

100% Renewable Energy in Hawaii: It's No Longer A Matter of When

March 16 - 18, 2016 | Maui Arts & Cultural Center

Presented By:



INQUIRING MINDS WANT TO KNOW: EDUCATING TOWARD 100% RENEWABLE ENERGY

Leslie Wilkins – Moderator

Vice President, Maui Economic Development Board, Inc.

Michael Chang

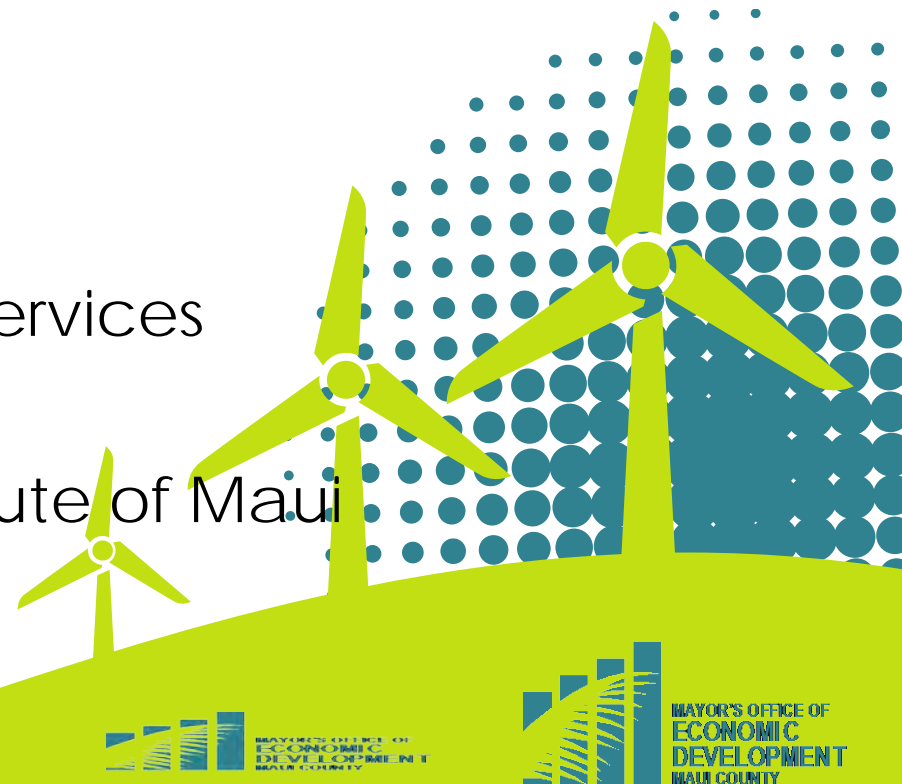
Chief Innovation Architect, Hawaii Energy

Brandon Hayashi

Strategic Alliances Manager, OpTerra Energy Services

Melanie Stephens

Education Coordinator, Sustainable Living Institute of Maui





INNOVATE.



EMPOWER.



IMPACT.

THE WORLD THROUGH STEM

BUILDING THE WORKFORCE STEM PIPELINE

K TO CAREERS — ALIGNING CULTURE & SCIENCE



EDUCATE THE EDUCATOR/BUILD STEM TEACHING CAPACITY

EDUCATING THE EDUCATORS



ALIGNING SCIENCE WITH CULTURE



STEM WORKFORCE PIPELINE

...WIT LED INITIATIVES
ACROSS THE STATE

SERVICE/PROJECT-BASED LEARNING

STEMWORKS

ISLAND ENERGY INQUIRY (IEI)

MENTORING

AFTERSCHOOL PROGRAMMING

STEM CAMPS

JOB SHADOWING

4H TECH CONNECT

WORKSHOPS

TECHNICAL ASSISTANCE

PROFESSIONAL DEVELOPMENT

ROBOTICS

JOB FAIRS/PLACEMENT

REPATRIATING RESIDENTS

HIGH SCHOOL/COLLEGE INTERNSHIPS





Island Energy Inquiry™

www.islandenergyinquiry.org

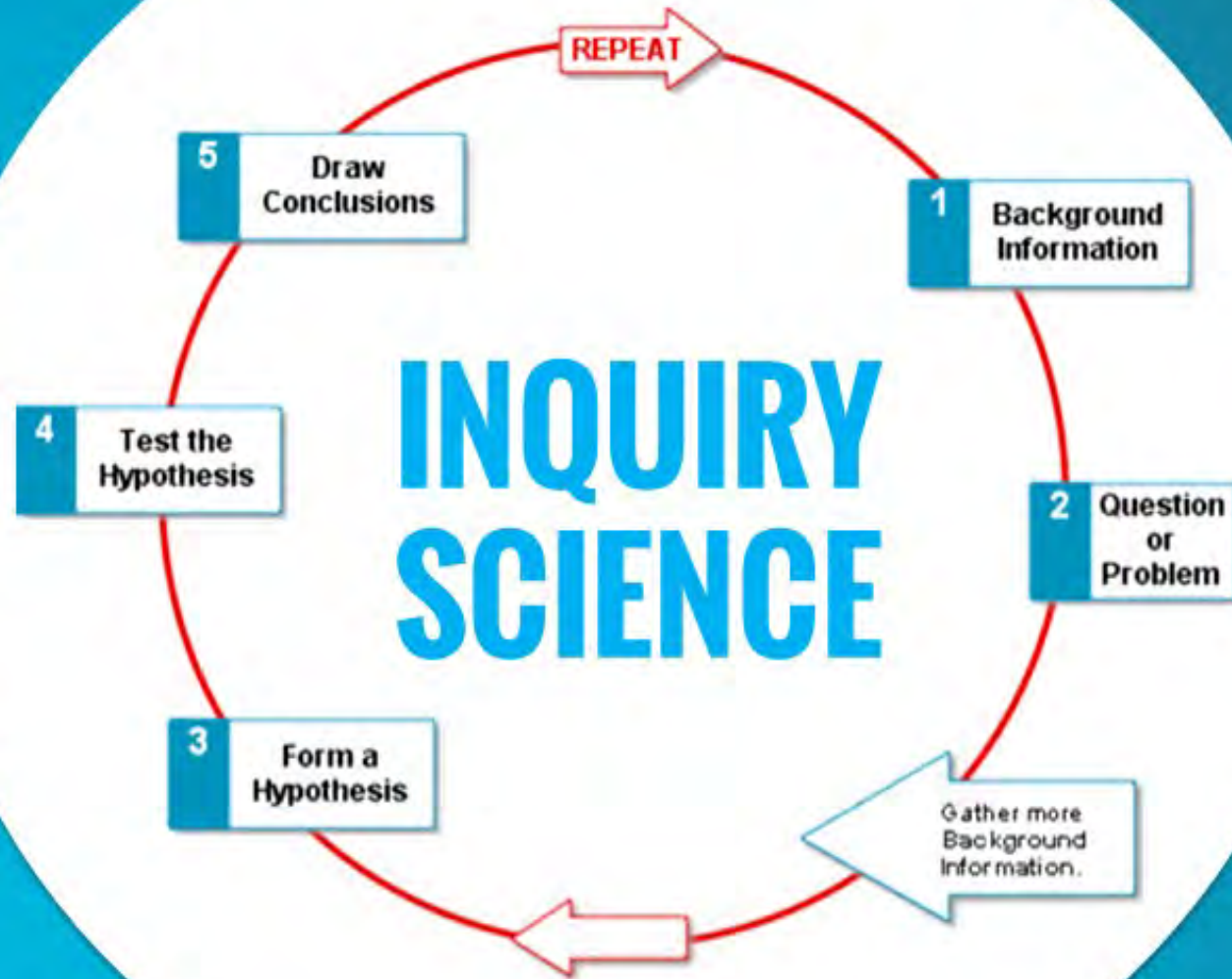
K-12

Place-Based • Standards
Aligned • Professional
Development Workshops For
Teachers • Ongoing Online
Training & Support • Energy
Industry Partnerships • STEM
Equipment Lending Library •
Hands-on Energy Kits For
Classrooms • Mobile Ipad
Touch/Ipad Lab

**CLEAN ENERGY
HAWAII
STEM HD**



INQUIRY SCIENCE



A photograph of three children in an outdoor setting. On the left, a boy with curly brown hair is holding a red string with a small white object attached. In the center, a girl with glasses is holding a small grey electronic device. On the right, another girl is looking at the device with an open-mouthed expression. The background shows other children and a fence.

ELEMENTARY

MIDDLE SCHOOL

HIGH SCHOOL

K – Hawaii's Warm Sun

1 – Changing Hawaii's Light

2 – Using Sunlight in Hawaii

3 – Magnetism, Electricity, & Movement

4 – Energy Transfer

5 – Earth's Resources, Clean Energy & Solar Thermal Solutions

6 – Solar Electricity with Photovoltaics

7 – Island Energy Use

8 – Island Breezes Blowing Energy

9 – Working Energy

10 – Biofuels & Hydrogen Fuel Cells

11 – Biofuels & Hydrogen Fuel Cells

12 – Electric Vehicles



REACH

488

TEACHERS

62,000

STUDENTS

90%
TEACHER
IMPLEMENTATION RATE



A large group of students, mostly young adults, are gathered outdoors for a group photo. They are arranged in many rows, with some sitting on the grass in the front and others standing behind. Most of the students are wearing blue and black t-shirts, some with "HAWAII STATE" printed on them. Many are making "rock on" hand gestures. The background features large, mature trees with thick trunks and lush green foliage. The overall atmosphere is festive and energetic.

HAWAII STEM CONFERENCE

MAY 6 & 7

STEM WORKS INTERNSHIPS

- Professionalism
- Resume Building
- College-Prep
- Career Readiness
- Time Management
- Presentation Skills
- Statewide

6 WEEKS
27 COMPANIES
42 INTERNS



ENERGY EDUCATION

for the builders, and our island community



OPTERRA
ENERGY SERVICES

2016 MAUI ENERGY CONFERENCE

Brandon Hayashi

Program Manager | OpTerra Energy Services Hawai'i

RIPON
9 MILES

THIRSK
6 MILES



6:04



BIG WAVES CREATES HEAVY EROSION
KAILUA BEACH

**ALL LINES & ELECTRICAL
MUST BE TURNED OFF
BEFORE ANY FUELING DEVICE**



UNLEADED

PRICE PER GALLON \$

28.56

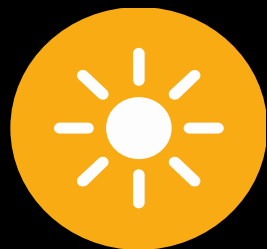
ALL TAXES INCLUDED







+



+



+



=



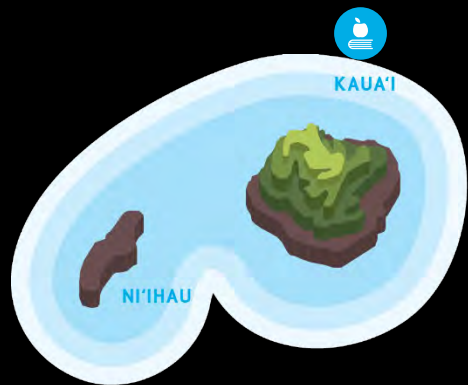
Efficiency


Renewables

Microgrids

Education

Ka Hei





OUR NAME IS
THE MILLENNIALS



2025

Millennials
will occupy
75% of the
workforce.

COMMON WORKPLACE MISPERCEPTIONS

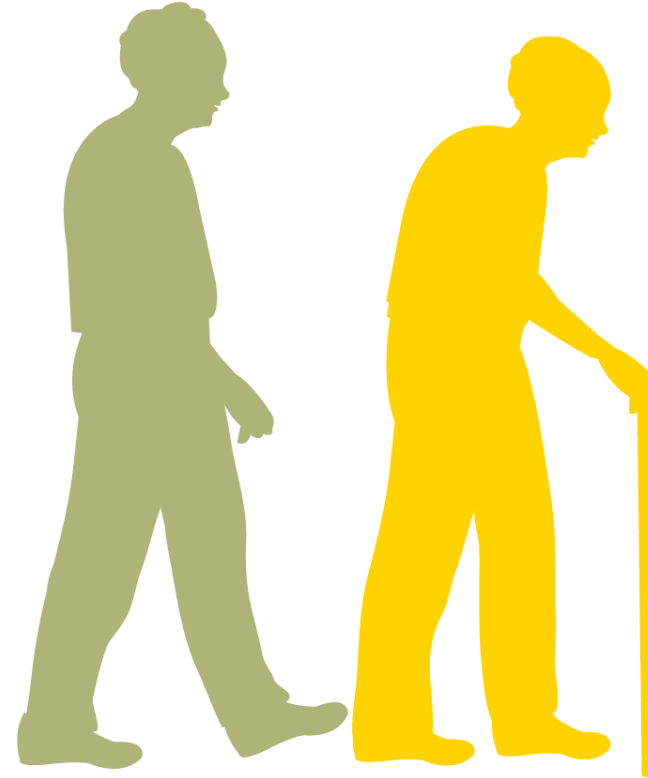
- Entitlement
- Laziness
- Lack of respect for authority
- Poor work ethic
- Lack of loyalty



OPTERRA

Millennial Born 1981-96

Boomer Born 1946-64



Gen X Born 1965-80

Silent Born 1928-45

MAKER SPACE







SPECIAL
REPORT

THE NEXT CYBERATTACK

COULD COME FROM YOUR COFFEEMAKER

PLUS!

