Hawaiian Electric

Integrated Grid Planning

Listening + Integrating + Collaborating to Reach 100% Renewables by 2045

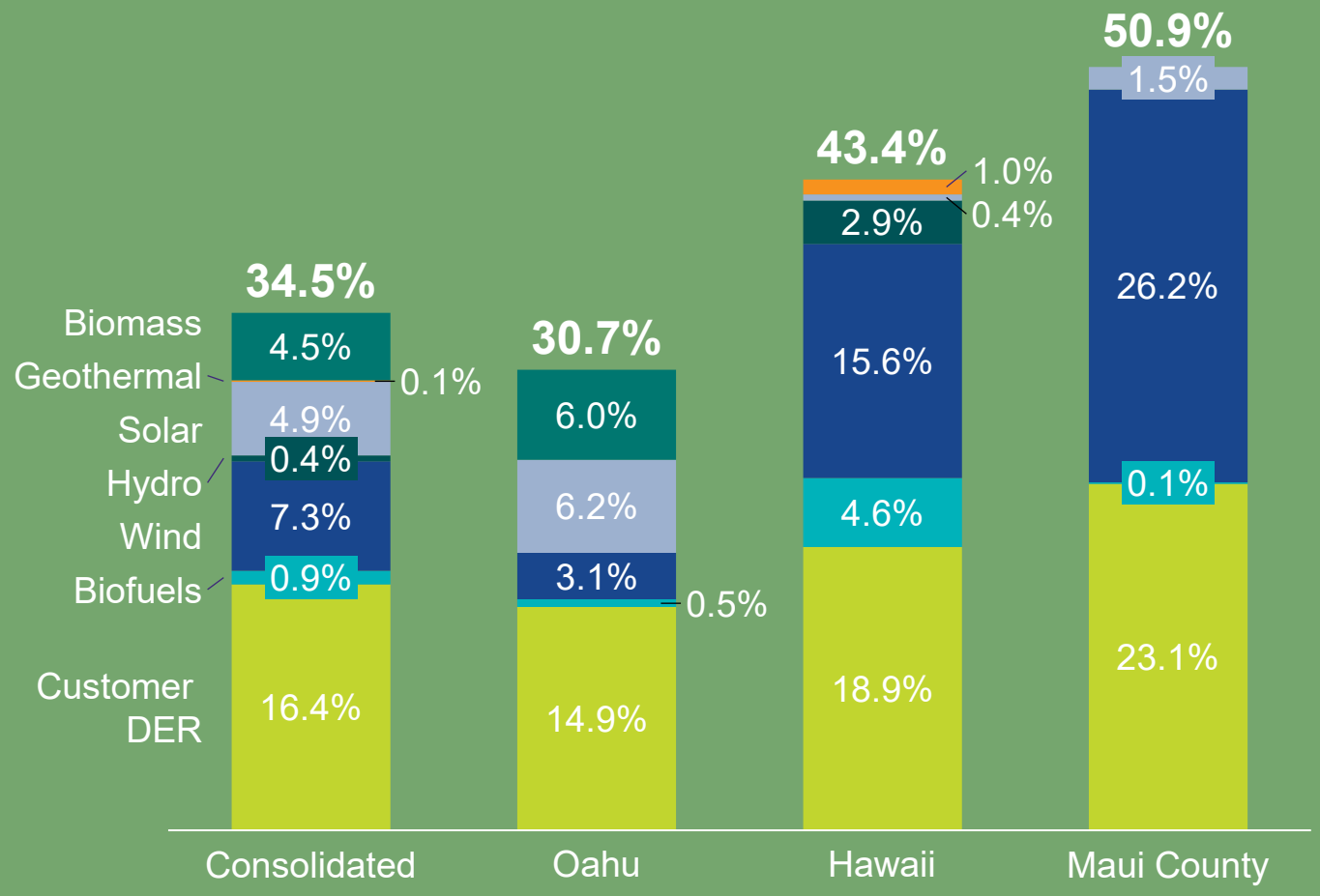
Getting to 100% Renewables

Evolving System Planning Considerations Including DER
2021 ESIG Fall Workshops
October 12, 2021

