

HAWAI'I 2017 UPDATE

ENERGY REPORT CARD

blue  planet
FOUNDATION

ENERGY REPORT CARD

Blue Planet Foundation's energy report card presents a big-picture assessment of Hawai'i's progress toward energy independence with 100 percent clean energy. By evaluating five key components—transportation, energy efficiency, renewables, smart grid, and economics—and tracking specific factors that influence them, we can identify bright spots and opportunities to improve. These grades generally reflect our clean energy progress through 2015 or 2016. Data for some factors have been updated into 2017. Look for a fully updated Report Card in even years, starting with 2018.

CLEAN ENERGY GRADES

TRANSPORTATION ↑	EFFICIENCY ↑	RENEWABLES ↓	SMART GRID ↔	ECONOMICS ↑
D+	A-	B+	D	C+
PREVIOUSLY: D-	PREVIOUSLY: B+	PREVIOUSLY: A-	PREVIOUSLY: D	PREVIOUSLY: C

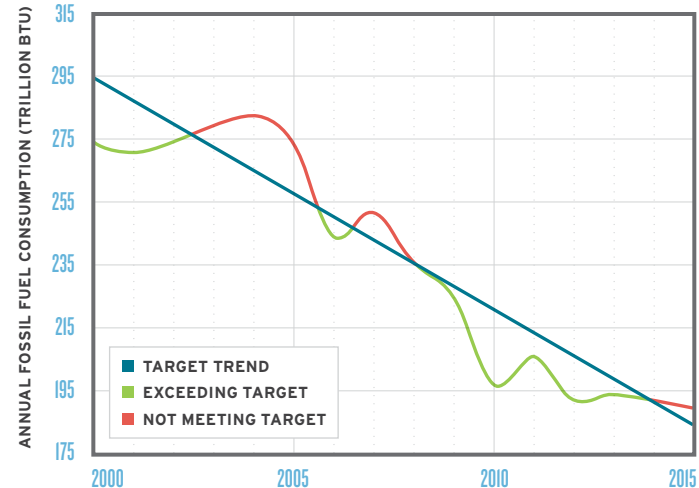
OBJECTIVE: 100% CLEAN ENERGY

OVERALL GRADE →

B-

PREVIOUSLY: B-

OVERALL PROGRESS: ANNUAL FOSSIL FUEL CONSUMPTION



Annual fossil fuel energy consumption is estimated from State of Hawai'i reports on the liquid fuel tax base and from data compiled by the U.S. Energy Information Administration. Target trend is based on an assumed decline from the 2008 consumption level, at the inception of the Hawaii Clean Energy Initiative, to zero in 2040.

Total fossil fuel consumption in Hawai'i is still declining, reflecting our progress toward 100 percent clean energy. But we are falling a little short of the target. More clean energy can get us back on track for energy independence by 2040.

HERE'S HOW TO READ THE CHARTS

TARGET TREND LINE

The blue target trend marks the pace of progress that would keep the state on track for a fossil-free future by 2040.

GREEN LINE

The green line indicates positive results.

RED LINE

The red line indicates shortfalls.

NOTES

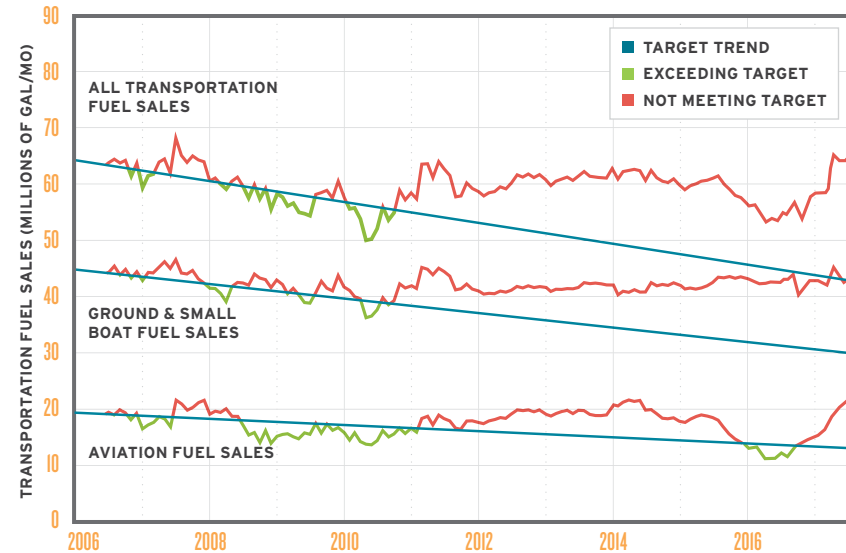
Each primary metric is accompanied by three factors, and each factor highlights trends and opportunities.

TRANSPORTATION

GRADE

D+

PREVIOUSLY: D-

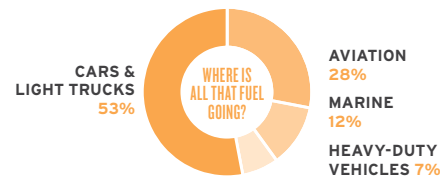


Fuel sales are presented as a six-month moving average of monthly gasoline, highway diesel and LPG, small boat gasoline and diesel, and aviation fuel sales, as reported by the State of Hawai'i Department of Business, Economic Development & Tourism or Department of Taxation, and assume that non-fossil-based transportation fuel sales to date have been negligible in comparison to overall sales. Energy independence target trends assume that fossil-based transportation fuel sales decrease linearly from the 2006 monthly average to zero gallons by 2040. Some information in the accompanying text is from the 2015 Hawai'i Clean Energy Initiative Transportation Energy Analysis.

PRIMARY METRIC

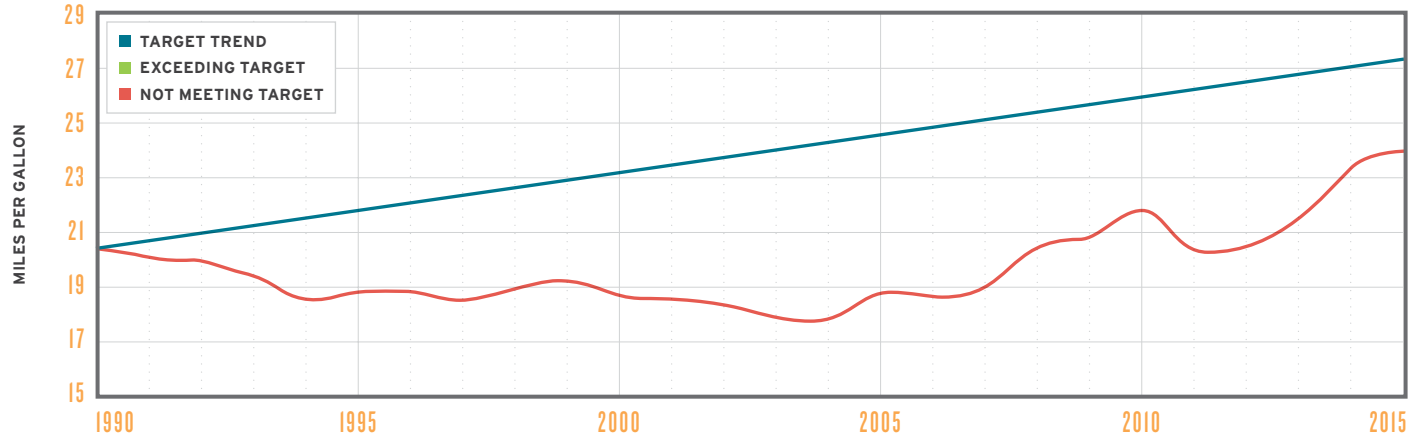
FOSSIL-BASED MOTOR FUEL SALES

Transportation accounts for almost two-thirds of our fossil fuel consumption, making sustainable mobility solutions essential to moving Hawai'i beyond oil. In the past year, demand for transportation fossil fuels has increased. We are not on track.



FACTOR No.1

VEHICLE EFFICIENCY



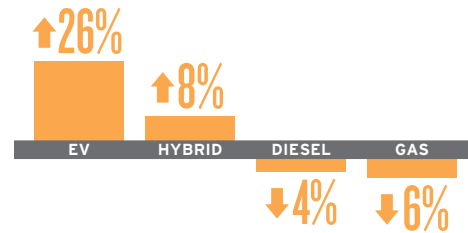
Statewide motor vehicle efficiency is derived from gasoline, highway diesel, and highway LPG consumption, and from vehicle miles traveled, reported in State of Hawai'i Department of Taxation Annual Fuels Reports and the 2014 State of Hawai'i Data Book, Table 18.17. Target trend is based on the Hawai'i Clean Energy Initiative Road Map: 2011 Edition, targeting average vehicle efficiency of 30 mpg for passenger cars, and 22 mpg for light trucks, by 2020, and also on 2013 relative distributions of registered passenger cars and light trucks reported in the 2013 State of Hawai'i Data Book, Table 18.06.

WHAT ABOUT VEHICLE EFFICIENCY?