INSIDE AMAZON'S
DRONE LAB PG.19

POPULAR SCIENCE

MARCH 2015

STRESS

**IT'S
KILLING
YOU**

How to
Beat It with
Science



INTRODUCING
THE VIZZIES

PG. 52

15

MUST-HAVE
GADGETS

RISE OF
THE DWARF
PLANETS

PG. 32

SANDWICHES—
FRIEND OR FOE?
RETHINKING AMERICA'S

BEST TECH OF THE **YEAR**

POPULAR SCIENCE

TODAY'S

100
GREATEST
INNOVATIONS

DRONES,*PHONES,
DRIVERLESS CARS,
VIRTUAL REALITY,
A HOVERBIKE,
AND **MORE!**



★
FEATURING:
STAR WARS
DROID

BB-8

Coming soon to a living
room near you!

**DIY
HOVERCRAFT**

TAKE OFF
IN AN HOUR

WHY IS

→
It doesn't have
to be this way!











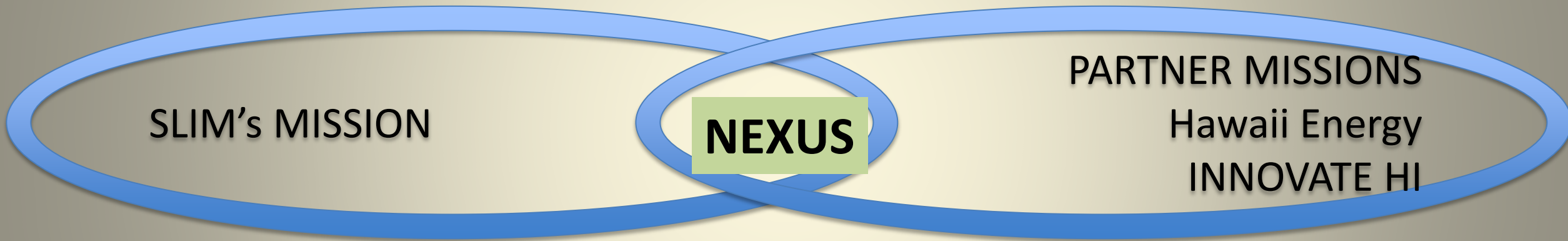


Energy Education: IT'S ALL ABOUT WE



UNIVERSITY of HAWAII®
MAUI COLLEGE

Overlapping organizational missions: identify nexus/overlap



Leveraging Resources
for mutually beneficial outcomes



WEST MAUI
Kumuwai



NEEC
NORTHWEST ENERGY
EFFICIENCY COUNCIL



The Research Corporation of the University of Hawaii



PARTNERSHIPS



MĀLAMA MAUI NUI
KEEP AMERICA BEAUTIFUL AFFILIATE



Maui Hotel & Lodging
ASSOCIATION



maui economic
DEVELOPMENT BOARD



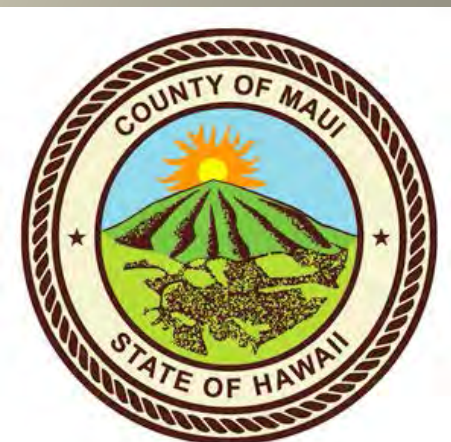
HYATT REGENCY®
MAUI RESORT & SPA



GREEN
BUILDING
HAWAII
CONSULTING & TRAINING

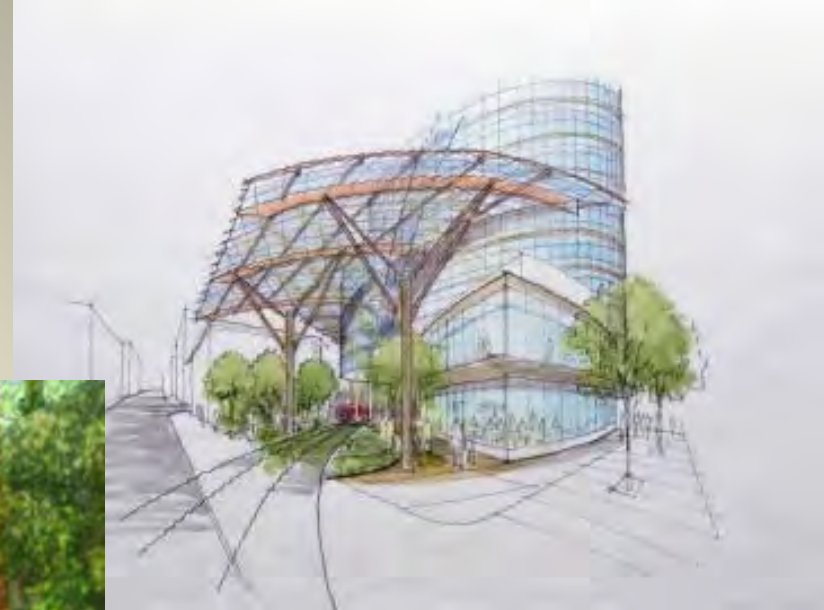


CORAL REEF
ALLIANCE



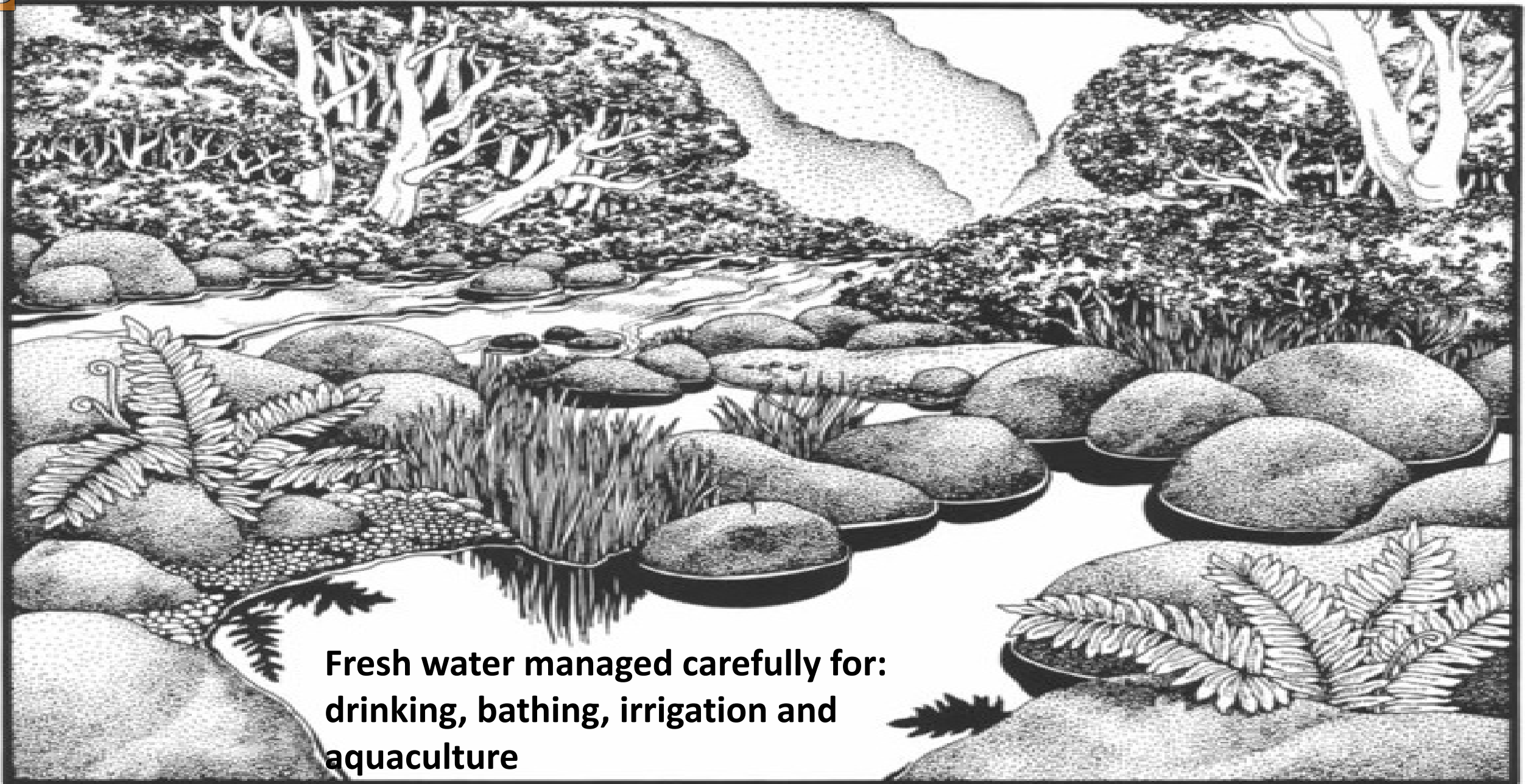


Meeting of Wisdoms: Where Traditional Meets Modern





Life in Early Hawai'i: The Ahupua'a
3rd Edition; Kamehameha Schools Press, 1994



**Fresh water managed carefully for:
drinking, bathing, irrigation and
aquaculture**

A kahawai, freshwater stream or river

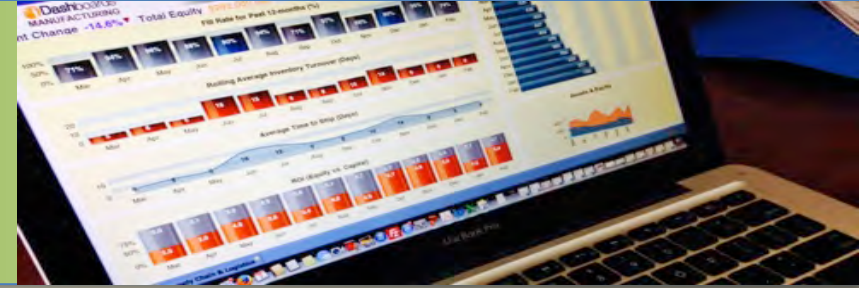
Life in Early Hawai'i: The Ahupua'a, 3rd Edition;
Kamehameha Schools Press, 1994

Culturally and geographically
relevant and appropriate education

Accessible Learning Opportunities



Facility Trainings



Building Operator Certification Level 1 & 2

- Fall 2014 & Spring 2015 BOC series served engineers from over 7 Maui resorts
- Spring 2016 BOC 1 launched on Big Island
- BOC Level 2 launching in Spring 2016 for first on Maui

Qualifying BOC participants receive \$1400 sponsorship by Hawaii Energy (\$200 to register)





Where the community ends and
the college begins is blurry

PRAXIS: the integration of theory
with practice

Structured and Targeted Training leading to Workforce Development

Challenge students with new ideas
Customize training to their interests
Help them understand what they will need to
realize their aspirations



Sustainable Strategies for Hotel and Resort Operations

Six-Week Training Program

Green Teams for Maui Resorts

- Trainee program supervised by SLIM staff- potential future employees in partnership with resort staff, providing on-site sustainability gap assessments
- Project teams prepare resorts for Green Key & Trip Advisor Rating Systems

FOUNDING SPONSORS





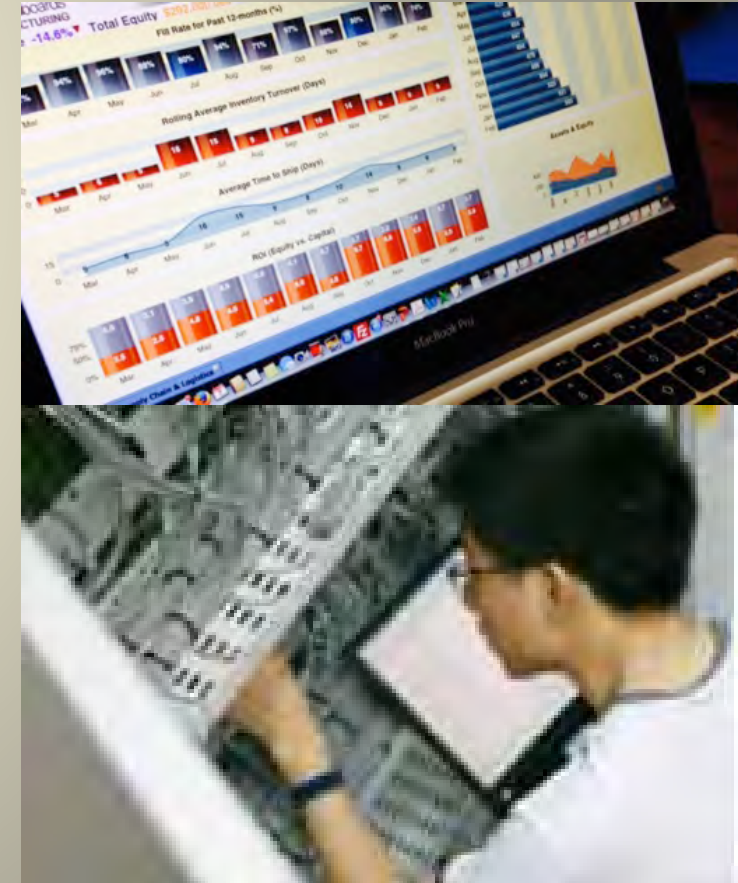
Green Internships

Maui Manufacturing Companies

- Semester-long Internship
- Energy efficiency, resource use and process efficiency audits using industry tools and skills
- Lean & Green

Partners and Sponsors

High Technology Development Corporation





The Latest In Energy Innovations For Industry & Community

For Industry: Energy Training

PV Trainings

- NABCEP- Entry-Level, Advanced, Battery-Based
- Custom designed- Battery Sales, Electricity for PV

LEED GA & AP O&M

Lean Manufacturing



Water/Wastewater Treatment

Training to build the next generation of municipal water specialists

- Water and wastewater math and science
- Operations and Utility Management
- Safety
- Energy Conservation



For Community Members

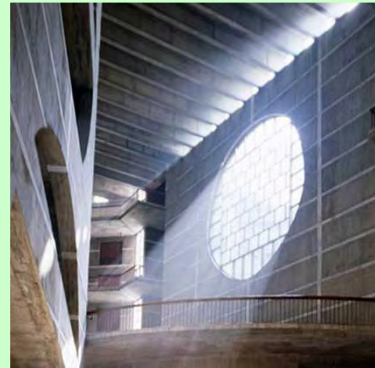
What's Up in Energy?