Marc Asano
Director, Integrated Grid Planning

Our Goal for the Future: **100% Renewables by 2045**

2020 Recap:** The Companies achieved **34.5% RPS



*RPS = Renewable Portfolio Standard

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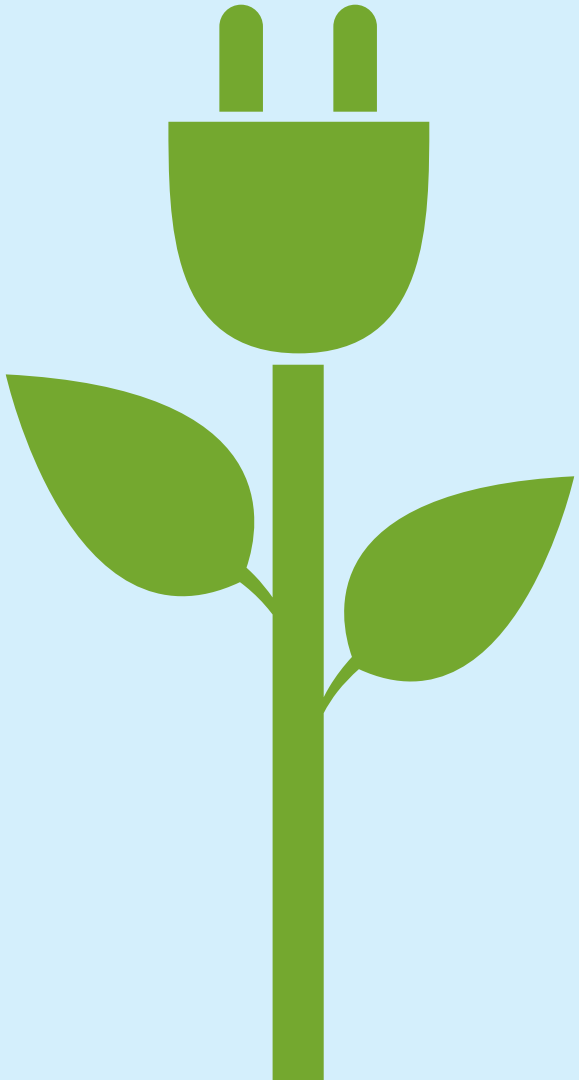
What is IGP?

Integrated Grid Planning (IGP) is an **energy planning process** to identify the best options for our customers to move Hawai'i toward a clean energy future.

Our planning principles



1. Renewable energy is the first option.
2. The energy transformation must include everyone.
3. Today's decisions must not crowd out tomorrow's breakthroughs.
4. The power grid needs to be modernized.
5. The lights have to stay on.
6. Our plans must address climate change.
7. There's no perfect choice.

Participating in the Process

As part of the IGP process, we are collecting your input and considering all our options in planning for our renewable future. Here are the participants Hawaiian Electric is collaborating with:

Working Groups

Address specific topics in an advisory capacity and not as a decision-making group

Stakeholder Council

Represents customers broad stakeholders to review work and provide guidance and insights