Even with record low oil prices, **VEHICLE EFFICIENCY IS MAKING GAINS.**

At 24 mpg on average, we are moving closer to the state's goal of 30 mpg efficiency by 2020.



Ownership of efficient electric and hybrid passenger vehicles continues to grow faster than other vehicles.

OUTLOOK & OPPORTUNITIES



Hawai'i County uses a 20% biodiesel blend (B20) in buses, fire trucks, and ambulances. Honolulu uses B20 for garbage trucks and ambulances.

RENEWABLE FUELS MEAN CLEANER TRANSPORTATION.

8 U.S. states and 5 countries are targeting 100% electric vehicles sales by 2050. Lawmakers in Norway and the Netherlands are considering a zero emissions target for all new cars by 2025.

A state study found that increasing the fuel tax could be the single most effective way to reduce gasoline and diesel consumption.

The extra revenue could lower other taxes or promote clean transportation options. Norway has used a similar strategy to make an electric vehicle the most popular new car in the country.

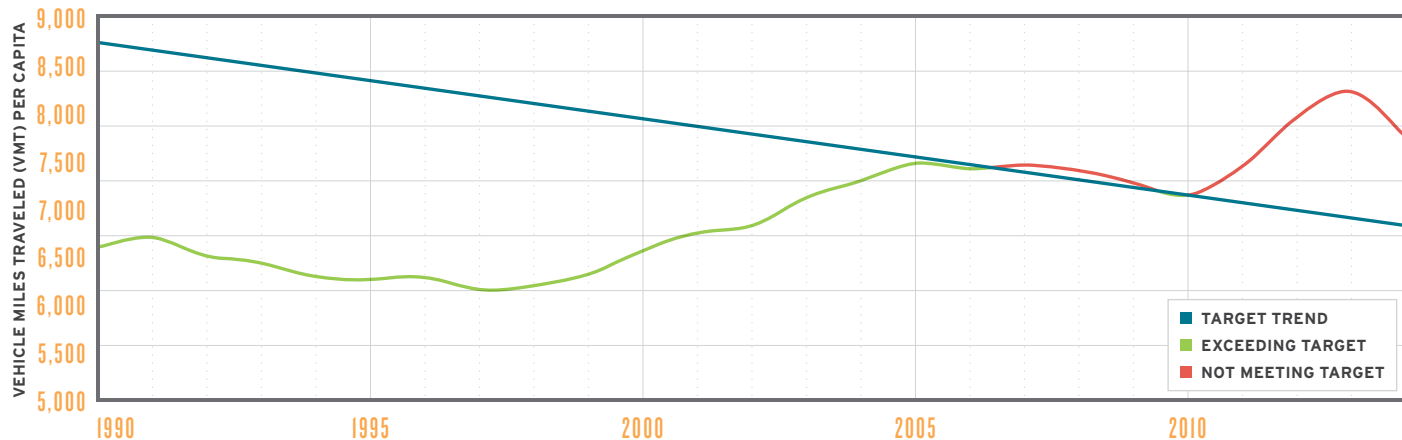
ELECTRIC VEHICLES ARE MORE EFFICIENT and they enable a smarter grid to integrate more renewable energy.

See page 32 for information on EVs



FACTOR No.2

VEHICLE MILES TRAVELED



Statewide per capita VMT is presented as a function of total VMT and de facto population (i.e. including visitors and military members) reported in the 2014 State of Hawai'i Data Book, Tables 1.09 and 18.17. Target trend is based on the Hawai'i Clean Energy Initiative Road Map: 2011 Edition, targeting a 4% reduction in total vehicle miles traveled (over 2010) by 2020, and a projected 2020 de facto population of approximately 1.5 million.

WHAT ABOUT VMT?



After a sharp uptick, VMT is finally headed in the right direction. But we are not yet on track.

HAWAII STILL NEEDS MORE CLEAN MOBILITY OPTIONS.



DRIVING IS BECOMING LESS POPULAR.

For three straight years, the number of active driver's licenses has dropped. Meanwhile, the share of people who commute by bike, walking, or public transit has increased every year.

OUTLOOK & OPPORTUNITIES



The King Street Cycle Track in Honolulu is proving the case for new mobility options. Bike ridership on King Street is up 88% since the track was created in 2014. Residents and businesses want more walkable and bikeable neighborhoods.

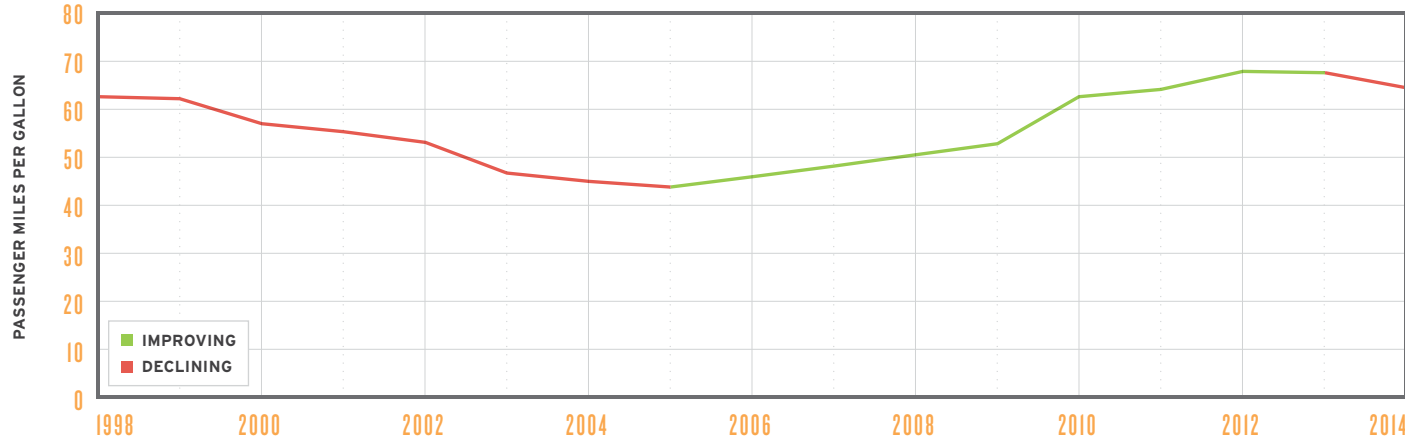
ACCORDING TO A STATE STUDY, PROMISING STRATEGIES FOR REDUCING VMT INCLUDE:

- Increasing fuel taxes (saving 28 million gallons per year by 2030)
- Transit-oriented development (23 million gallons per year)
- Telecommuting by public employees and large employers (5 million gallons per year)



FACTOR No.3

PUBLIC TRANSIT EFFICIENCY



Honolulu public transit efficiency is presented as a two-year moving average of passenger miles and fuel consumption as reported by the National Transit Database.

WHAT ABOUT PUBLIC TRANSIT?



BUS EFFICIENCY IS STILL A GOOD DEAL, at nearly 65 passenger miles per gallon. But in 2015, bus ridership was flat and efficiency fell slightly.

THE HONOLULU BUS SYSTEM IS AT CAPACITY.

Demand is high, but no new public transit capacity has been added since the 1980s. This limits its potential.

OUTLOOK & OPPORTUNITIES



Once completed, the Honolulu rail project will boost transit capacity and lower VMT. With the right planning, it could also be powered by renewable electricity.

THIS IS A HUGE OPPORTUNITY FOR EFFICIENCY AND ZERO EMISSION TRANSPORTATION.

Tour company JTB Hawaii has announced a plan to convert its fleet of buses to zero emissions. Already, China has more than 100,000 electric buses on the road, and communities in the U.S. are following suit.

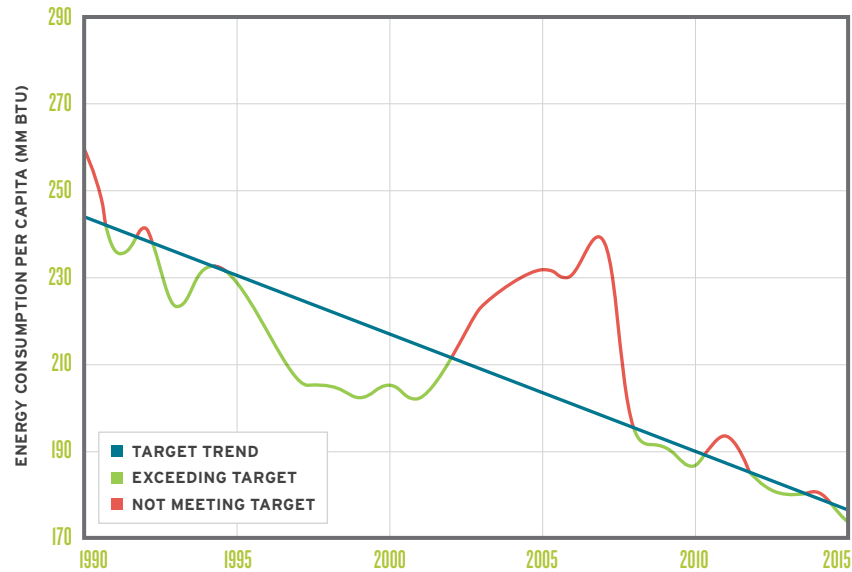




EFFICIENCY

GRADE A-

PREVIOUSLY: B+



Energy data are from primary energy consumption data available from the U.S. Energy Information Administration, and from the State of Hawai'i Department of Business, Economic Development & Tourism. Population data are from the 2014 State of Hawai'i Data Book. Target trend assumes 30% decrease in per capita energy consumption from 2008 to 2030.