3-hour Updates

- Lighting for a New Hawaii
- Becoming an Energy Detective: Home Energy Auditing for Beginners
- Maui Solar Update
- State of the Art In Water Heating

24-hour Introduction

- Electricity for Beginners





A Living Lab for the Campus and Community



SLIM Community Garden

- **20+ Garden Plots for Community Members**
- **Rain Garden Demonstration Site**
- **Living Laboratory for Trainings and Workshops**

Partners

Ulupono Foundation
Frost Family Foundation
Makana Family Foundation
UHMC Culinary Institute
County of Maui



MAHALO NUI LOA

Alex de Roode, SLIM Executive Director

808-984-3379, deroode@hawaii.edu

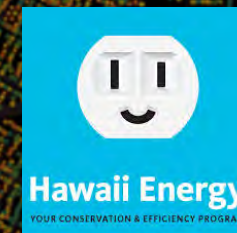
Melanie Stephens, SLIM Program Coordinator

808-984-3502, mvstephe@hawaii.edu



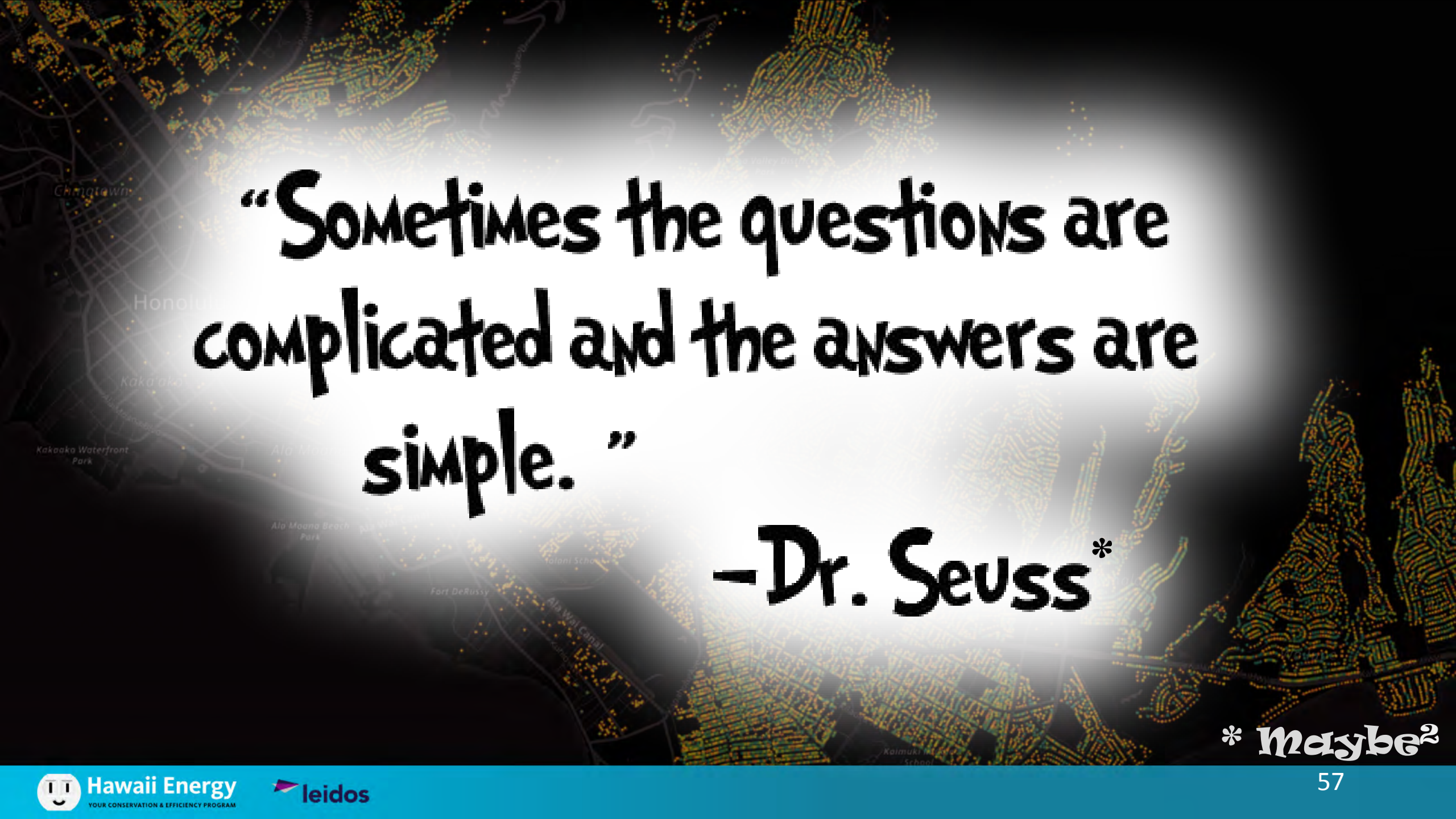
2016 Maui Energy Conference

**How do we Educate and Prepare Hawaii's Citizens
Young and Old for a 100% Renewable Energy Future?**



Michael Chang
Chief Innovation Architect

3/17/2016



**“Sometimes the questions are
complicated and the answers are
simple.”**

—Dr. Seuss*

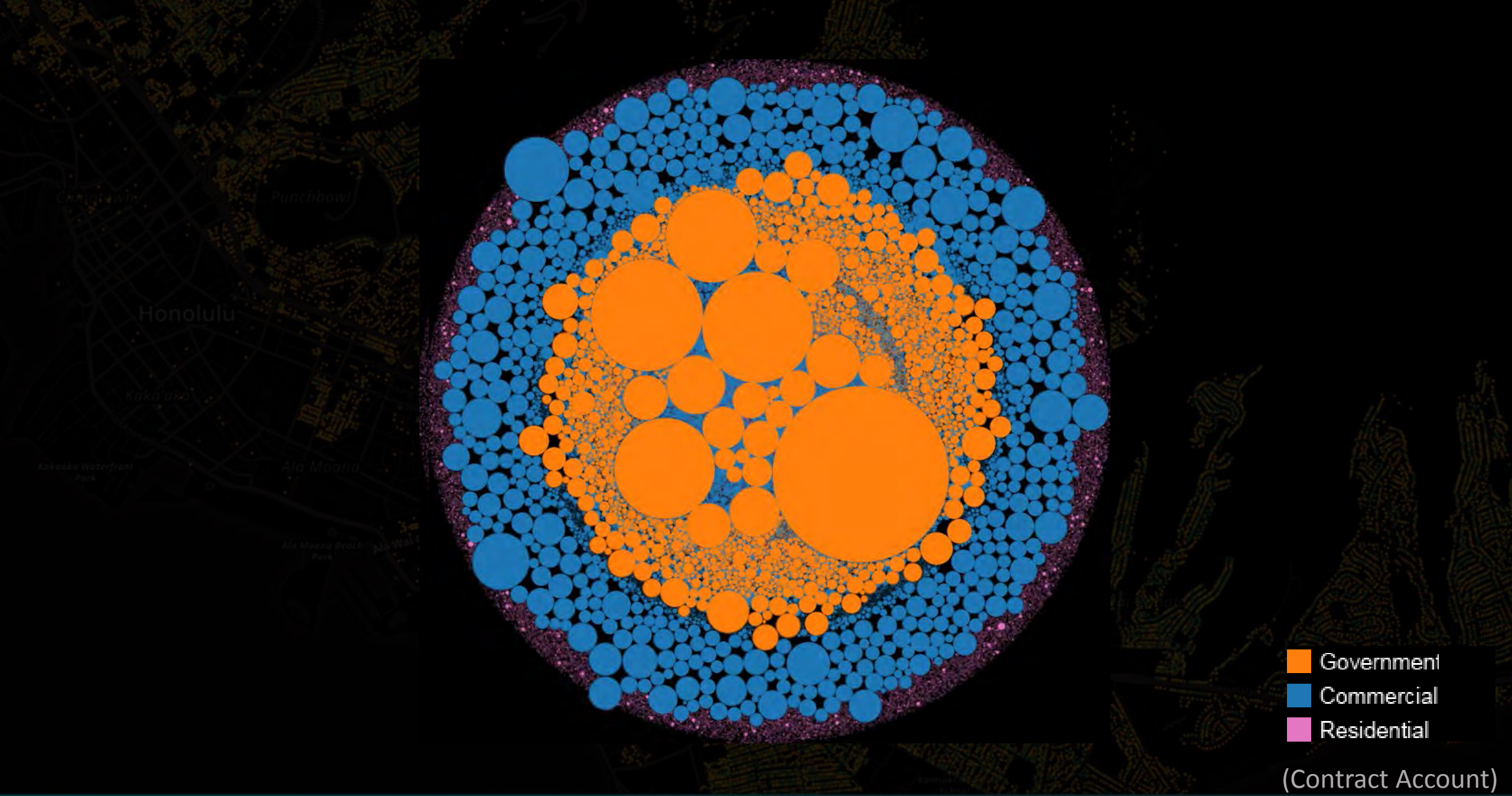
*** maybe²**



Perspective

9,046
GWh



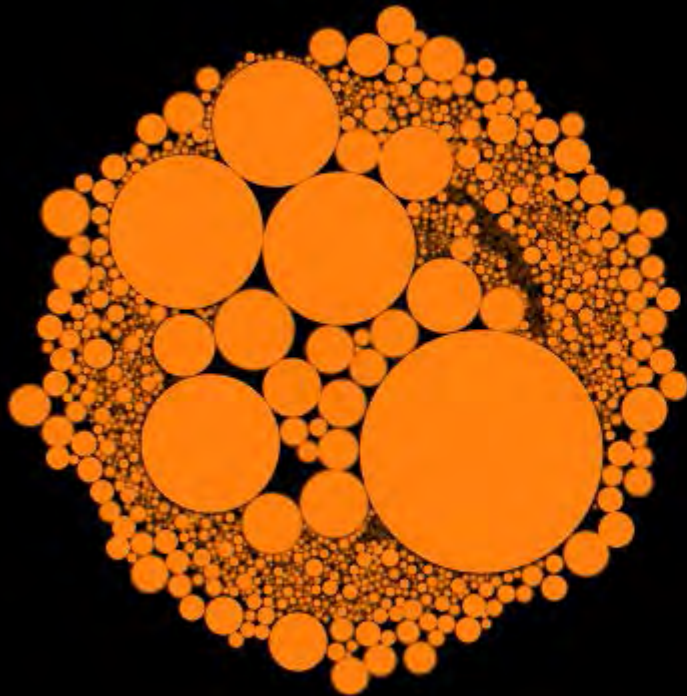


- Government
- Commercial
- Residential

(Contract Account)