The Public

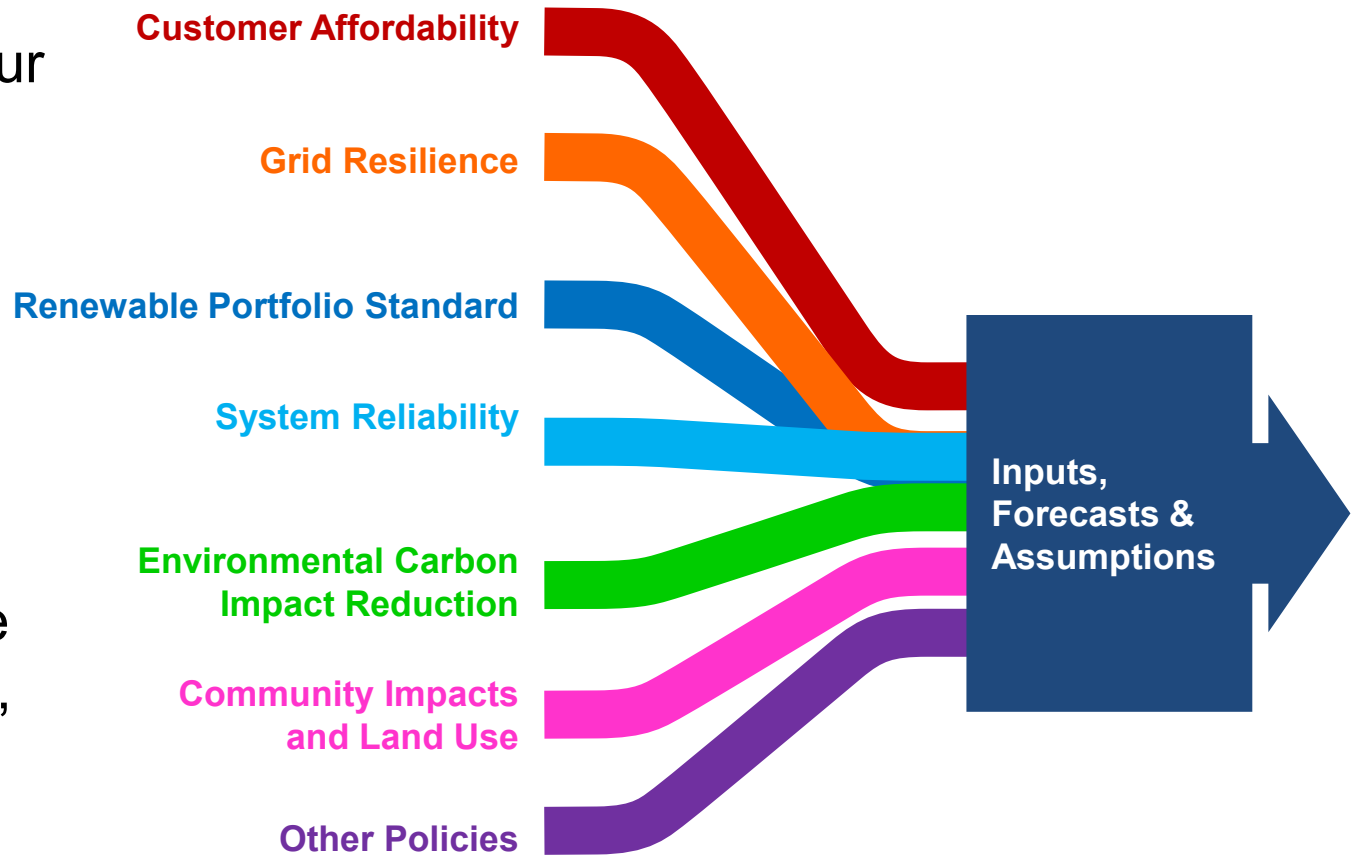
Communication with customers

Technical Advisory Panel

Provides independent evaluation and feedback on the working group activities and reviews point filings

Long-range planning considers many factors

- Our goals requires a transformation of our electric system
- Integration of resource, transmission, distribution and customer resource planning
- Technical work informed by active Stakeholder engagement
- No blueprint; Hawaiian Electric leads the way with work recognized by RMI, EPRI, SEPA and Utility Dive, and others as industry-leading



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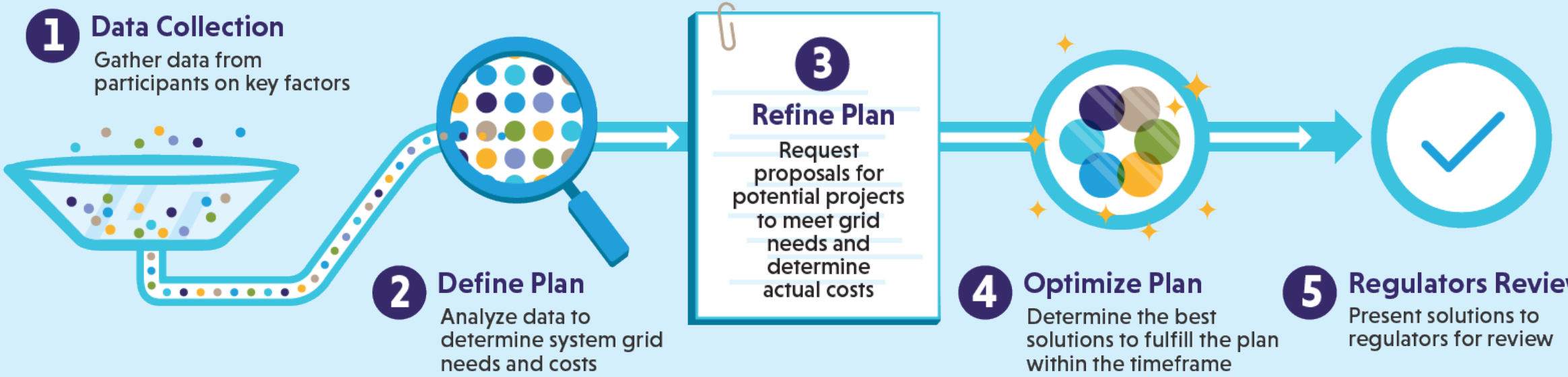
The IGP process integrates generation, T&D, and customer resources, with the resource procurement