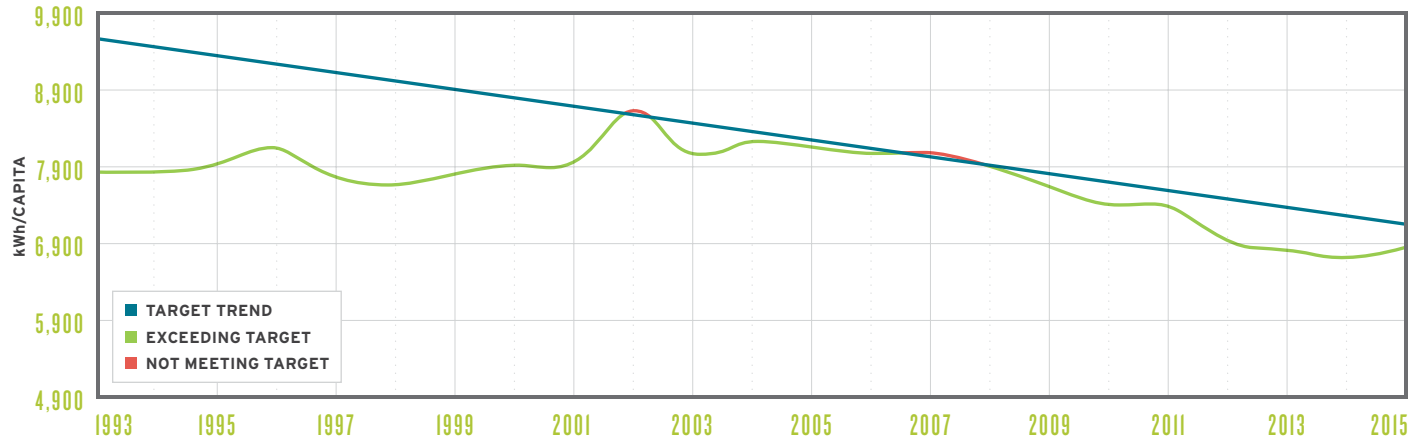
PRIMARY METRIC

ENERGY CONSUMPTION PER CAPITA

Efficiency is still our cheapest and easiest form of clean energy. This chart measures efficiency by examining Hawai'i's per capita consumption of energy since 1990. Hawai'i's efficiency grade is driven by the electricity-related factors identified here as well as the factors identified in the Transportation section. We are on track.

FACTOR No.1

ANNUAL ELECTRICITY GENERATED PER CAPITA



Electricity generation is compiled from data in the 2014 State of Hawai'i Data Book (1993 to 2005), the State of Hawai'i Department of Business, Economic Development & Tourism's Monthly Energy Trends (2006 to 2015), and annual utility reports. Population data (including visitor population) are from the 2014 State of Hawai'i Data Book. 2015 population data point is projected from data available in prior years. Target trend is adapted from the Hawai'i Clean Energy Initiative goal of a 4,300 GWh per year reduction, and assumes approximately linear population growth to 2030.

WHAT ABOUT ENERGY EFFICIENCY?

TEST YOUR ENERGY KNOWLEDGE:



On which day of the year do we use the least electricity?

See page 15 for the answer.



We are still on target to meet the Hawai'i Clean Energy Initiative goal of **30% ENERGY EFFICIENCY SAVINGS BY 2030.**

OUTLOOK & OPPORTUNITIES

Our daily energy peak used to be near mid-day. But solar energy successfully eliminated that peak.

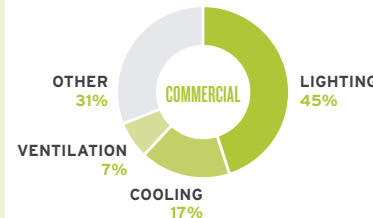
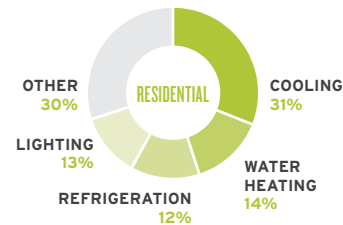
NOW, EVENING HOURS ARE WHEN WE MOST NEED CLEAN ENERGY.

This makes evening efficiency particularly valuable. Here are the best opportunities to lower the peak. ▶

More efficiency means we will need fewer fossil fuels on the path to 100% renewable energy. Efficiency is also cheaper than fossil fuels like oil, coal, and LNG.

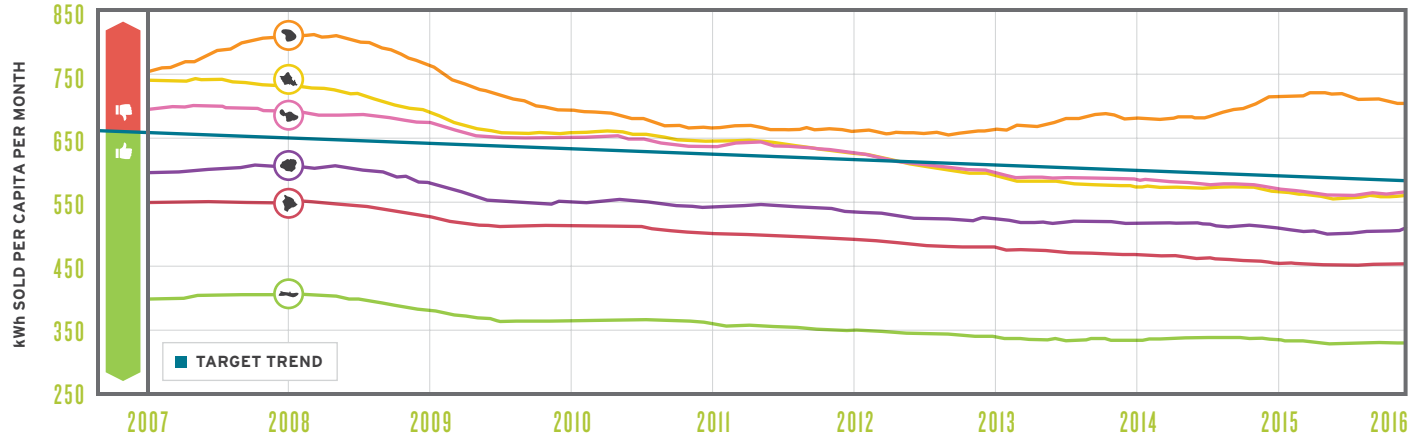
THIS MEANS EFFICIENCY IS A TRUE BRIDGE TO CLEANER ENERGY.

% OF ENERGY DEMAND DURING THE EVENING PEAK



FACTOR No.2

ISLAND BY ISLAND ELECTRICITY SALES



Monthly energy sales data are presented as a 12-month moving average of kWh sold per capita per month from the State of Hawai'i Department of Business, Economic Development & Tourism's Monthly Energy Trends. Island population data are from 2014 State of Hawai'i Data Book, interpolated from available data to identify monthly population by island (residents only). Target trend assumes consumption of approximately 440 kWh per person per month by 2030.

MORE ABOUT ENERGY EFFICIENCY

QUIZ ANSWER:



SUPERBOWL SUNDAY

One of the the most efficient days all year is Superbowl Sunday, when many of us join up for the big game. This illustrates how energy efficiency can come from many small individual actions working together.



Molokai, Kauai, Oahu, Maui, and Hawaii are ahead of the efficiency target trend. Molokai is already ahead of the 2030 goal.

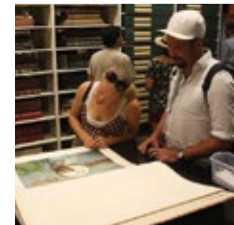
OUTLOOK & OPPORTUNITIES



Last year, Hawai'i Energy invested \$36 million in efficiency to enable \$435 million in lifetime savings. **Efficiency is the cheapest source of clean energy**, and justifies even more investment.



Energy for streetlights adds up to nearly \$14 million each year. Each county is switching to high-efficiency LED lights to cut the bill by 50%. Updating our building codes could help find more opportunities like this.