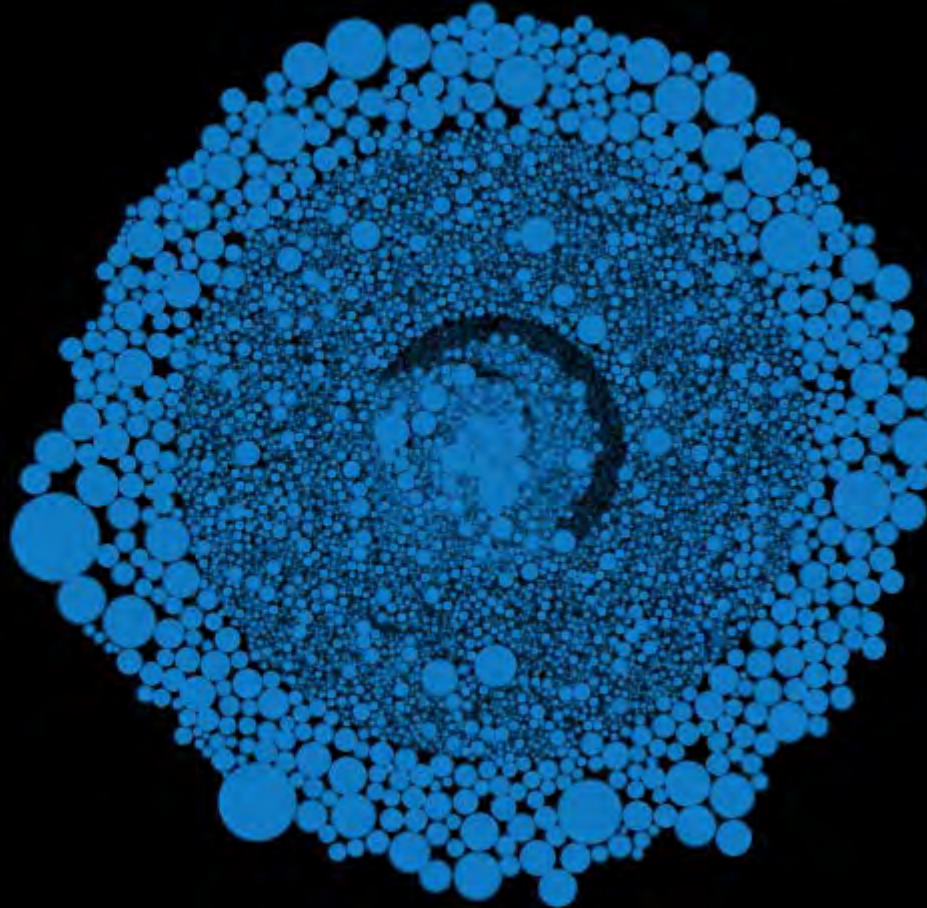
Government

24%



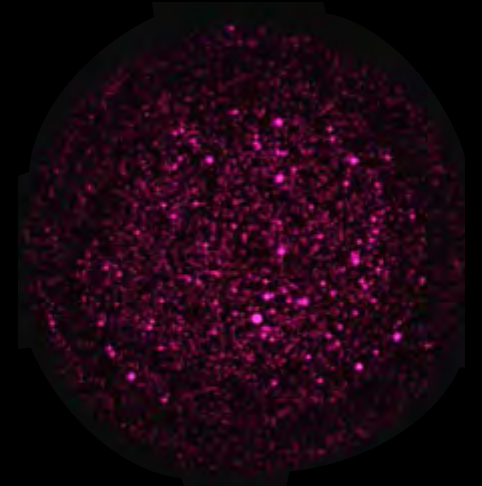
Commercial

49%



Residential

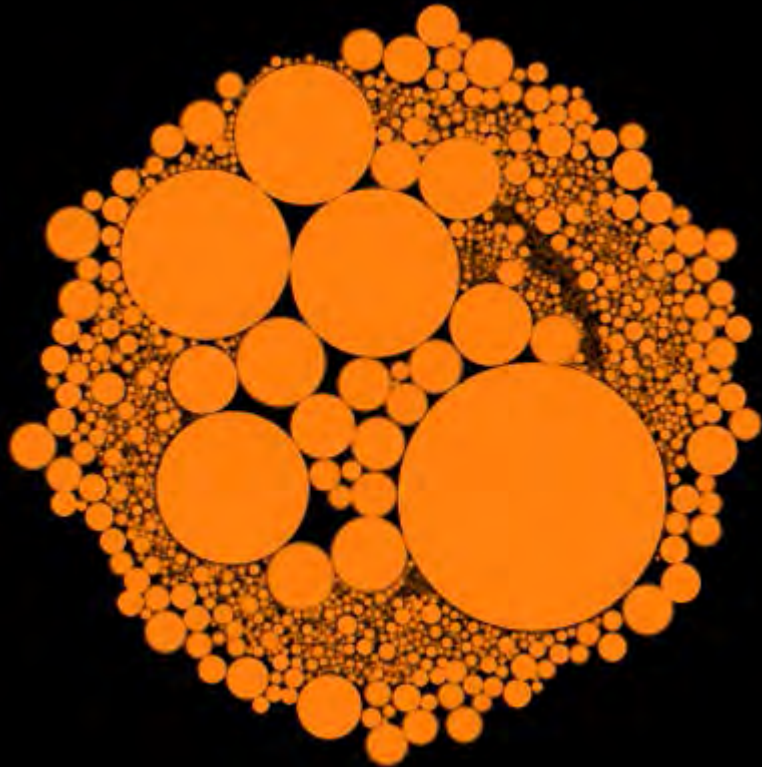
27%



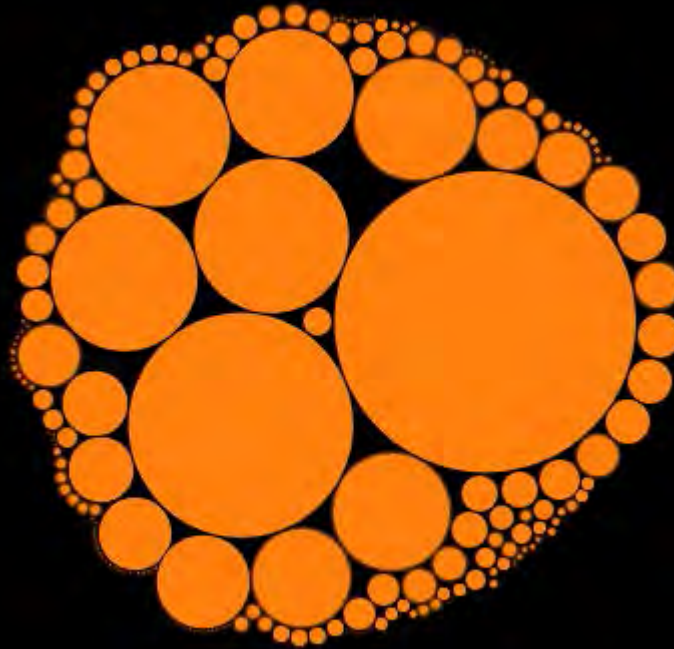
(Contract Account)