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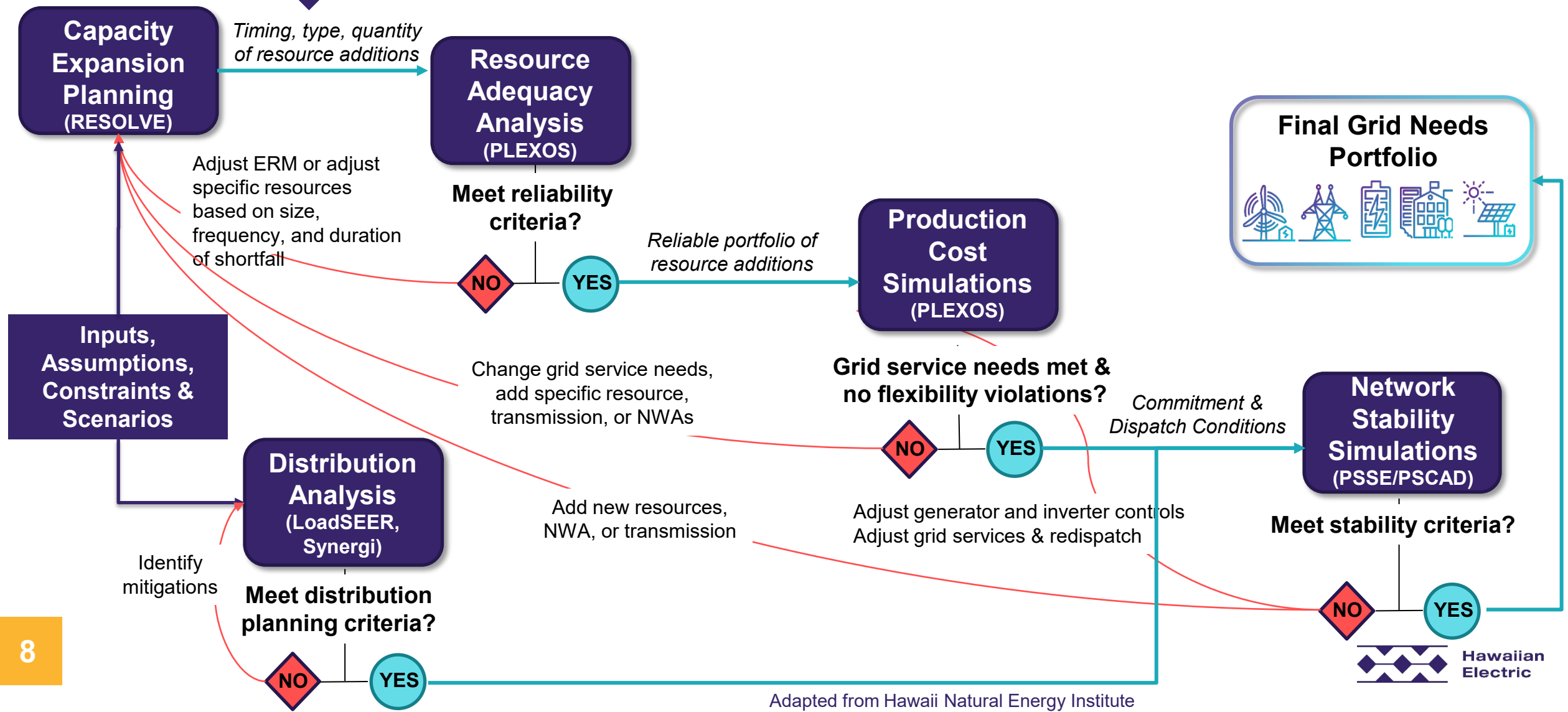
Integrated Analytical Framework



Adapted from Hawaii Natural Energy Institute

Integration of customer technologies foundational to achieving RPS and decarbonization goals

Energy Efficiency
4,300 GWh savings by 2030
In 2019-20, Hawaii Energy achieved 134 million kWh of EE Savings

Private Customer Rooftop Solar and Battery Energy Storage
Today, 32% of single-family homes have rooftop solar

Emissions Reductions
Used 107 million fewer gallons of oil in 2020 compared to 2008, and cut greenhouse gas emissions by 24% since 2010.

Electrification of Transportation
Installed 25 fast chargers across territories; Introduced an eBus Make-Ready Infrastructure Pilot Project

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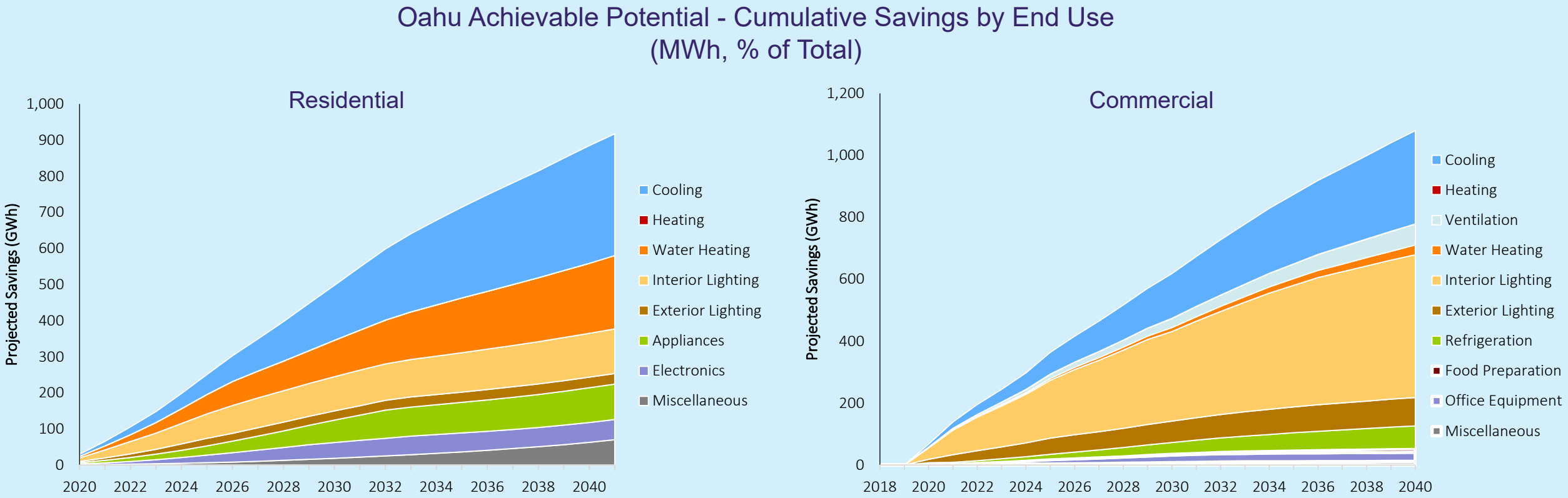
Energy efficiency is critical to managing growth from EoT and other customer end uses