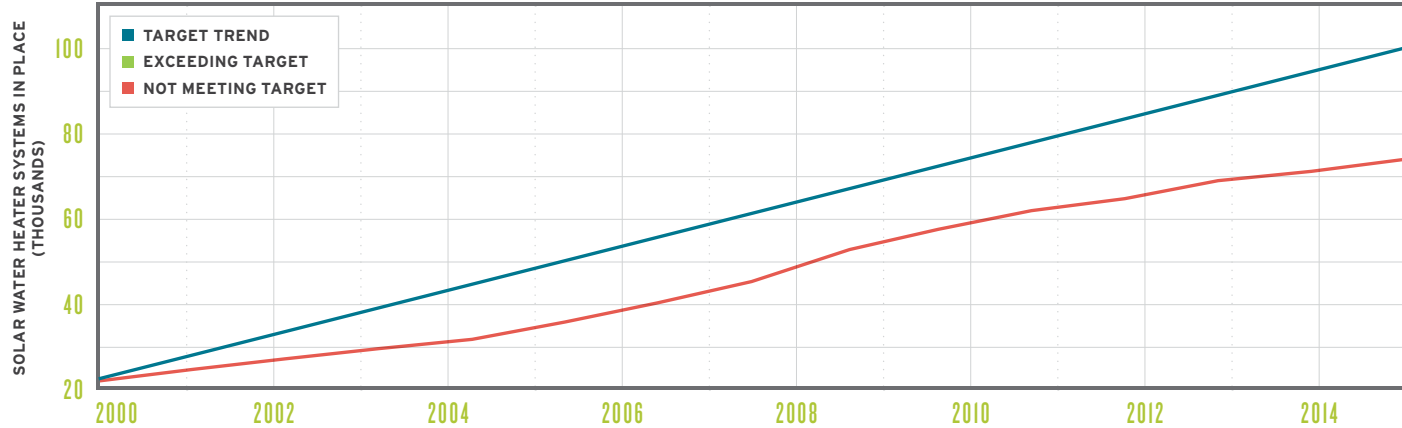


Blue Planet's WEfficiency platform and Kauai's National Tropical Botanical Garden (NTBG) partnered on the state's largest-ever crowdfunding campaign. A more efficient climate control system will protect NTBG's priceless collection of rare plants, seeds, and books. Energy savings will be recycled into new efficiency projects.



FACTOR No.3

SOLAR WATER HEATING



Annual solar hot water (SHW) installations estimated from sources including Hawai'i Energy program reports, county building permits, and state variances. As presented, data assumes (i) 20-year lifespan for solar hot water systems, (ii) annual installations in all years prior to 1996 (the earliest year for which data are available) were equal to the number of installations in 1996, (iii) solar water heaters were installed in every new home in the state from 2010 onward, unless a variance was approved, and (iv) the pace of SHW units retrofitted in the second half of 2015 was equal to the pace reported for July 2014 to June 2015. Energy independence target assumes that the number of installed systems rises from the 2000 estimated level, to 90% of the number of single-family detached residences in Hawai'i in 2011, by 2040. Housing data are from 2010-2012 American Community Survey and the 2014 State of Hawai'i Data Book.

WHAT ABOUT SOLAR WATER HEATING?



HEATING WATER IS ONE OF THE BIGGEST HOME ENERGY CONSUMERS, making up about 35% of the electricity bill.

Solar water heating is cleaner, more efficient, and cost-effective.

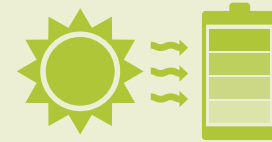
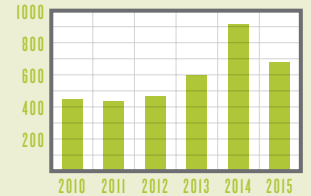
YET 2 OUT OF 3 SINGLE-FAMILY HOMES DON'T YET HAVE A SOLAR WATER HEATER.



OUTLOOK & OPPORTUNITIES

Hawai'i law requires new homes to use solar water heating. **BUT AROUND 30% OF NEW HOMES HAVE SIDESTEPED SOLAR POWER** by requesting a variance for fossil-fuel gas water heaters. More than 1,500 of those requests were submitted by a single architect. In 2017, the legislature should close this loophole.

NEW HOMES LACKING SOLAR WATER HEATING



Heating water makes up almost 15% of our evening residential energy peak. Reaching 100% renewable energy will mean meeting that peak by storing solar energy during the day. **We don't have to wait for new technologies or utility approvals – solar water heaters are thermal batteries that can help today.**

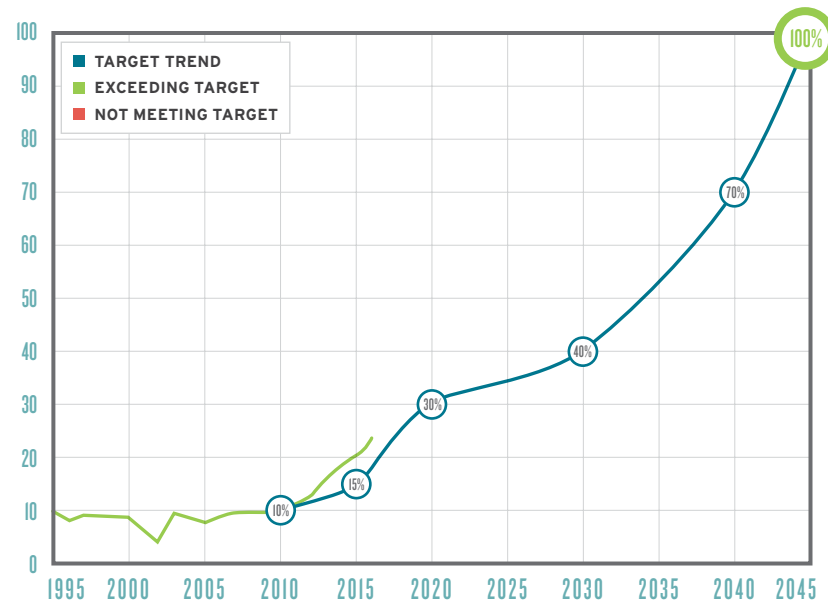
RENEWABLES

GRADE

B+

PREVIOUSLY: A-

RENEWABLES AS % OF TOTAL GENERATION



Electricity generation data is adapted from the U.S. Energy Information Administration (through 2004) and from the Hawaiian Electric and KIUC Renewable Portfolio Standards Law Examination filings (2005 onward).

PRIMARY METRIC

RENEWABLE ENERGY AS % OF TOTAL ELECTRICITY SALES

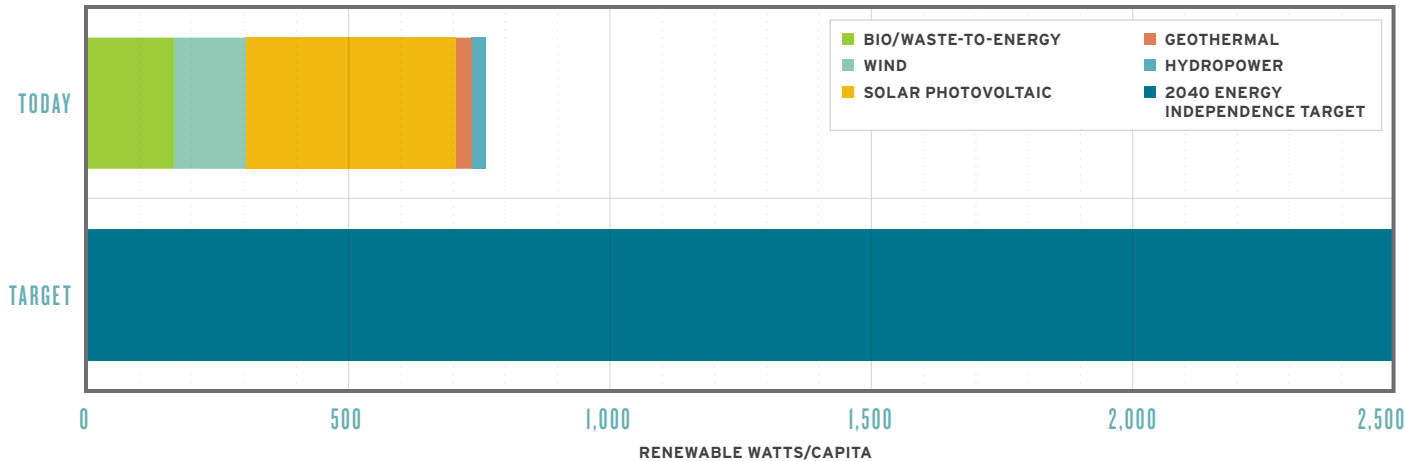
This chart shows the state's progress to 100% renewable electricity. We are on track, but we need continued steady progress of about 3% per year. This means laying the groundwork each and every year for renewable capacity that will be installed in the future.



RENEWABLES

FACTOR No.1

RENEWABLE GENERATING CAPACITY



Existing renewable generating capacity is adapted from State of Hawai'i Department of Business, Economics & Tourism's 2016 Energy Facts & Figures and utility reports. The energy independence target assumes that approximately 3,055 MW of new nameplate generating capacity will be required by 2040. Population data is from the 2014 State of Hawai'i Data Book, and assumes approximately linear growth to 2040.

WHAT ABOUT RENEWABLE GENERATING CAPACITY?