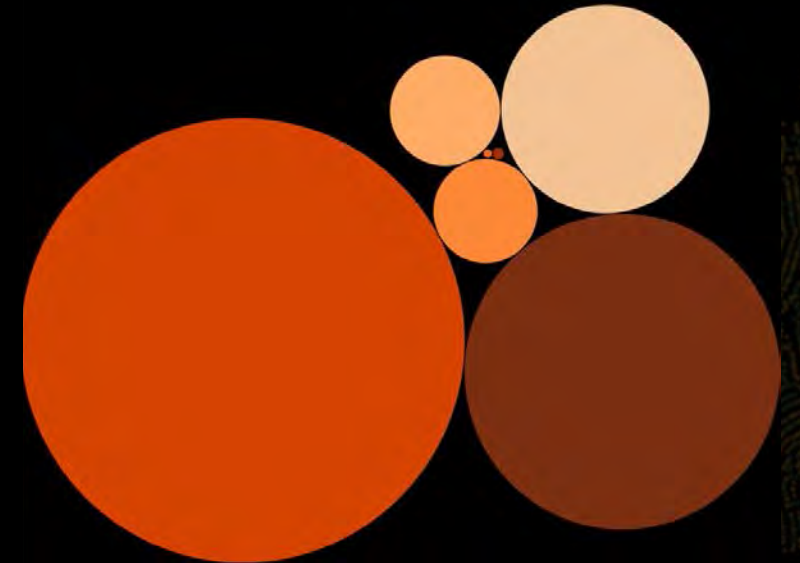
Accounts

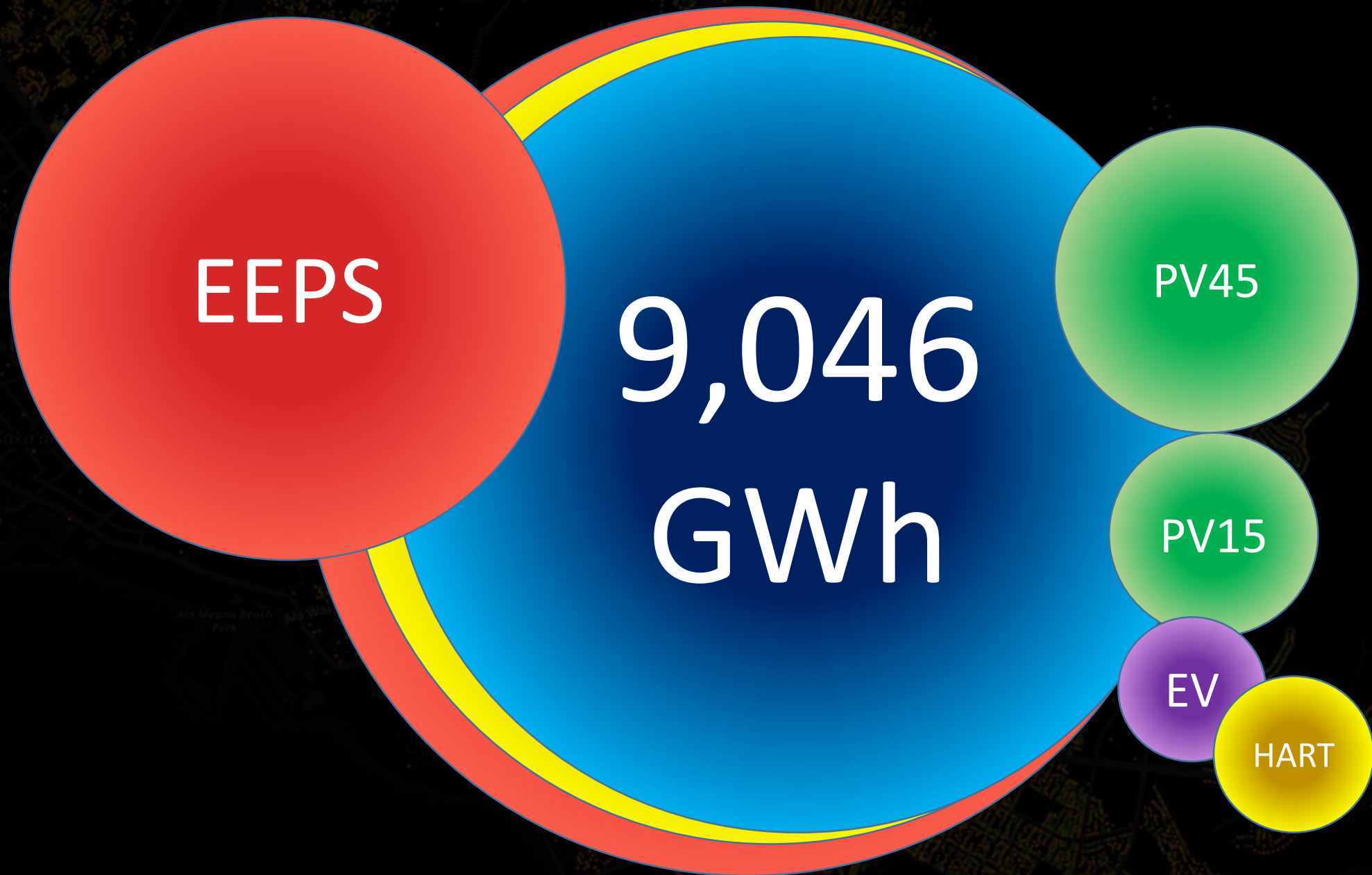


Organization

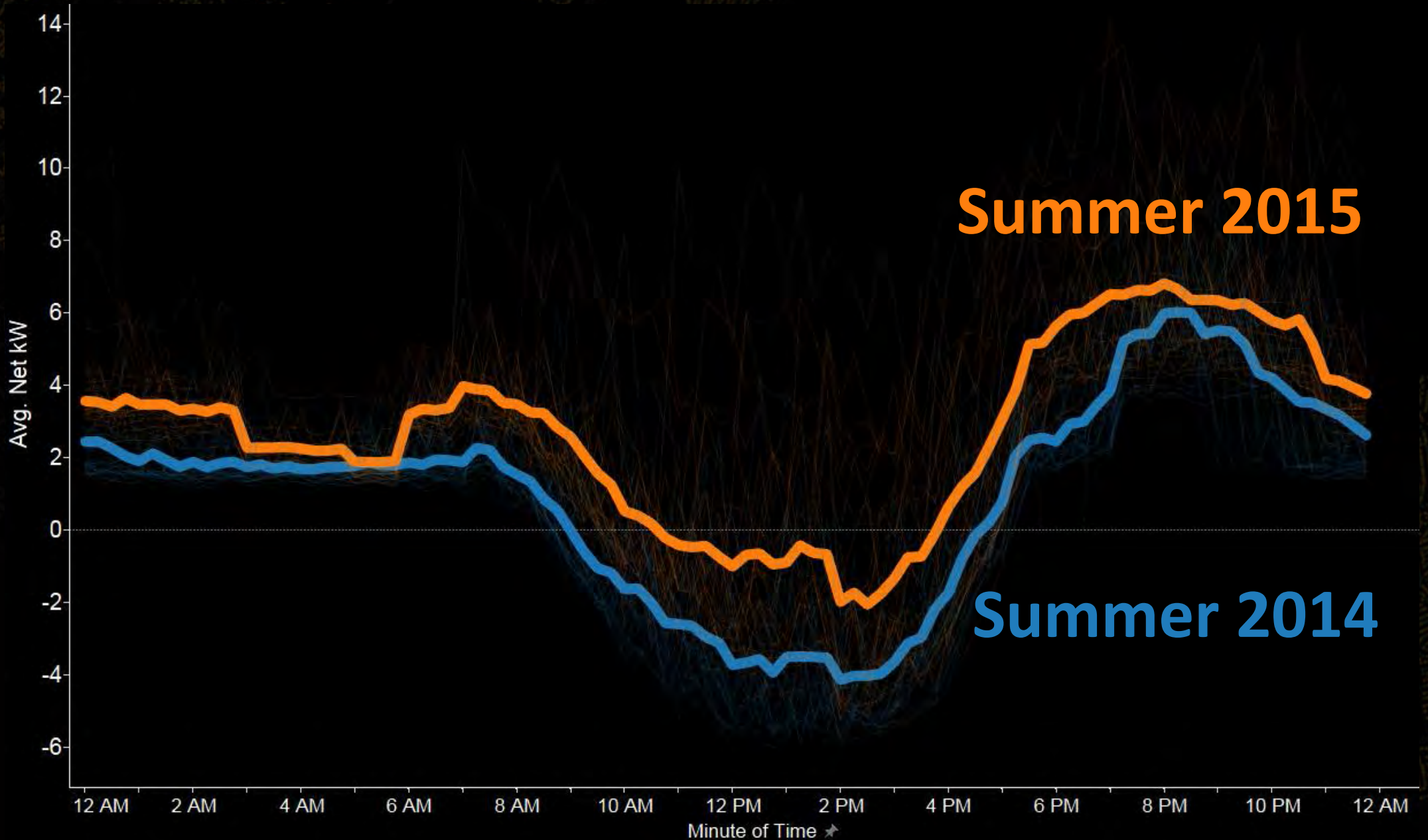


Agencies

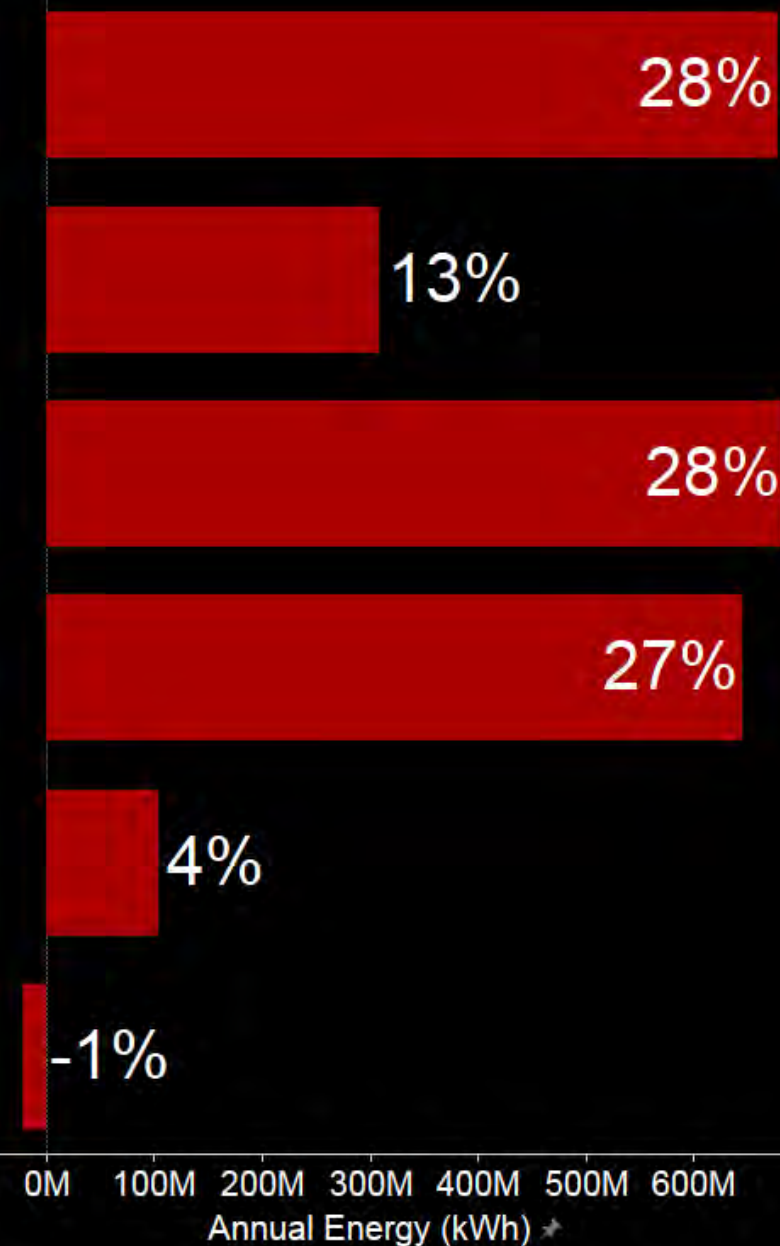
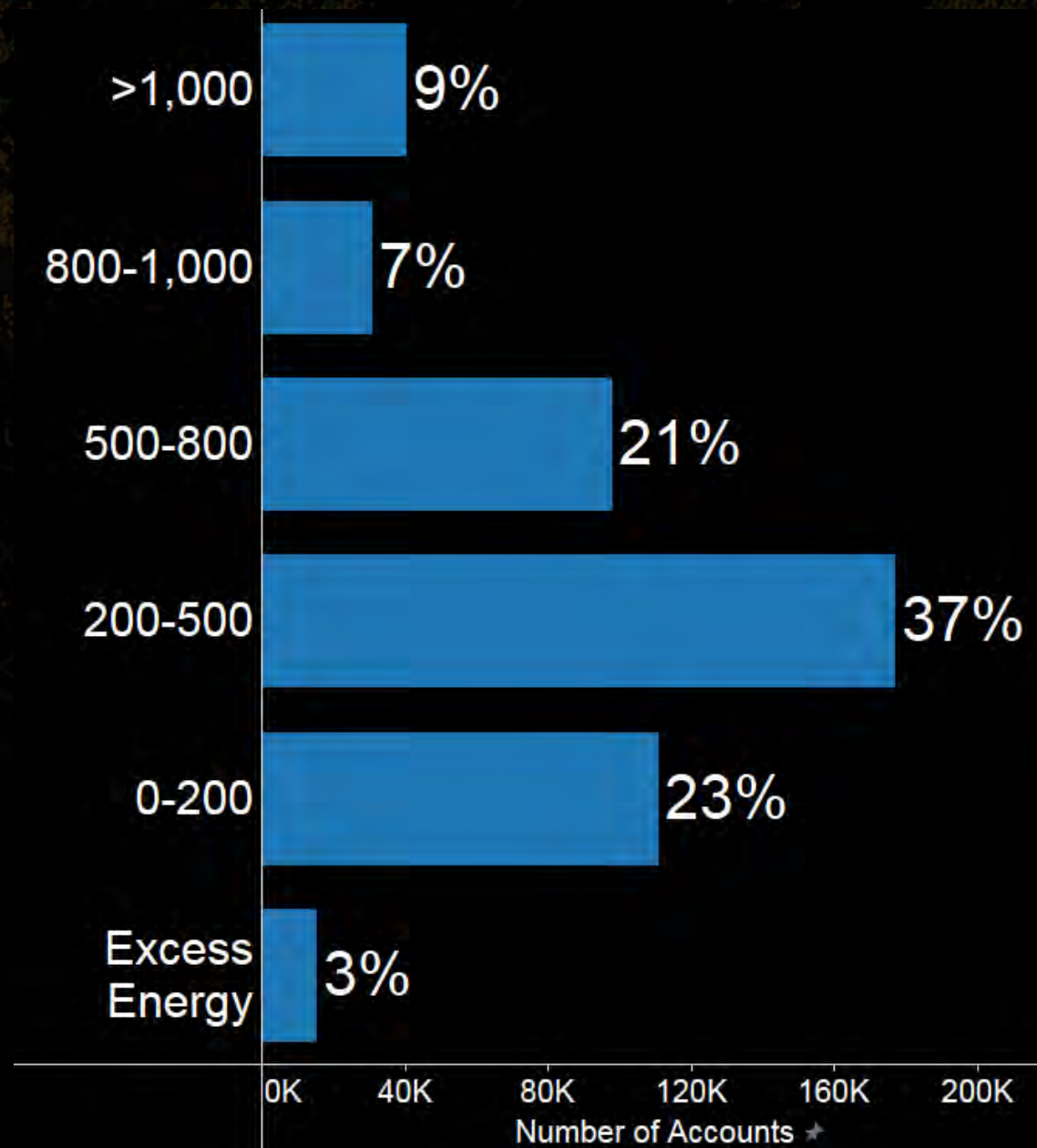




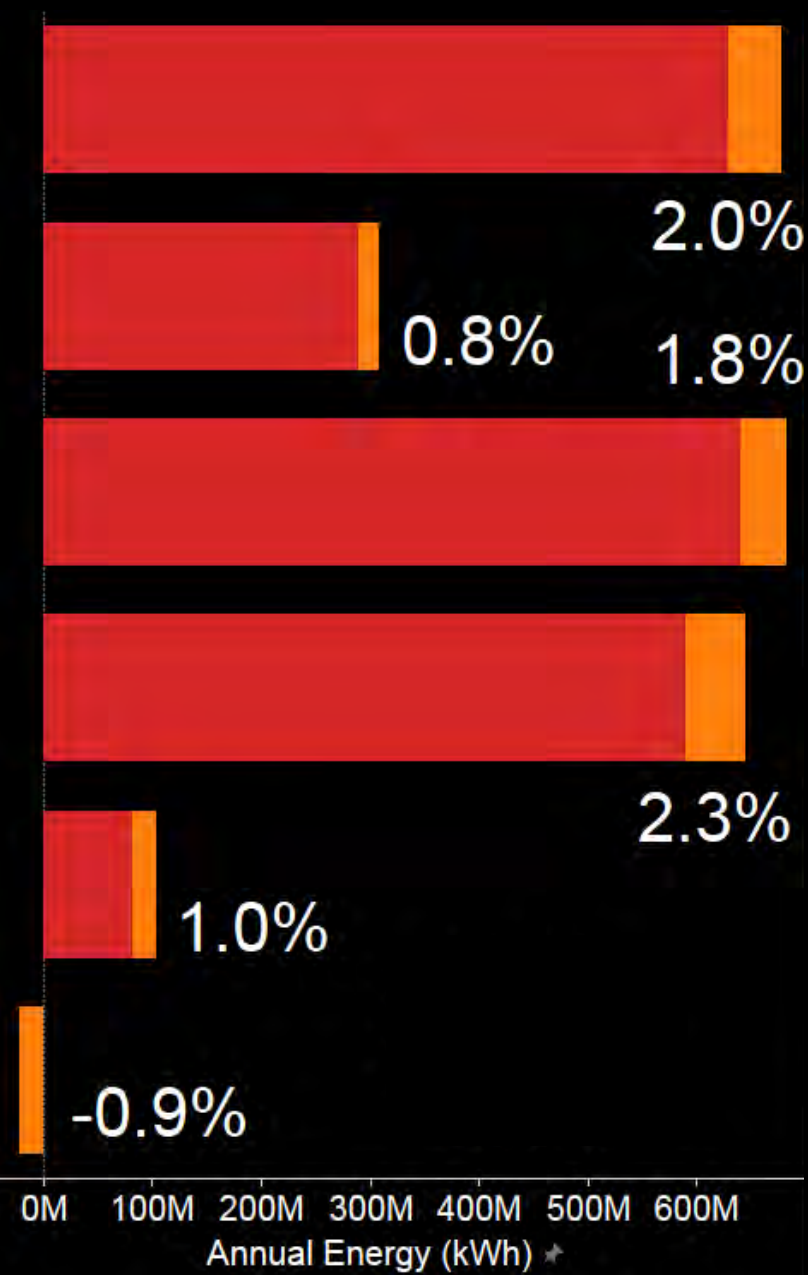
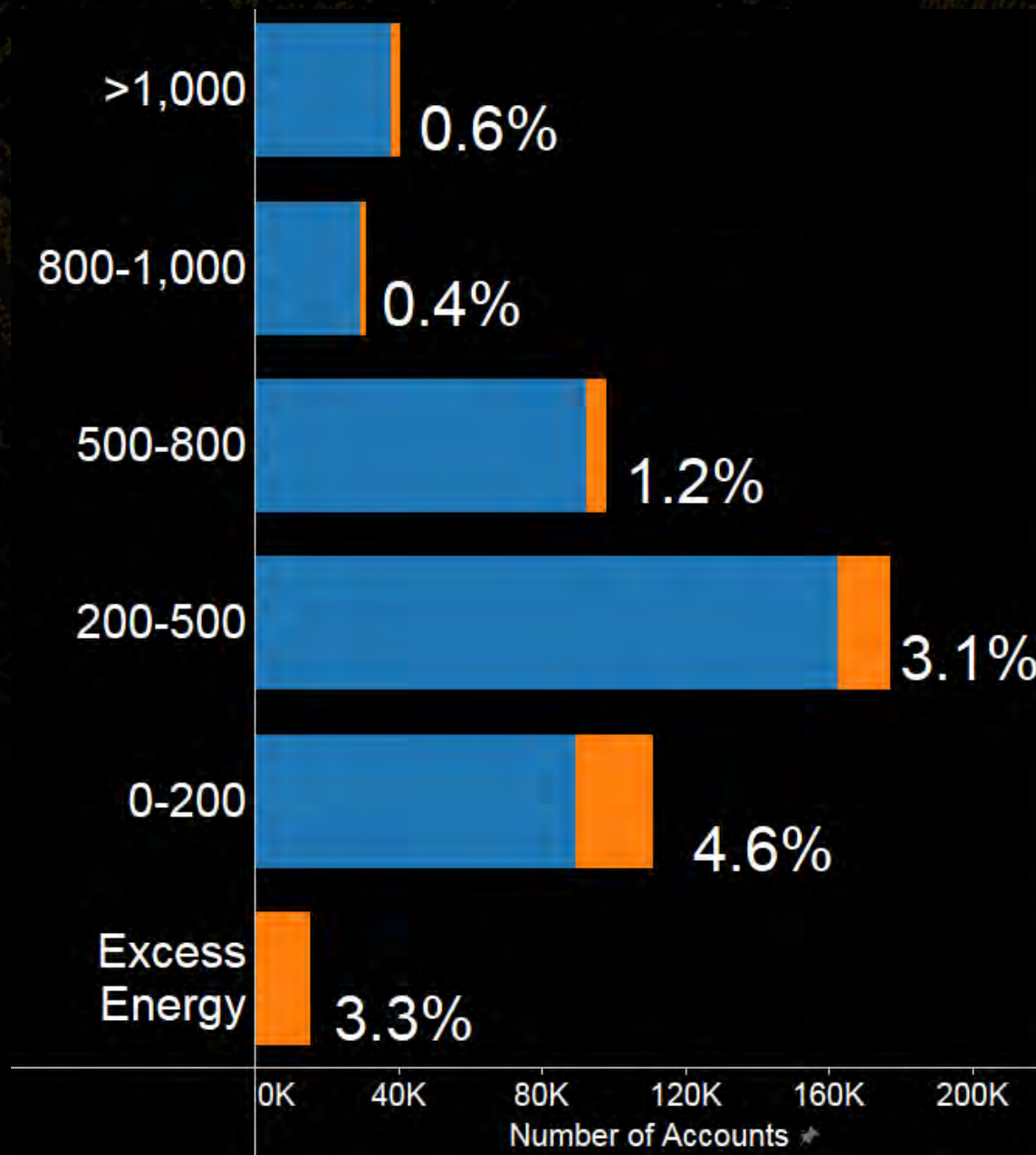
Understand