Source: State of Hawaii Market Potential Study 2020

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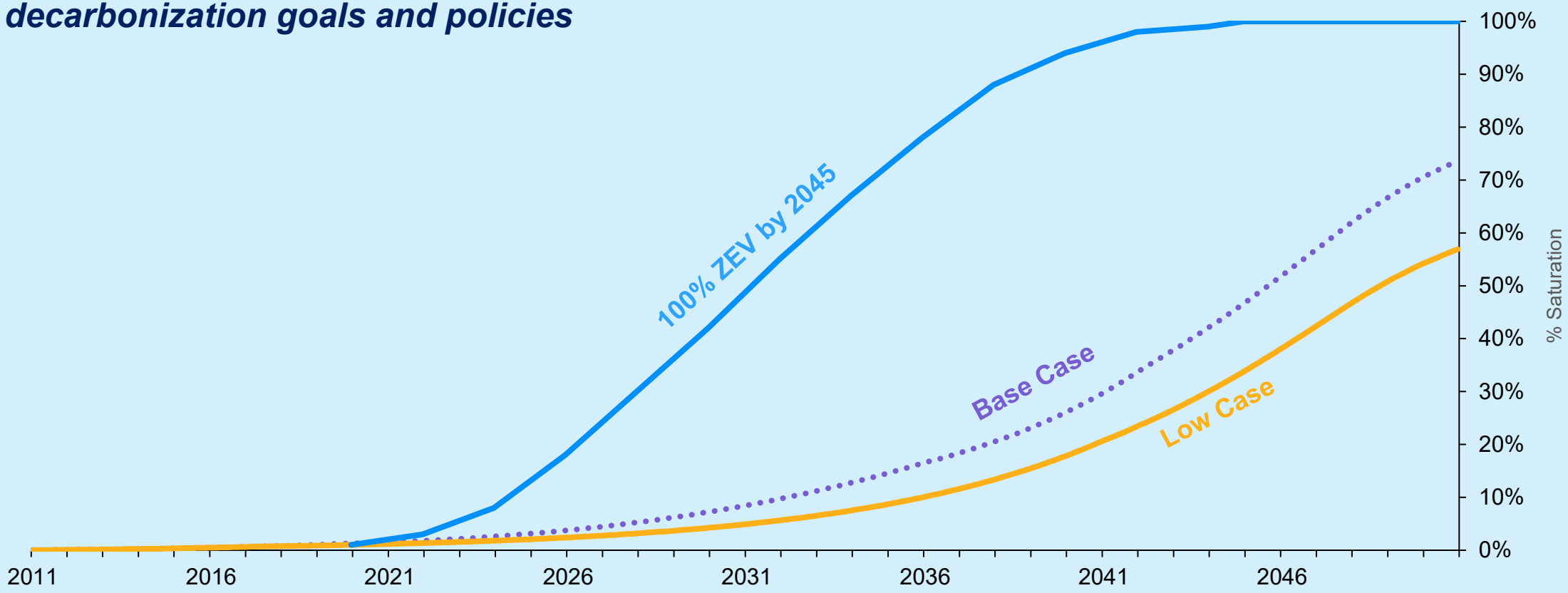
Future EV adoption is uncertain

A range of scenarios is needed to assess impact to electric system

The high EV scenario assumes 100% market saturation by 2045 to achieve decarbonization goals and policies