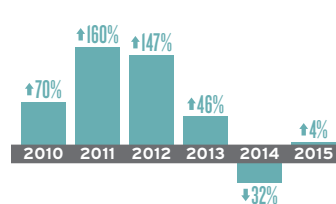
SOLAR POWER IS LEADING THE CHARGE.

In 2014 and 2015, rooftop and utility-scale solar overtook wind as the state's top renewable resource.

Rooftops are driving Hawai'i's clean energy success.

THEY CURRENTLY PROVIDE 7 TIMES MORE POWER THAN UTILITY-SCALE SOLAR FARMS.

A University of Hawai'i economics study estimated that household solar roofs could supply 1,100 megawatts of generating capacity. Commercial rooftops could add to the mix.



Despite this potential, the growth of rooftop solar has slowed. In 2015, Hawai'i became the first state in the nation to close the net-energy metering program. The replacement program is almost full. What's next?

OUTLOOK & OPPORTUNITIES

What's the plan?

An engineering study out of the University of Hawai'i showed **several paths to 100% renewable electricity using existing and established technologies.**

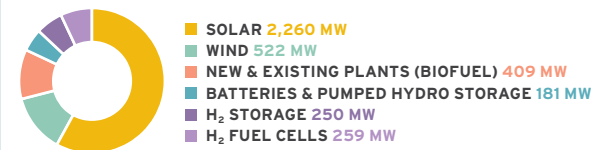
What's missing? Clean transportation is a key.

100% renewable electricity will probably need a large fleet of electric vehicles helping to stabilize the grid.

HAWAII IS READY FOR A 100% CLEAN TRANSPORTATION TARGET.

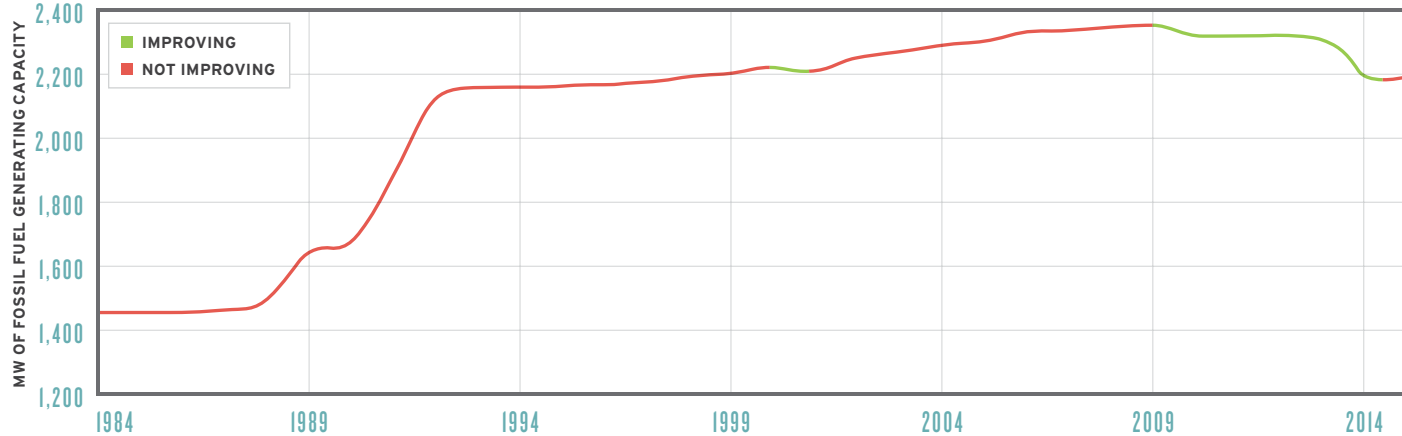
LOW CARBON CAN ALSO MEAN LOW COST.

According to the engineering study, this 100% mix could provide energy 17% cheaper than the average cost of oil over the last 5 years:



FACTOR No.2

RETIRING FOSSIL GENERATING UNITS



Data regarding fossil fuel generating units are adapted from the U.S. EPA's 2012 eGRID database, Hawaiian Electric's Power Supply Improvement Plan Update, and energyjustice.net.

WHAT ABOUT RETIRING OLD FOSSIL GENERATING UNITS?

OIL-FIRED STEAM GENERATORS STILL SERVE THE BULK OF O'AHU'S ELECTRICITY NEEDS.

The average age of these plants is over 50 years old. Retirement party, anyone?



IT'S TIME TO RETIRE COAL, TOO.

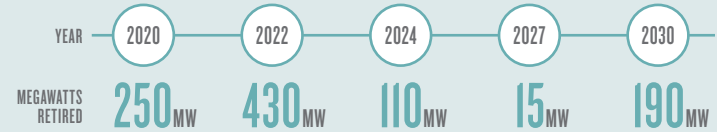
HECO's agreement with the last coal power plant in the state will end in 2022.

Photo by: Ililani Media

From 2012 to 2014, generating units at the Honolulu Power Plant (113 MW), Shipman Plant (14 MW) on Hawai'i Island, and the Kahului Power Plant (11 MW) were deactivated. The retirement date for additional Kahului generators has been pushed back from 2019 to 2022.

OUTLOOK & OPPORTUNITIES

The latest preferred plan by Hawaiian Electric shows the potential for big fossil fuel retirements:



THERE IS A CATCH.

This retirement plan would have come with the ill-fated plan to spend more than \$1.3 billion dollars on new infrastructure for liquefied natural gas (LNG):

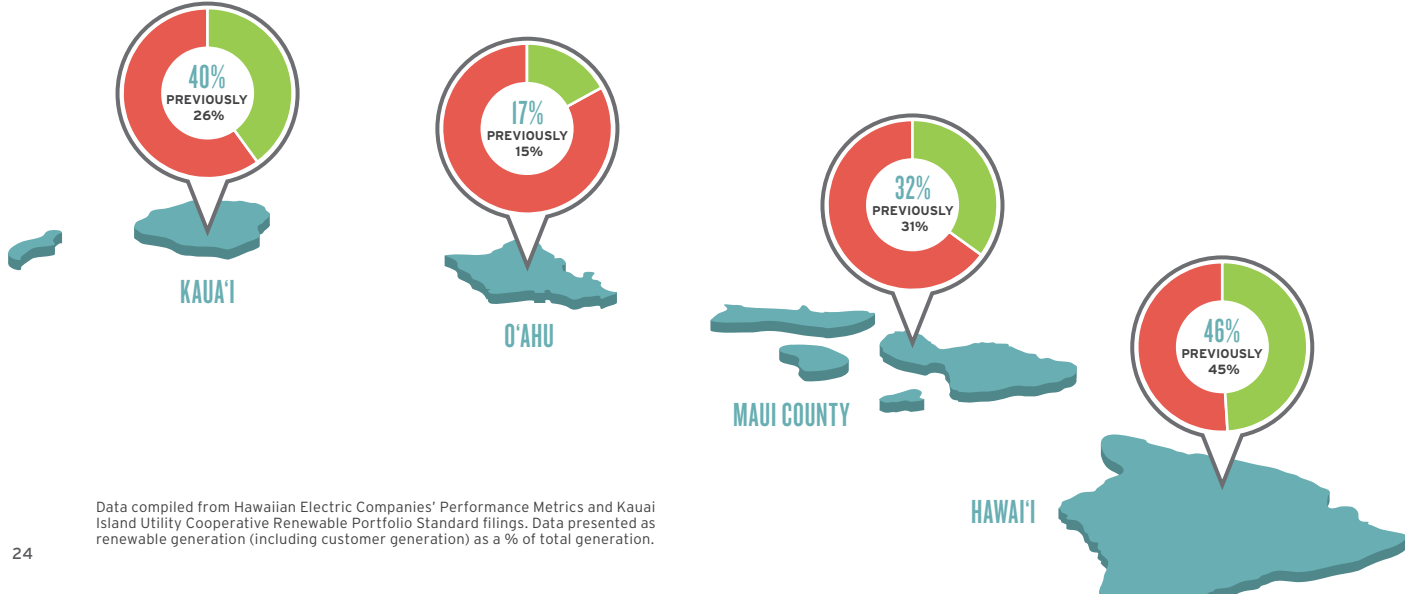
- Buying equipment and infrastructure to import the fossil fuel
- Retrofitting old power plants across the state to burn it
- Building a huge new 383 megawatt fossil fuel plant on O'ahu

THOSE WOULD HAVE BEEN STEPS IN THE WRONG DIRECTION, LOCKING US IN FOR DECADES TO COME.



FACTOR No.3

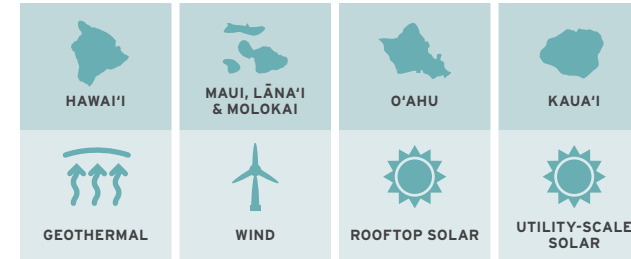
RENEWABLE GENERATION BY ISLAND



Data compiled from Hawaiian Electric Companies' Performance Metrics and Kauai Island Utility Cooperative Renewable Portfolio Standard filings. Data presented as renewable generation (including customer generation) as a % of total generation.