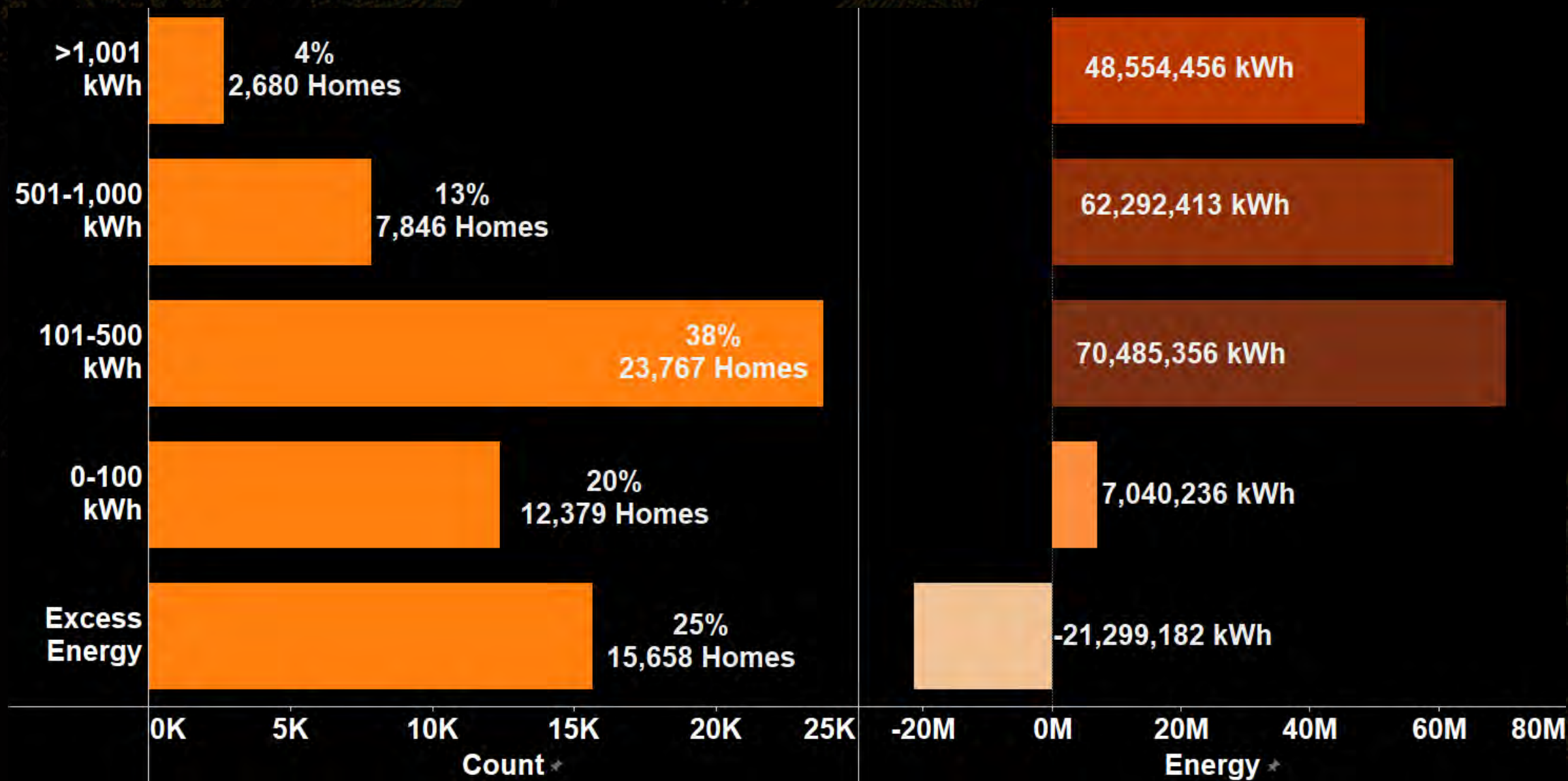


Residential Bins of Monthly Energy Usage (kWh/Month)

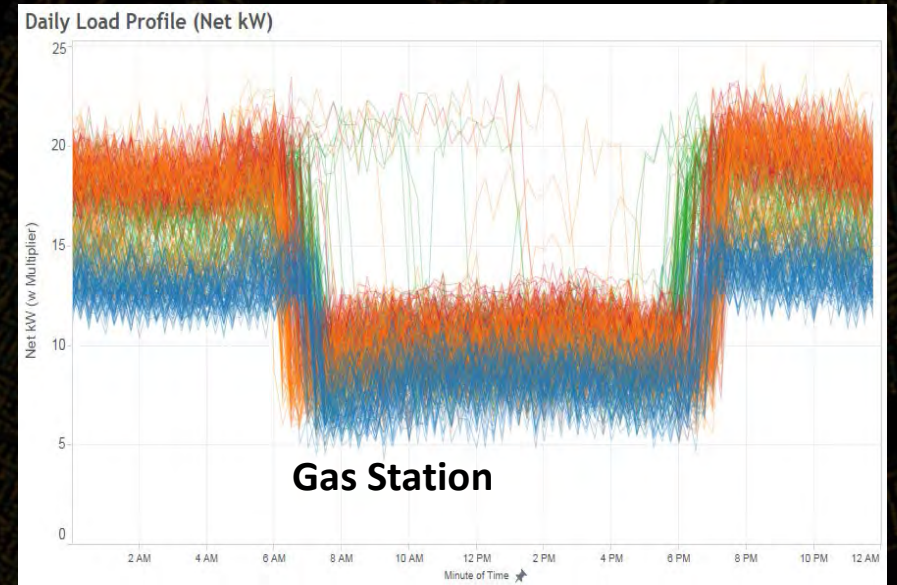
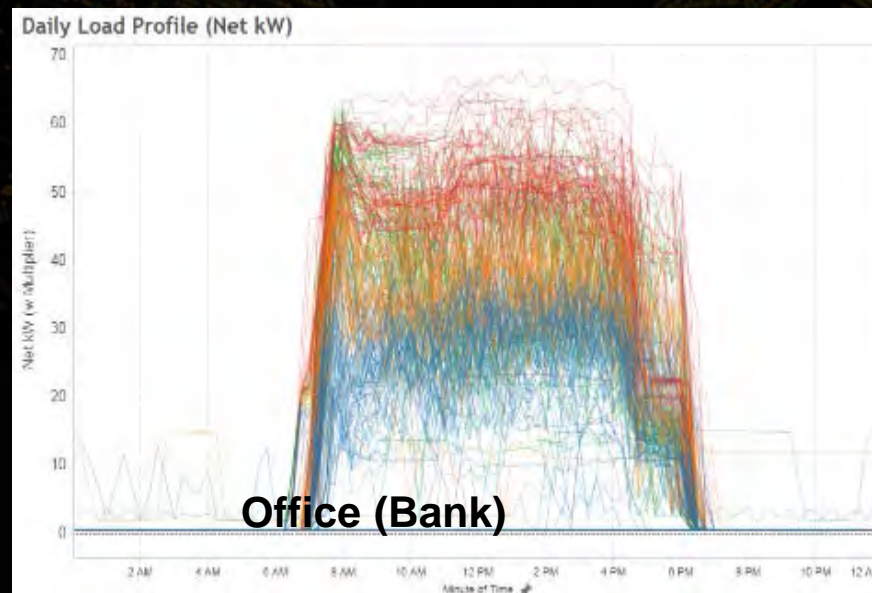
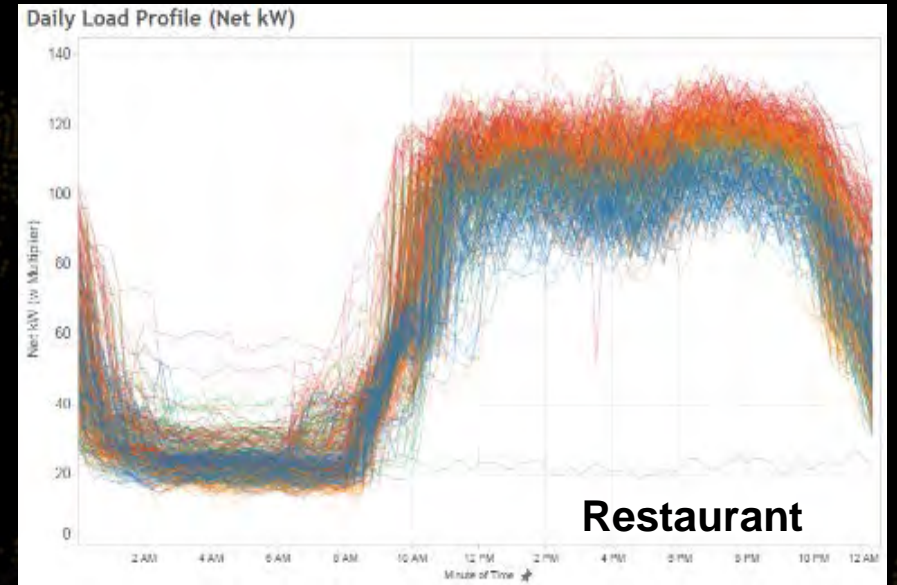
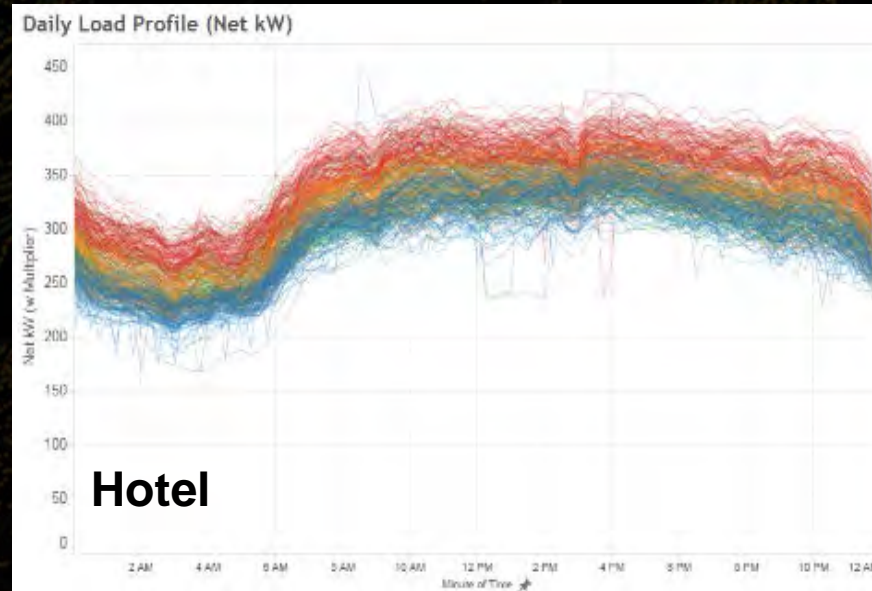