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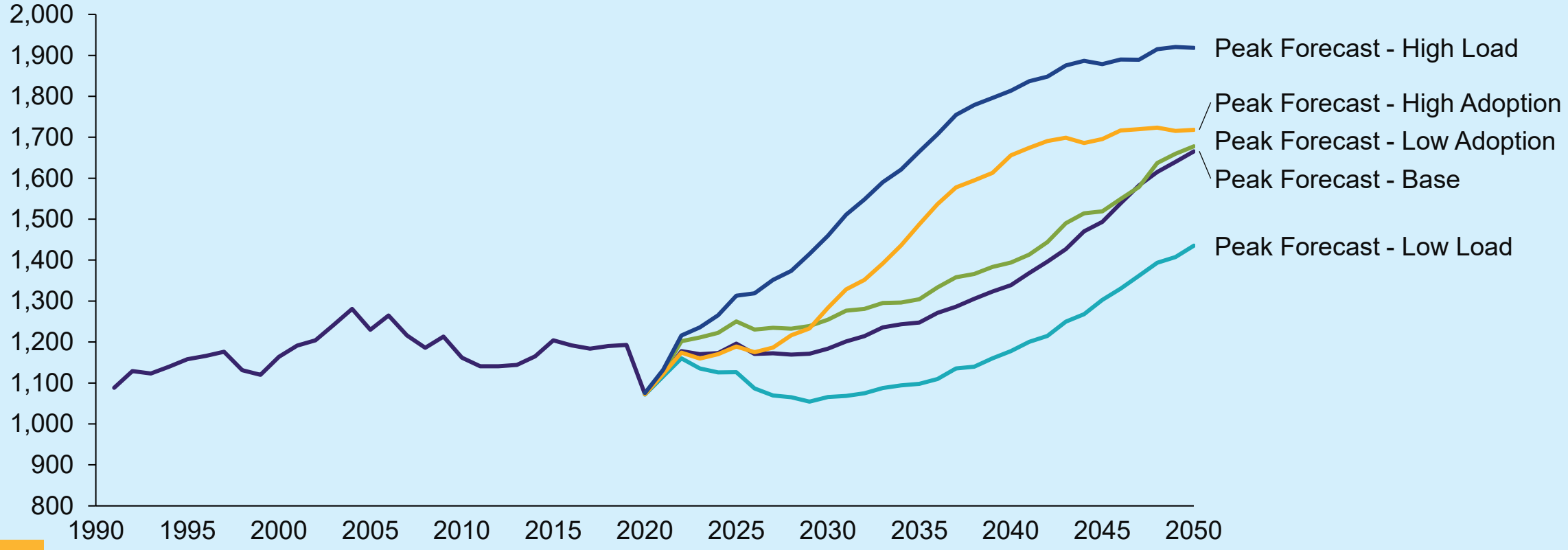
Significant growth in peak demand expected over the next 30 years to electrify the transportation sector

A combination of customer technology adoption futures are assessed for long-range planning

We use a high and low load "bookend" to test robustness of long-range plans against uncertain futures



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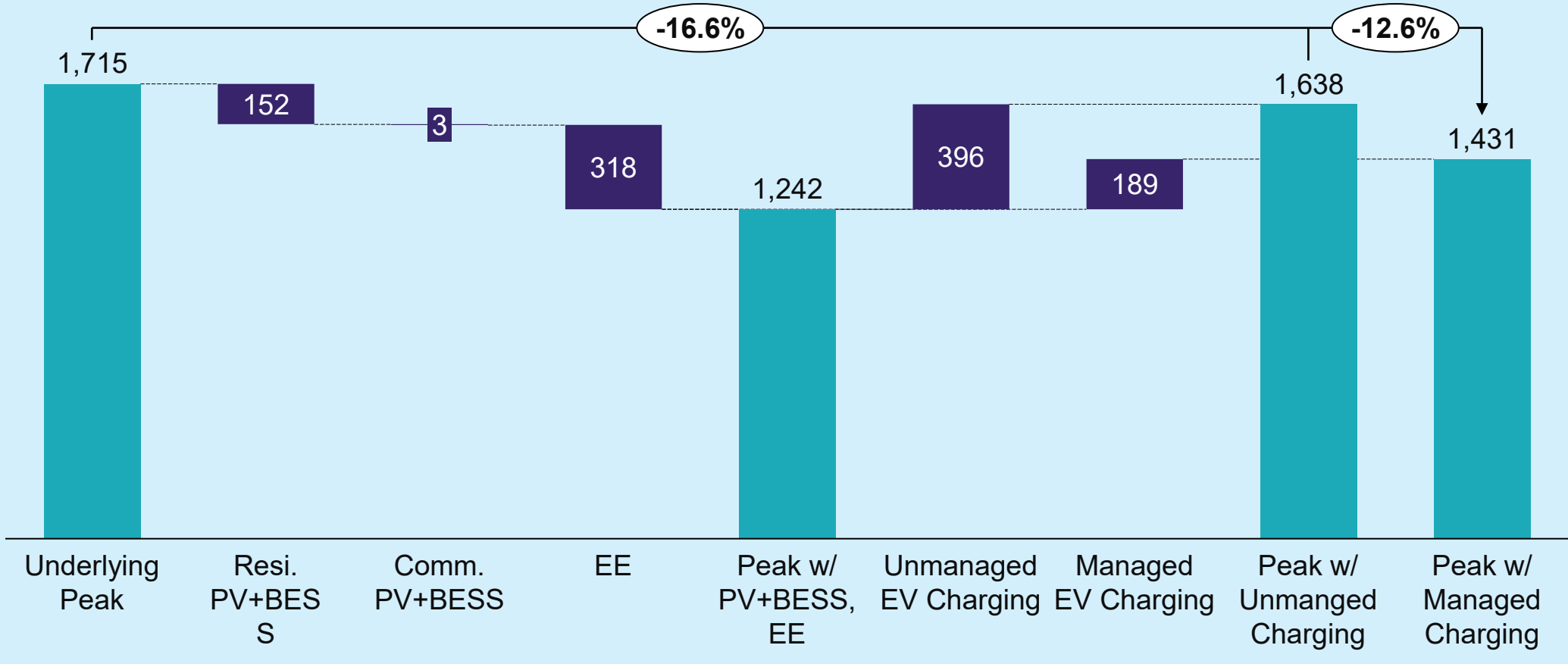
Flexible technologies are critical to managing peak demands