WHAT ABOUT RENEWABLE GENERATION?

The key to 100% clean energy is to use a diverse mix of resources most appropriate for each island. Iceland, for example, generates 100% renewable power from abundant geothermal and hydropower resources. In Hawai'i, each island currently has a different type of clean energy resource providing the most energy:



Connecting islands with undersea power cables might help to maximize the strength of this diversity.

OUTLOOK & OPPORTUNITIES



The state's 100% renewable electricity law sets a deadline of 2045. But that's a floor, not a ceiling, and we can get there sooner. The latest utility plans show Molokai and Lāna'i reaching 100% by 2030. Maui and Hawai'i are projected to get there by 2040.

Hawaiian Electric recently cancelled over 100 megawatts of solar projects on O'ahu. Our renewable progress will quickly fade if projects like these aren't in the pipeline.



Accessing strong and steady offshore winds could help O'ahu reach 100%. Several projects have been proposed, and each could quadruple the island's current wind power.

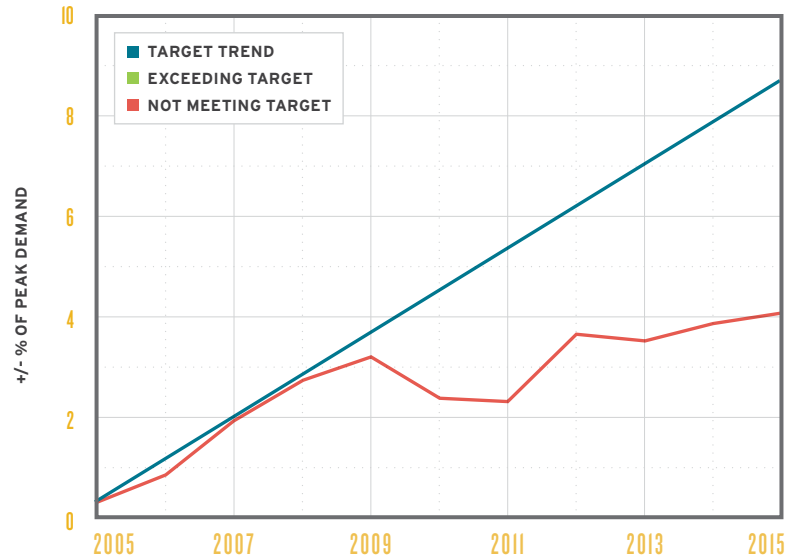


SMART GRID



GRADE D

PREVIOUSLY: D



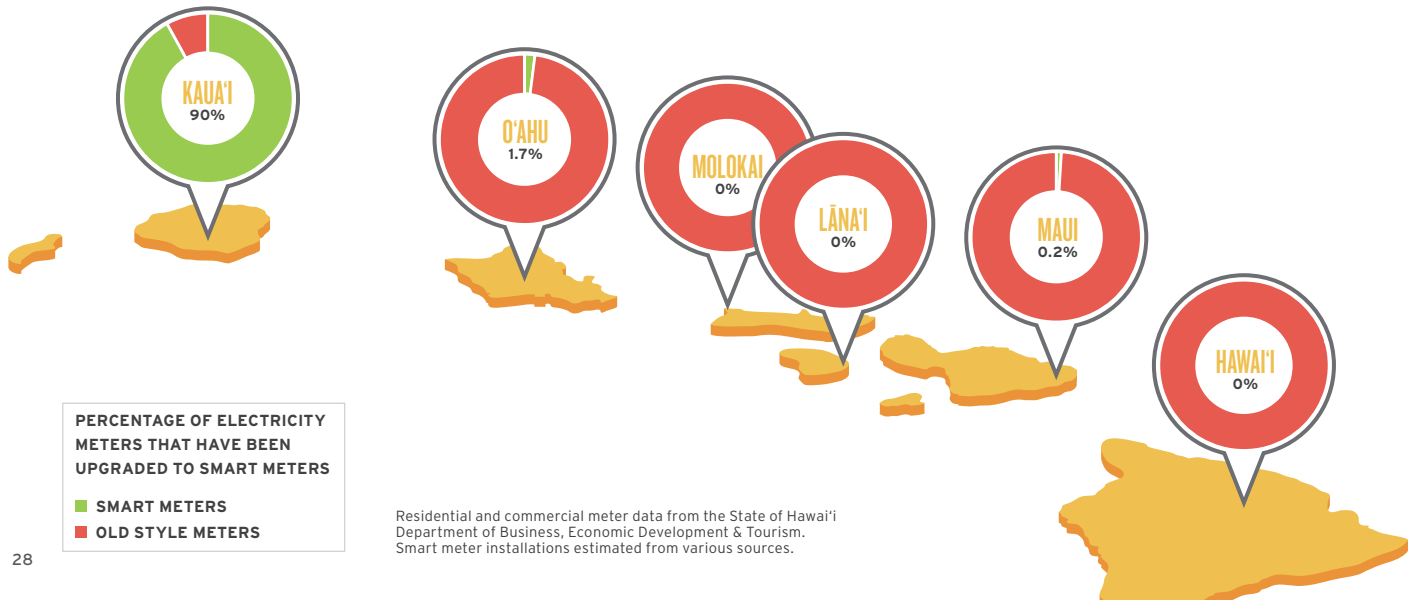
Demand response and energy storage capacity are estimated from Hawaiian Electric Key Performance Metrics, utility Adequacy of Supply ("AOS") reports, and other sources. Data presented as a % of peak demand, from utility AOS reports. 2040 target is 30% of peak demand served by flexiwatts.

PRIMARY METRIC FLEXIWATTS

"Flexiwatts" are a measure of flexible supply and demand that can be used to balance the grid. This chart combines flexibility from two sources. Demand response allows the utility or its customers to momentarily dial back energy for non-essential demands. Energy storage can soak up excess renewable energy, and then inject that energy back onto the grid to serve peak demand.

FACTOR No.1

SMART METER INSTALLATIONS



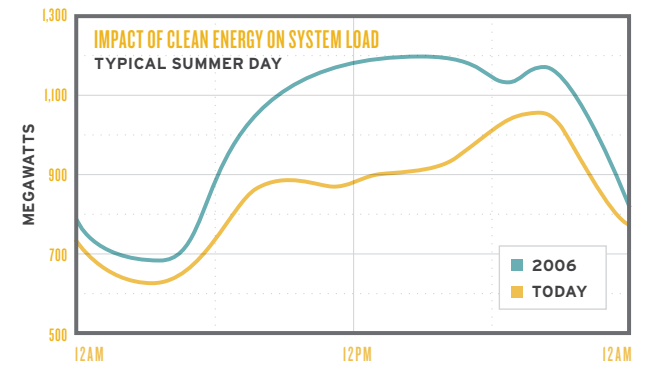
PERCENTAGE OF ELECTRICITY METERS THAT HAVE BEEN UPGRADED TO SMART METERS

- SMART METERS
- OLD STYLE METERS

Residential and commercial meter data from the State of Hawai'i Department of Business, Economic Development & Tourism. Smart meter installations estimated from various sources.

WHAT ABOUT SMART METERS?

Smart meters enable a host of clean energy strategies, such as dynamic energy prices to help balance supply and demand. **A MAJORITY OF HAWAI'I RESIDENTS SAY THEY WOULD CONSIDER USING SUCH RATES IF THEY WERE MORE ACCESSIBLE.**



OUTLOOK & OPPORTUNITIES



O'AHU'S SMART METER PILOT HAS BEEN A STRONG SUCCESS, with more than 99% of customers in pilot neighborhoods participating. A five-year plan to install smart meters for all O'ahu, Maui County, and Big Island customers is now before the PUC.