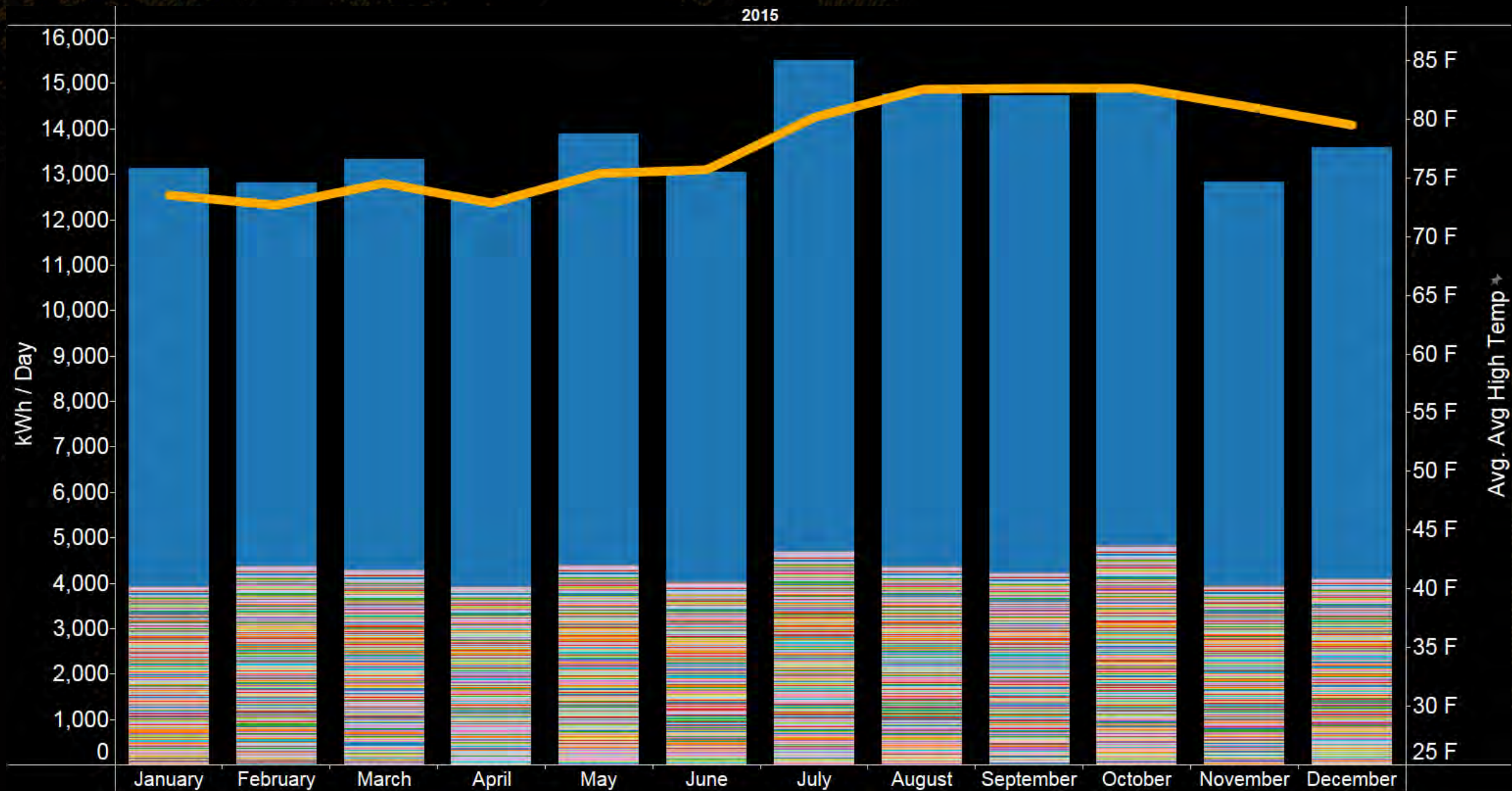
Residential Bins of Monthly Energy Usage (kWh/Month)