PV+BESS and EE adoption in 2050 can offset EV driven growth

Customer Technologies under managed EV charging can reduce the peak by 16.6%

Managed EV charging can potentially reduce the peak 12.6% versus unmanaged charging



Illustrative Day in 2050

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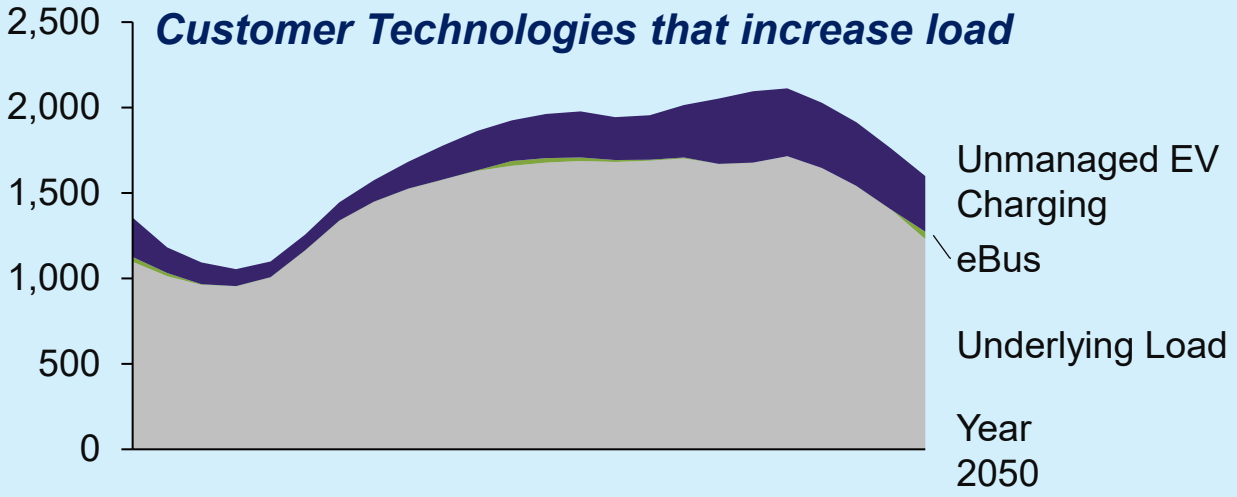
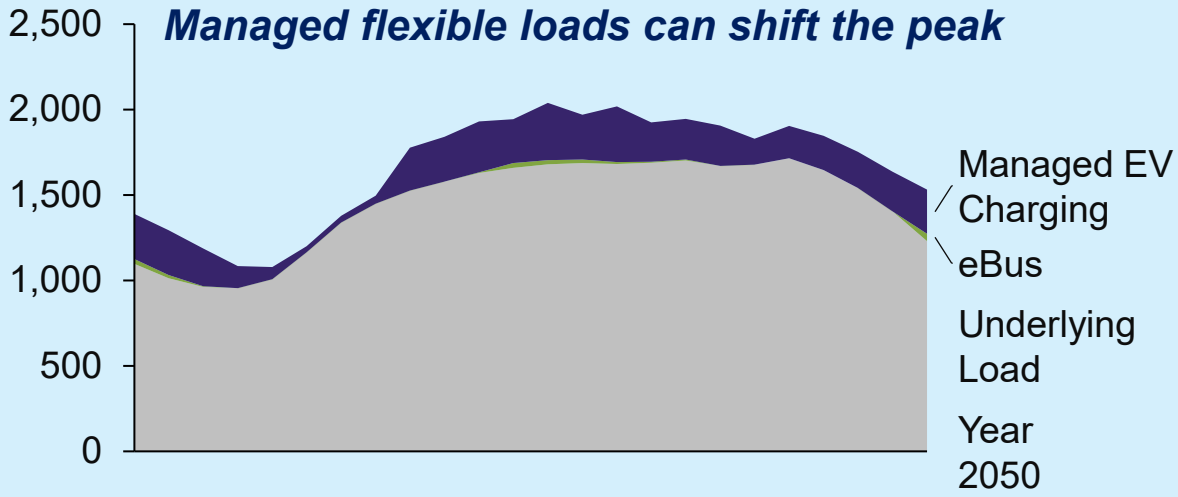
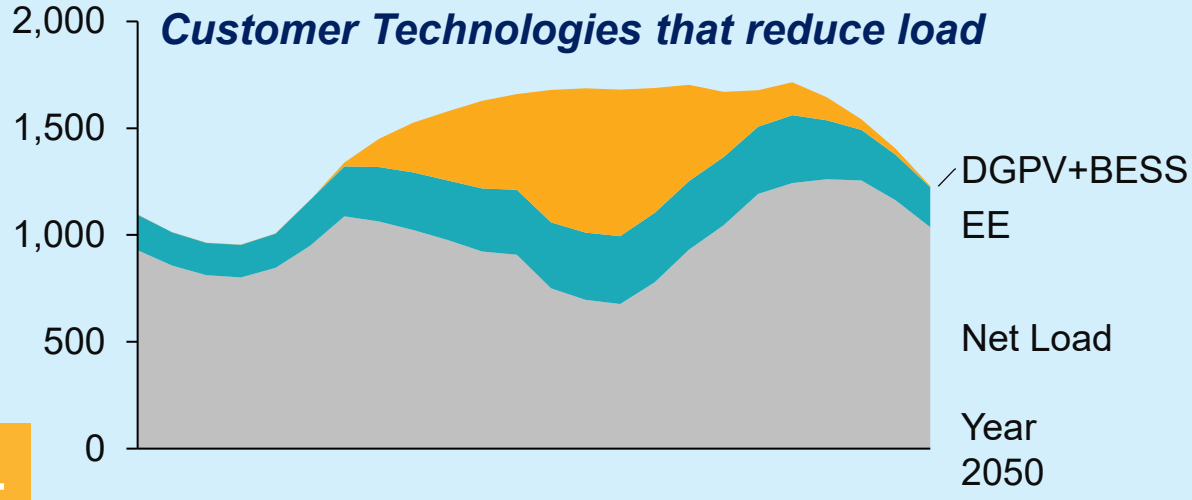
Flexible customer technologies are complementary