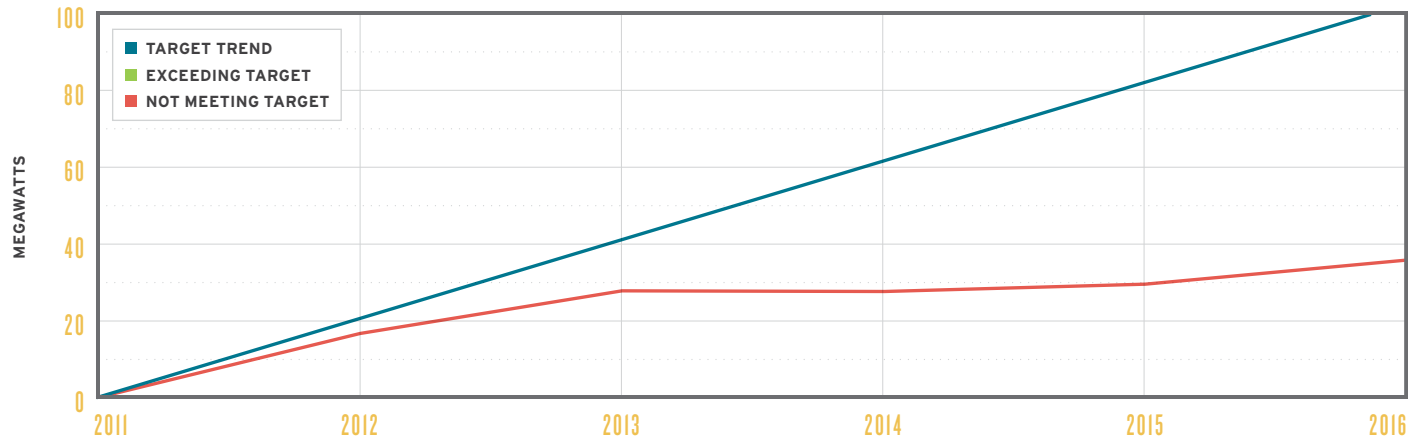
Blue Planet Foundation, Hawaiian Electric, Energy Exclerator, and tech-startup Bidgely have teamed up to use real-time energy monitors in a pilot program to

HELP HAWAI'I RESIDENTS BECOME MORE EFFICIENT, and to test behavioral strategies for shaping system load.



FACTOR No.2

ENERGY STORAGE



Energy storage capacity from Hawaiian Electric Companies Key Performance metrics and various other sources. Target trend based on estimated 615 MW of storage installed by 2040 (excluding electric vehicles).

WHAT ABOUT ENERGY STORAGE?



BATTERIES ARE CHANGING THE GAME.

KIUC has signed on a “dispatchable solar” project that will use batteries to provide solar power at night – **at a cost lower than the recent cost of fuel.** Residential battery systems are also gaining traction.

ENERGY STORAGE CAN COME IN MANY FORMS.

For example, Kapi’olani Medical Center is using ice storage to charge its air conditioning system, and expects to save millions of dollars in energy and demand charges.

OUTLOOK & OPPORTUNITIES

BATTERY COSTS ARE FALLING FAST, around 20% per year. Hawaiian Electric forecasts that battery costs will decline more than 50% in the next 15 years. Lazard investment bank is projecting the same decline in the next 5 years. To capture these lower costs, we need new energy pricing signals for customers.

PUMPED HYDRO STORAGE IS ANOTHER PROMISING OPTION.

Kau’i is looking at a 25 MW system to help manage clean energy while also storing water for other uses.

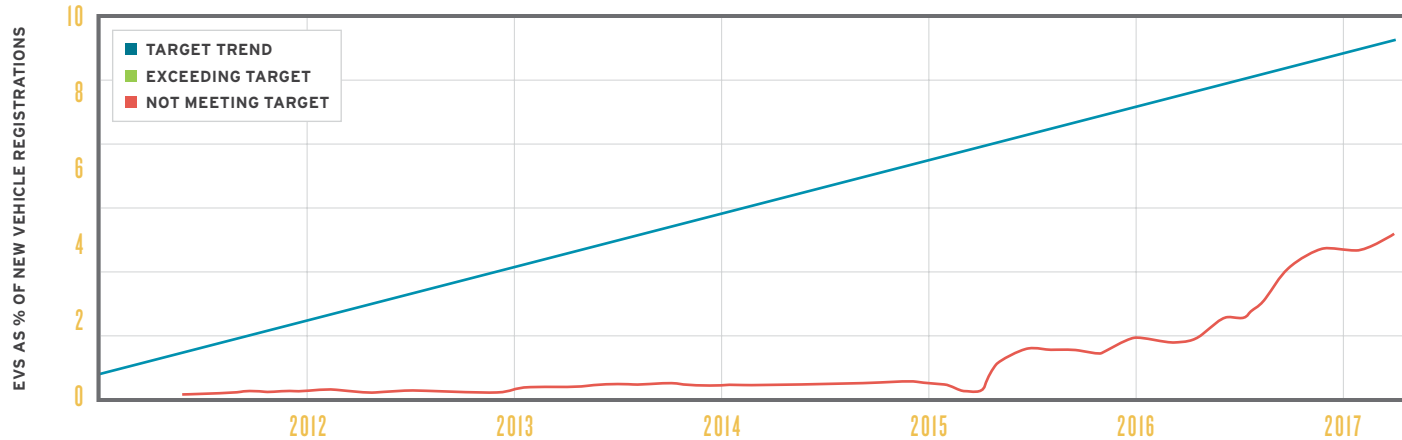


A University of Hawai’i engineering analysis found that **HYDROGEN ENERGY STORAGE COULD BE A KEY SOLUTION** for lower energy costs by balancing the seasonal changes in solar power.



FACTOR No.3

ELECTRIC VEHICLES



Electric passenger vehicle and total passenger vehicle registration data compiled from the State of Hawai'i Department of Business, Economic Development & Tourism. Data presented as the twelve-month moving average of monthly change in electric vehicle registrations as % of monthly change in total passenger vehicle registrations. Target trend aims for electric vehicles to comprise 100% of new passenger vehicle registrations by 2035.

WHAT ABOUT ELECTRIC VEHICLES?

CAR MANUFACTURERS ARE BULLISH ON ELECTRIC POWERTRAINS, including EVs, plug-in hybrids, and hydrogen vehicles.

- Toyota says that by 2050 **virtually all its cars will be zero emission.**
- Honda is targeting electrification for **2/3 of its vehicles by 2030.**
- In the first week, Tesla received **over \$14 billion** in reservations for the Model 3 EV.

WE ARE FALLING BEHIND ELECTRIC VEHICLE (EV) TARGETS. This needs to become a priority because EVs are a key strategy for clean transportation and a smarter grid.

32% of Hawai'i residents say that they are thinking about buying an EV. 53% haven't already bought an EV because of perceptions about price. **YET OWNING THE MOST POPULAR EV (NISSAN LEAF) COSTS LESS THAN OWNING THE MOST POPULAR GASOLINE PASSENGER VEHICLE (TOYOTA CAMRY).**

OUTLOOK & OPPORTUNITIES



Right now, around 6,500 EVs are parked somewhere in Hawai'i. If those vehicles were plugged into normal 110V outlets, they could help balance the grid with up to **15 MEGAWATTS OF DEMAND RESPONSE CAPACITY.**

Research from the University of Hawai'i found that in a 100% renewable energy system with high EV adoption, **SMART EV CHARGING CAN LOWER ENERGY COSTS BY MORE THAN \$200 MILLION EACH YEAR.**

SAN DIEGO GAS & ELECTRIC IS INSTALLING 3,500 EV CHARGERS, focusing on businesses and multi-unit housing sites. 10% will be installed in disadvantaged communities. Hawai'i can do the same.