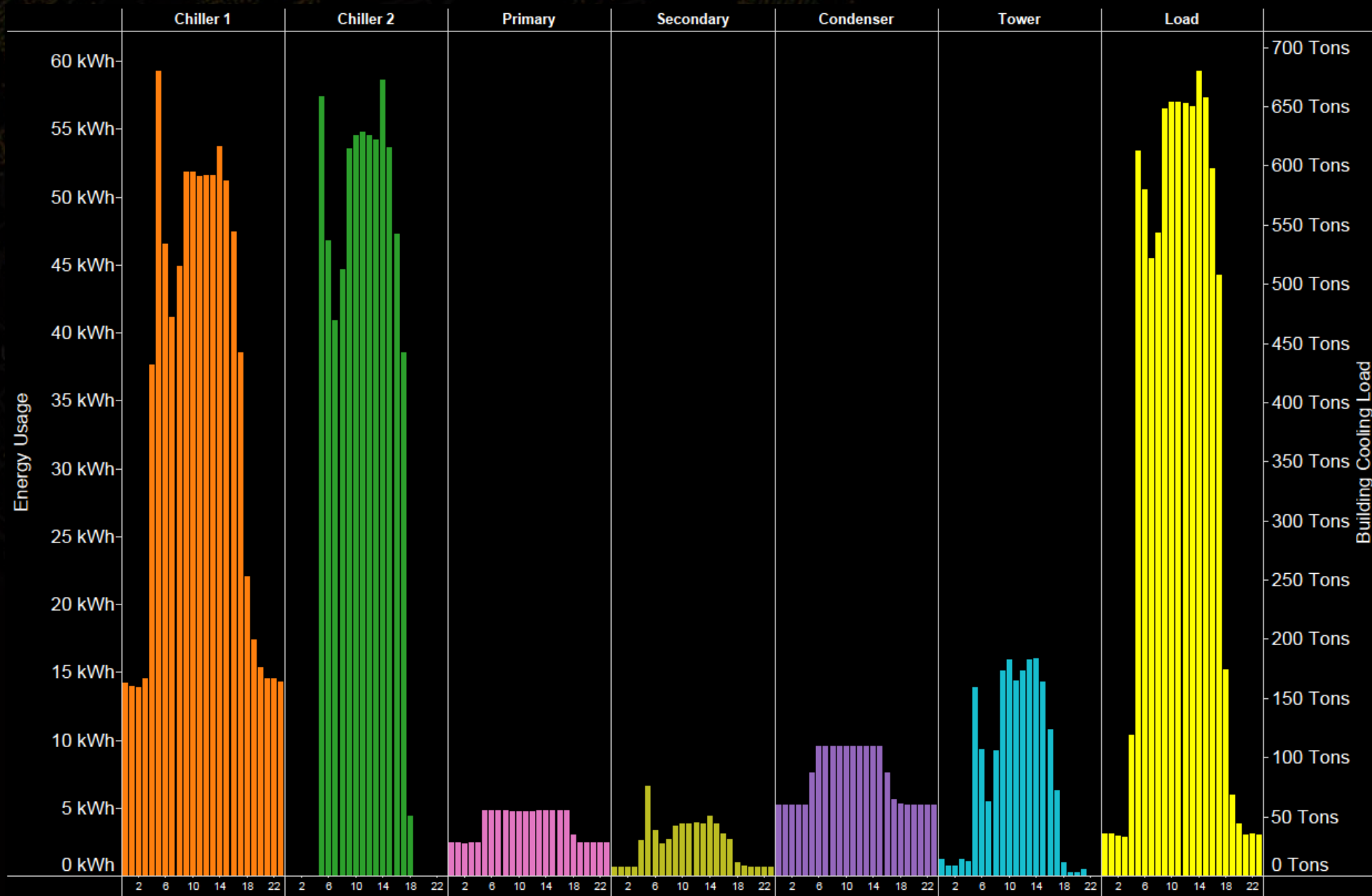


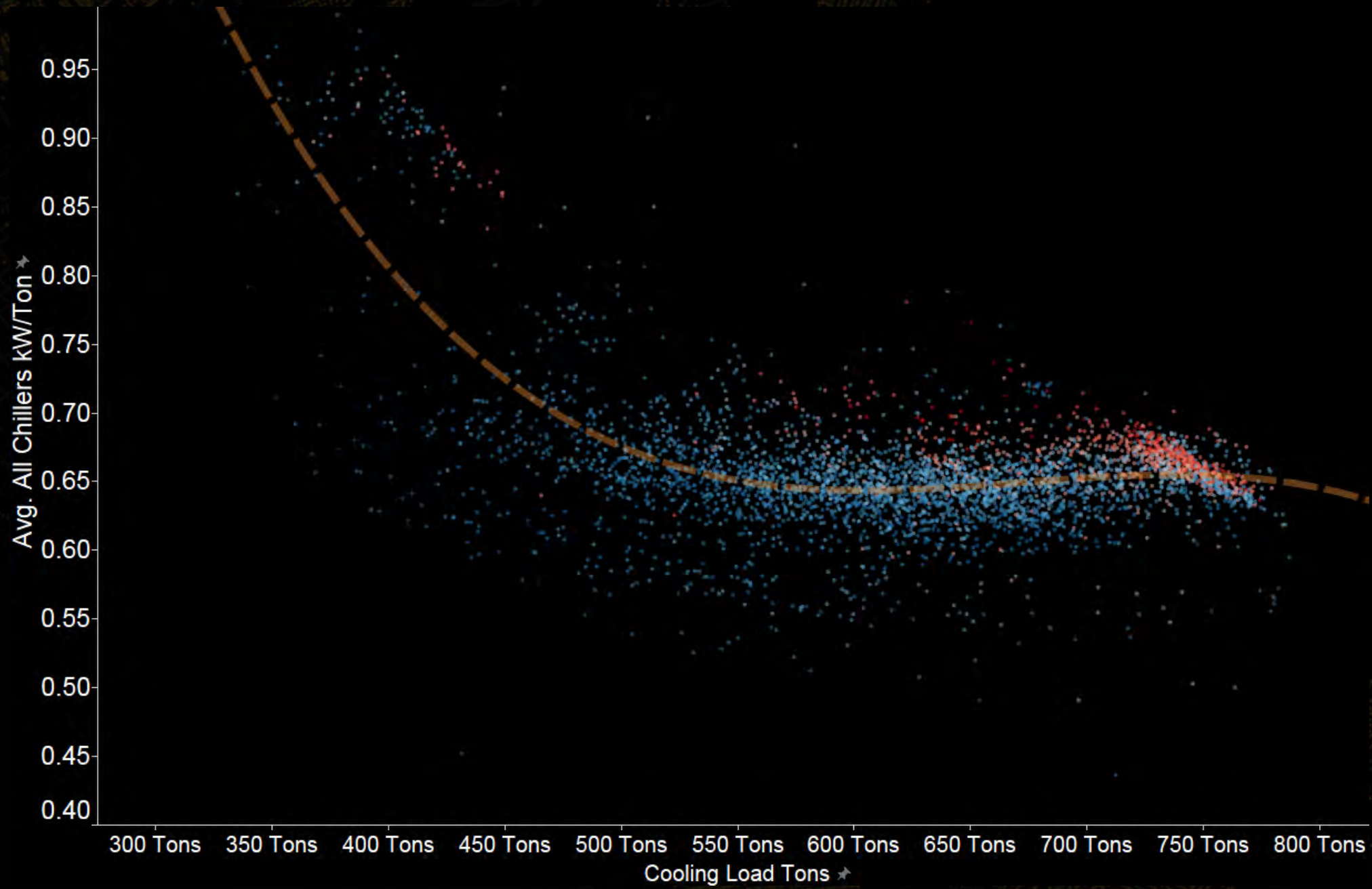
Engage





Optimize







Mahalo

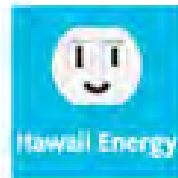
HELPING HAWAII CONSERVE TODAY, TO POWER A BETTER TOMORROW

www.hawaiienergy.com



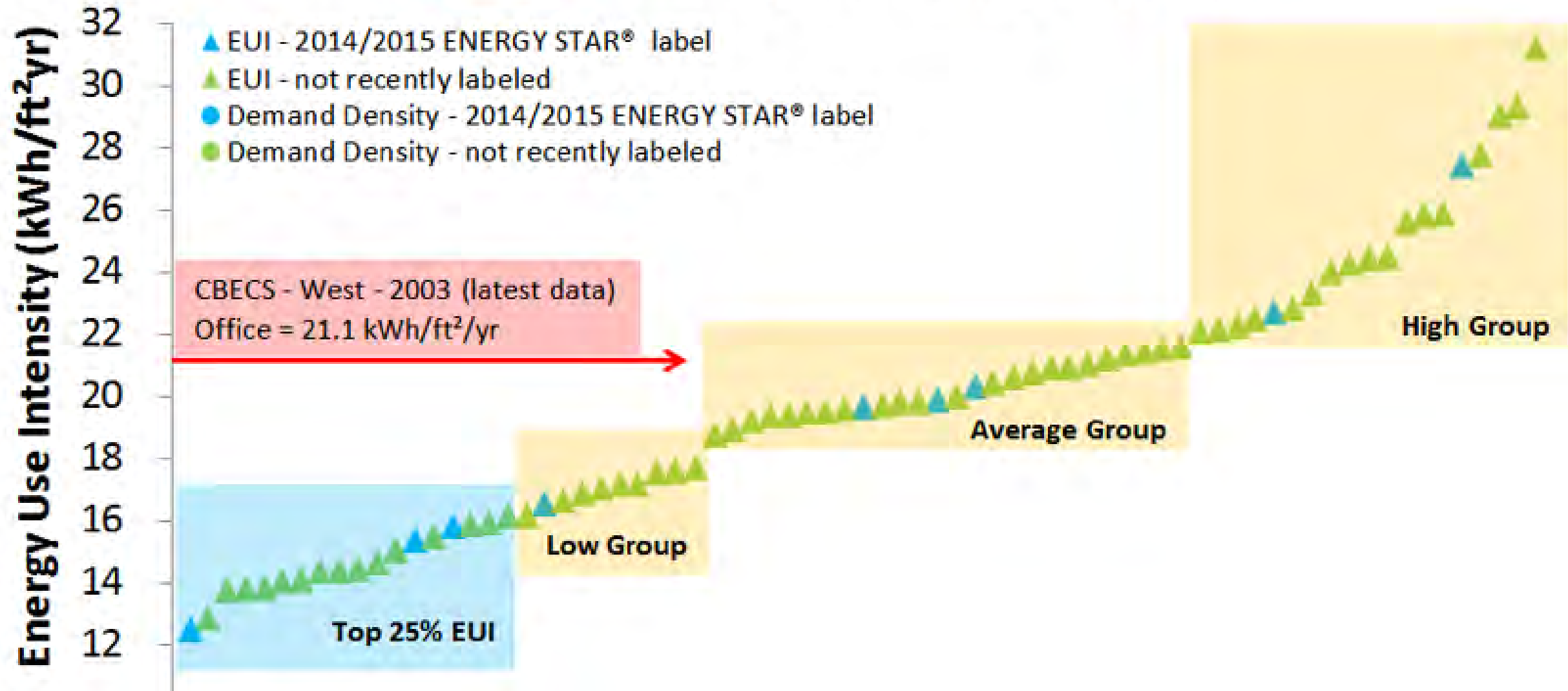
Hawaii Energy

Your Conservation and Efficiency Program



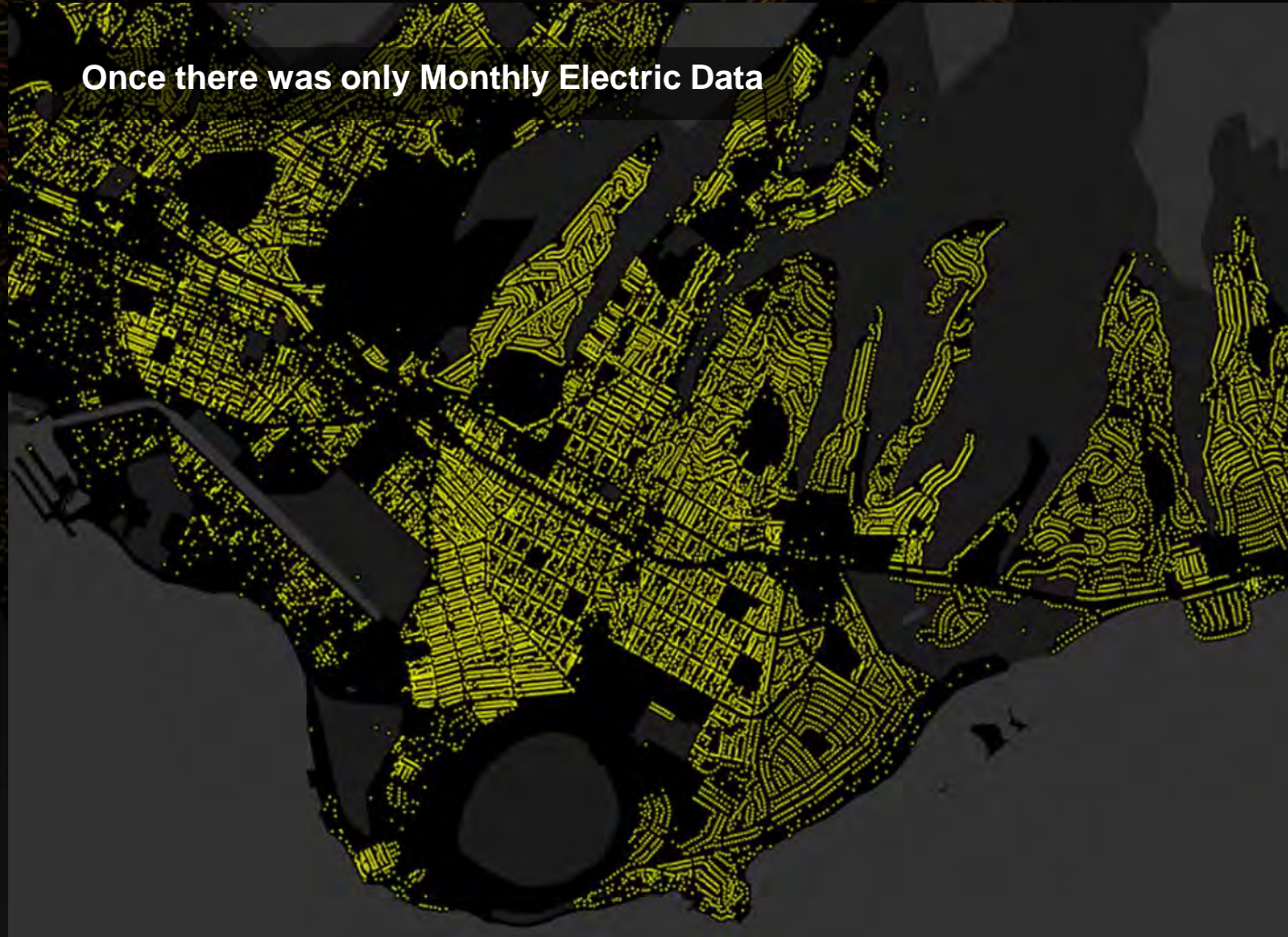
Honolulu Office Buildings

2014 Energy Use Intensity Comparison



Data Integration

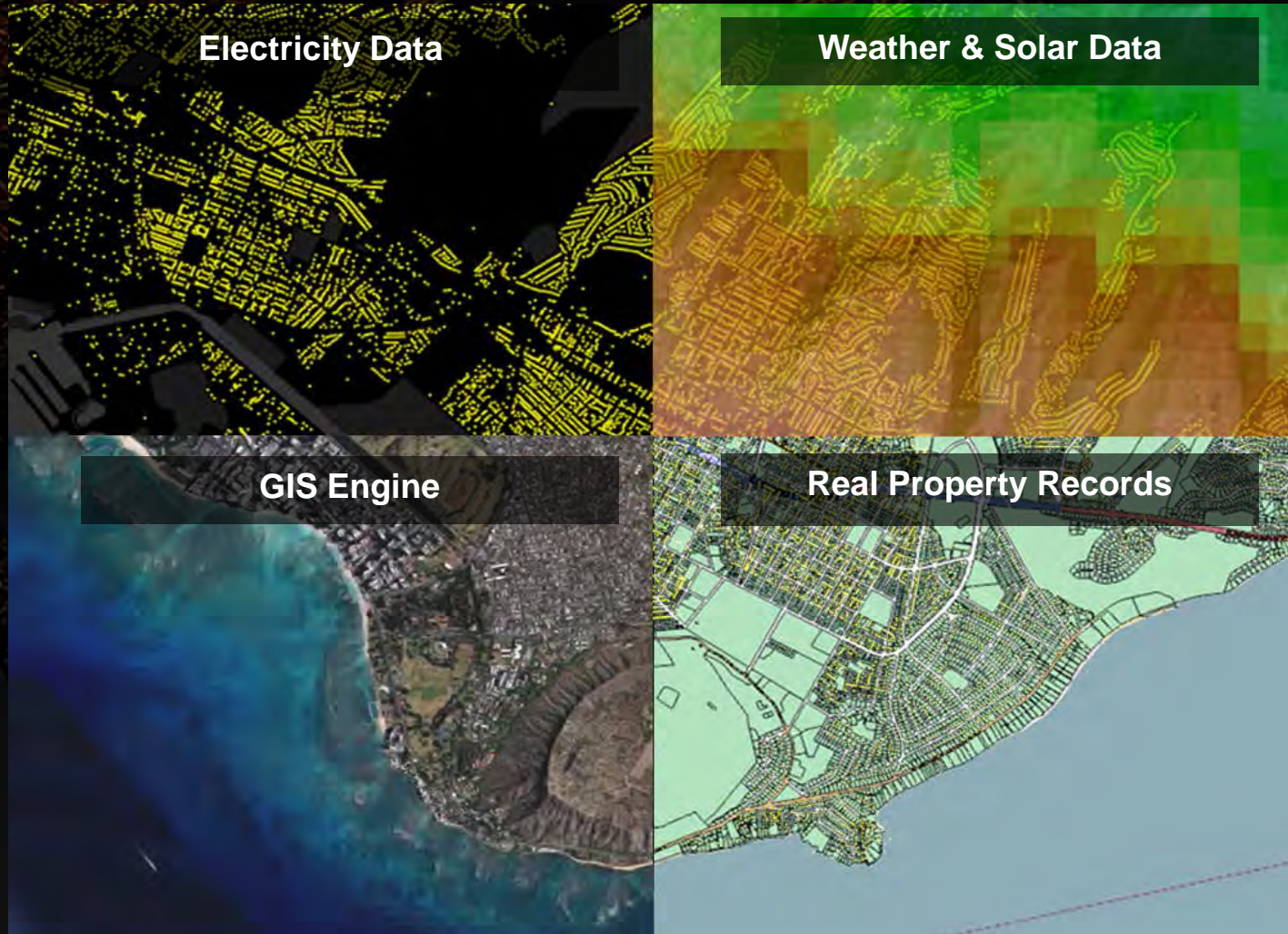
Once there was only Monthly Electric Data



Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM



hawaiienergy.com

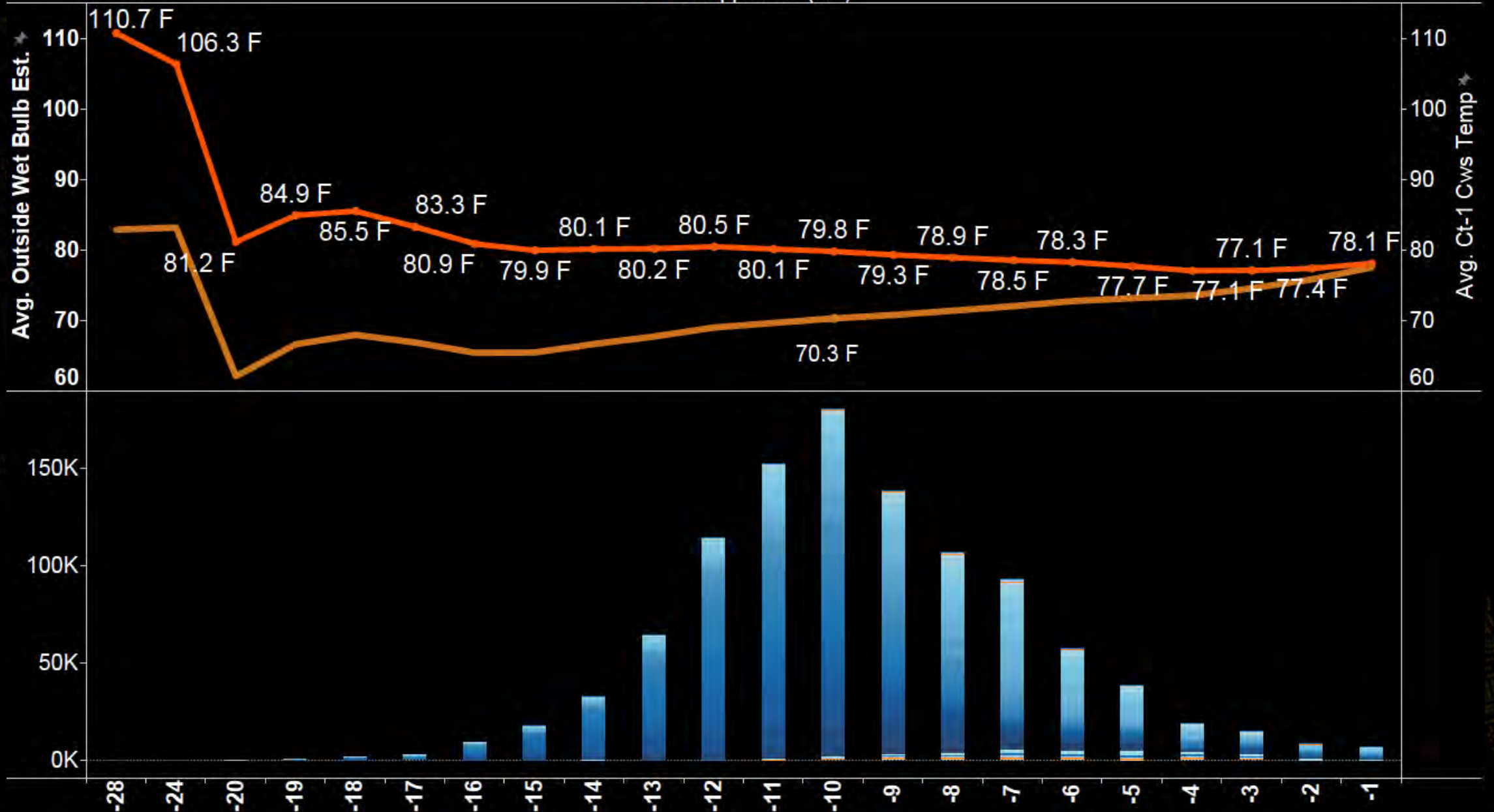


Hawaii Energy
YOUR CONSERVATION & EFFICIENCY PROGRAM





Tower Approach (bin)



Example Slide 7 - Schools Varying energy usage based on the school calendar

