The Propane Consideration

Propane to Electrification

- ▶ An all-electric building code will leave some customers in the cold
 - ▶ Colder regions that have periodic power outages need alternative methods of staying warm in the winter
- ▶ Propane customers are often ineligible for program incentives
 - ▶ Lack of motivation to do electrification projects
- ▶ Additional cost of EE and code updates before heat pumps can be installed will be shouldered by the customer

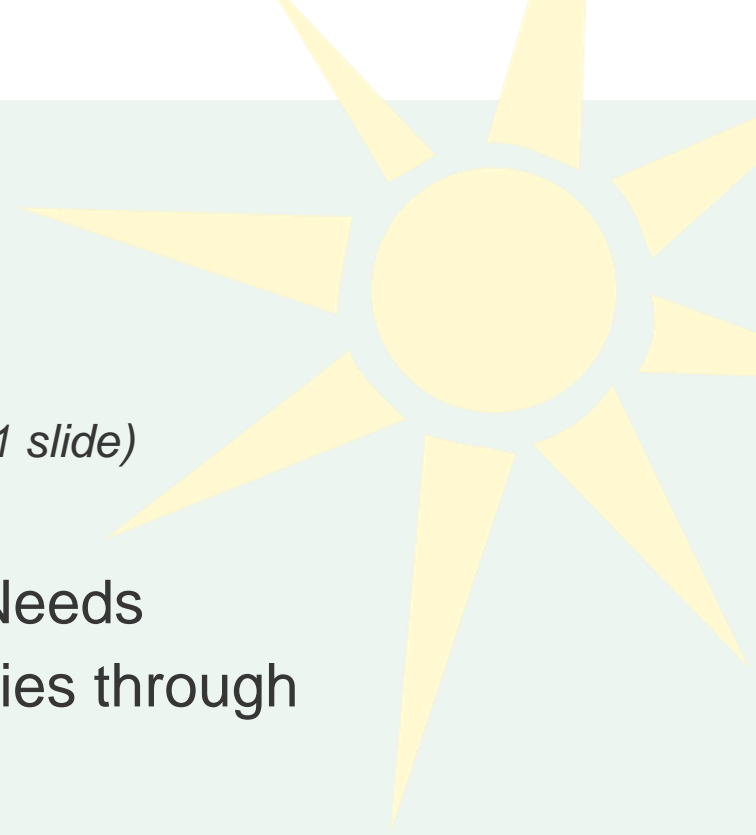
Who Will We Leave Behind?

Electrification is inevitable in California

- ▶ The most vulnerable communities in the state will be “left behind” if we:
 - ▶ Do not have the trust of these communities
 - ▶ Cannot communicate the “why” based on logic alone
- ▶ Unfunded mandate placed on those who can least bear it
- ▶ Application of urban solutions to rural spaces

Overview

1. **About GRID** *(1 slide)*
2. **Electrification in DACs** *(1 slide)*
 - a. Equitable Approach
 - b. Address Customer Needs
 - c. Empower Communities through Workforce
3. **Solutions** *(1 slide)*
 - a. Funding
 - b. Improve Permitting and Program Design
 - c. Coordination and Integration of Programs



About GRID

- **History**
 - Founded in 2001; leading voice in low-income solar policy; largest non-profit renewable energy installer
- **Regions**
 - Affiliate regions throughout California, in Colorado, and Mid-Atlantic, and international (Nicaragua, Mexico, Nepal) and tribal programs
- **Mission**
 - Build community-powered solutions to advance economic and environmental justice through renewable energy. We envision a rapid, equitable transition to a world powered by renewable energy that benefits everyone
- **Impact**
 - **People:** 24,048 households; 201 community facilities; \$624M lifetime savings
 - **Planet:** 2.5 GWh; 1.7M tons of GHGs prevented; ~330,000 cars removed
 - **Employment:** 32,807 trained; 315,743 hours trained; 312 job-training partners



Electrification in Disadvantaged Communities



- **Equitable Approach**

- Prioritize Environmental and Economic Justice Communities
 - Increased price pressures compounding impact on low-income households
 - Economic and regulatory barriers

- **Speak to Customer Needs**

- Don't present people with a problem to solve that ignores their immediate needs
 - Bill savings
 - Health, safety and comfort

- **Empower Communities through Workforce Training**

- Leverage programs and funding to create pathways to employment
 - “Green” jobs must be “good” jobs

Solutions

- **Funding**

- Prioritize Environmental and Economic Justice Communities
 - Upfront costs to electrification create barriers to entry
 - Funding for main service panel upgrades for single-family buildings
 - Funding or low-cost financing for multi-family buildings
 - Funding for new appliances and installation

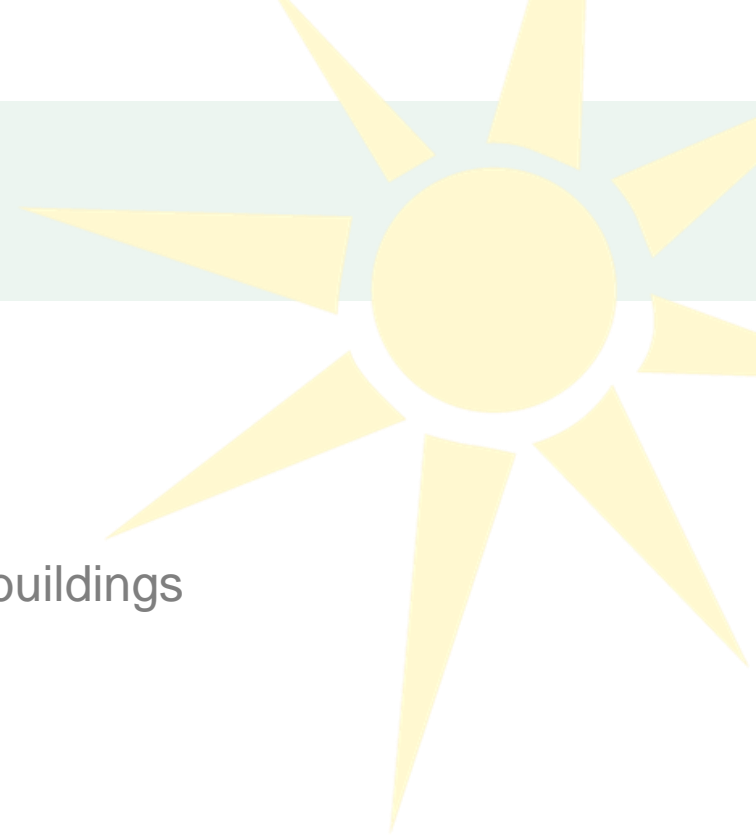
- **Improved Permitting and Program Design**

- Permitting: over-the counter permitting; standardized plan sets
- Program: allow oversized systems (utility); don't limit system size (DAC-SASH)

- **Coordination and Integration of Programs**

- Support regional and statewide coordination of funding and programs
 - Incentivize layering of funding across programs for single projects

###



The Dunes of Arrakis

Scientists Never Like to Say 100%

Marcos Inaros

Wrapping It Up!