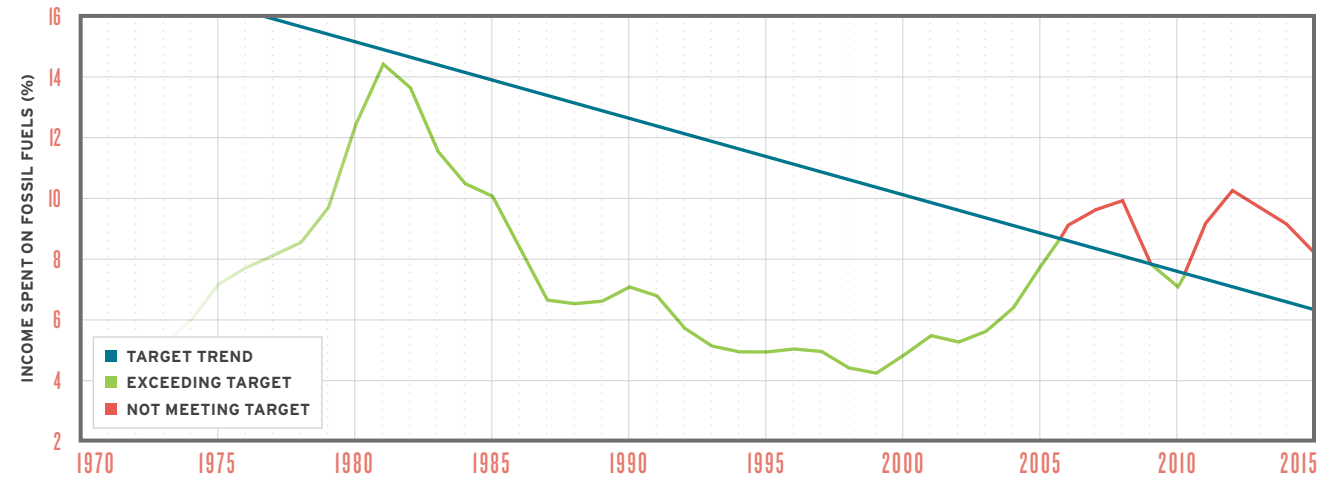
ECONOMICS

GRADE C+

PREVIOUSLY: C

PRIMARY METRIC

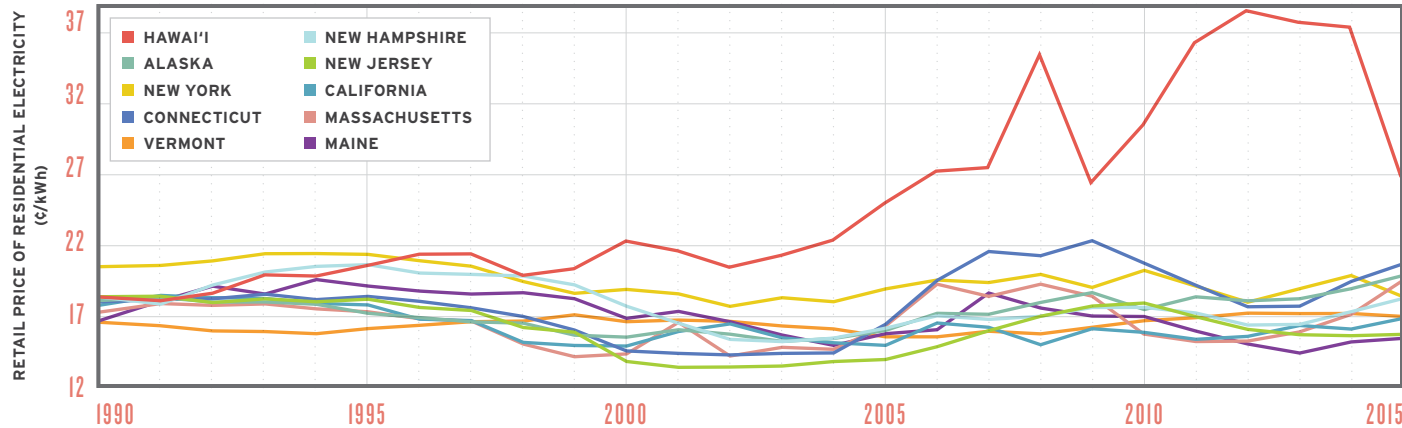
PERCENT OF INCOME SPENT ON FOSSIL FUELS



Data are presented as a two-year moving average of per capita fossil fuel expenditures as a percentage of per capita disposable income in Hawai'i. Fossil fuel expenditure data are adapted from the U.S. Energy Information Administration and from the State of Hawai'i Department of Business, Economic Development & Tourism monthly energy trends. Resident population data are from the Table 1.4 of the State of Hawai'i Data Book. Per capita disposable income is from Table 13.07 of the State of Hawai'i Data Book and from the U.S. Department of Commerce's Bureau of Economic Analysis. Target trend is based on an assumed decline from the 1981 peak to zero in 2040.

FACTOR No.1

HAWAI'I RESIDENTIAL ELECTRICITY RATES



Electricity price data collected from the U.S. Energy Information Administration. Nominal retail prices adjusted to 2015 dollars using inflation factor from U.S. Bureau of Labor Statistics Consumer Price Index.

Hawai'i still has the highest electricity rates in the United States, **ABOUT 1.5X THE NEXT TEN MOST EXPENSIVE STATES.**



The recent oil price decline has reduced Hawai'i's electricity rates. But oil prices are not likely to stay low forever. 100% of that price risk is passed to customers, and utilities have little business incentive to protect against volatility.

MORE RENEWABLES, AND A PROPER INCENTIVE SYSTEM, CAN PROTECT CONSUMERS.

Consumers want more options to control their energy rates. **MOST RESIDENTS (62%) ARE OPEN TO HIGHER RATES AT PEAK TIMES IF LOWER RATES ARE AVAILABLE DURING NON-PEAK HOURS.**

Less than 1 in 4 (24%) would not consider that option.



FACTOR No.2

COMPARISON OF RENEWABLE & FOSSIL FUEL ENERGY COSTS



In 2013 and 2014, Hawaiian Electric obtained proposals for near-term utility scale renewable energy, and selected 250 MW at record-low prices. Disappointingly, nearly all of those projects have been canceled or disapproved. **This is a missed opportunity for stable energy prices.**

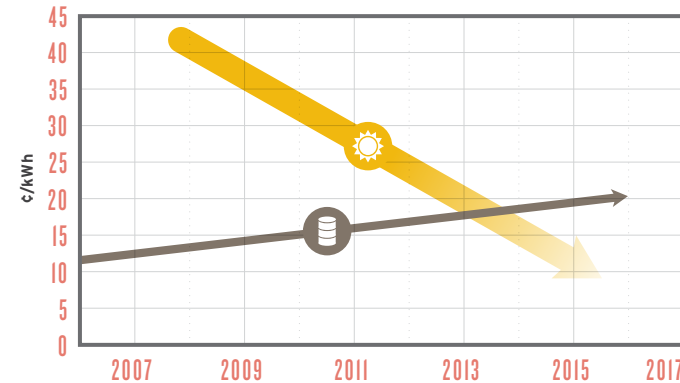


Only 5% of Hawai'i residents think we should use the cheapest energy, no matter where it comes from. **95% think other factors are important, like protecting the environment and securing local jobs.**

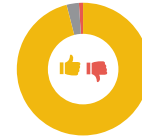
Fossil fuel energy costs based on three-year average of fuel cost data reported in the State of Hawai'i Department of Business, Economic Development & Tourism Monthly Energy Trends, and includes only fuel costs. Cost of electricity from utility-scale renewable resources derived from prices agreed upon in recent Power Purchase Agreements approved by the Hawai'i Public Utilities Commission (PUC), or prices of proposed projects reflected in recent PUC filings: Wind - Na Pua Makani, O'ahu; Geothermal - PGV Expansion, Hawai'i; Municipal Solid Waste - HPower Expansion, O'ahu; Solar - Proposed O'ahu "Waiver" projects. Where applicable/available, costs include capacity charge and an assumed apportionment between on-peak and off-peak rates.

FACTOR No.3

ENERGY COST TRENDS



Cost of oil per kWh generated is a linear regression of data from State of Hawai'i Department of Business, Economic Development & Tourism Monthly Energy Trends, and includes only fuel costs. Cost of electricity generated from distributed solar power is a linear regression of data from stated solar photovoltaic system costs compiled from City and County of Honolulu solar photovoltaic building permits and DBEDT, along with estimated solar photovoltaic capacity installed annually in the City and County of Honolulu from data in HECO net-energy metering reports. Solar photovoltaic cost per kWh is based on assumed maintenance cost totaling 15% of reported initial system cost, 18% capacity factor, 20% capacity degradation over the life of the system, and 30-year system life.



HAWAI'I RESIDENTS OVERWHELMINGLY FAVOR SOLAR POWER with 96% supporting and only 1% opposing. Utilities and policymakers will benefit from listening to these residents.



Consumers are driving the rooftop solar revolution. In the last five years, these private individuals have leveraged federal support to contribute **\$1 BILLION TOWARD CLEAN, LOCAL, FIXED-COST ENERGY IN HAWAI'I.**

Solar grew to account for 20% of Hawai'i's construction industry – putting 1 in 5 construction jobs in the clean energy economy.

ENERGY INNOVATIONS IN HAWAI'I



1881

'Iolani Palace is **FIRST ROYAL RESIDENCE LIT BY ELECTRICITY.**

1956

Mauna Loa is host to **PREMIER SCIENCE CENTER** for global atmospheric carbon dioxide testing.

1979

FIRST OCEAN POWER THERMAL ENERGY CONVERSION FACILITY. And later, first grid-tied wave energy device.

1987

WORLD'S LARGEST WIND ENERGY TURBINE, BUILT BY BOEING. Coming soon: Google's Makani Wind energy "kite" tested at Parker Ranch.

1996

PACIFIC BIODIESEL LAUNCHES ONE OF FIRST COMMERCIALY VIABLE BIODIESEL PLANTS IN U.S. So early to the industry that they are biodiesel.com.

2010

FIRST STATE TO REQUIRE SOLAR WATER HEATERS IN ALL NEW HOMES. Today, Hawai'i has the highest per capita use of solar power in the nation – heating water and generating electricity.

2015

FIRST U.S. STATE TO PASS A LAW FOR 100% RENEWABLE ELECTRICITY.

2040

WITH 100% RENEWABLE POWER, HAWAI'I BECOMES A GLOBAL CENTER FOR ENERGY AND CLIMATE LEADERSHIP.

Current and future generations enjoy a healthier environment and stronger local economy. Clean energy is forecasted to lower energy bills for everyone.



BLUE PLANET FOUNDATION

MISSION

To clear the path for 100% clean energy.

VISION

A world of abundant, renewable energy that sustains all life on Earth.

The information in this report card generally reflects our clean energy progress through 2015 or 2016. Data for some factors have been updated into 2017. More information on each data source is provided with each metric. Blue Planet Foundation cannot warrant the accuracy and timeliness of those data sources, and we are always on the lookout for comprehensive sources of information on our energy consumption and resources.

We welcome your suggestions on how to make the next Report Card update as interesting and accurate as possible.

Please email: reportcard@blueplanetfoundation.org.

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