Continued adoption of customer solar, BESS, and EE measures can reduce the peak demand and charge EVs with clean energy

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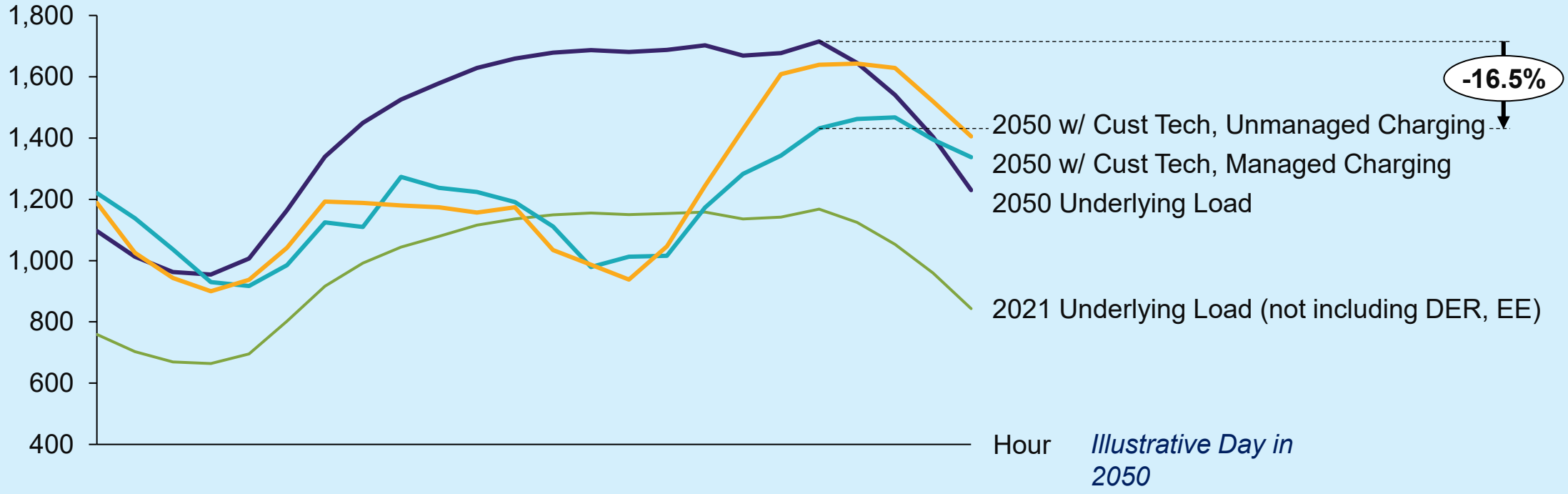
Customer technologies will play a significant role in achieving RPS and decarbonization goals

The underlying peak hour is reduced by 16.5% with managed EV charging

Even under unmanaged EV charging, EE, PV, BESS key to offsetting load growth from EV

The right policies, programs, and rate designs are needed to realize this future



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Mahalo!

Here are the many ways to stay connected with us.

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Website: **www.hawaiianelectric.com/igp**

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