

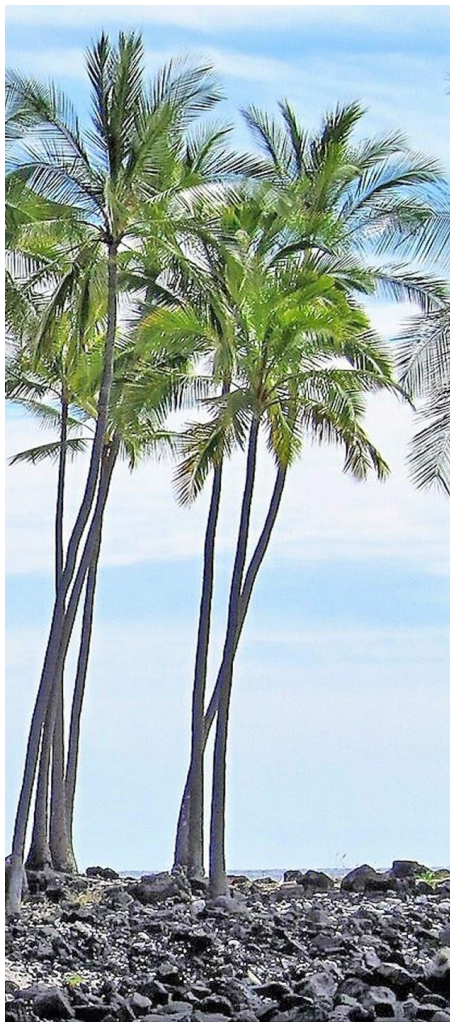
CLIMATE REGION
HAWAII



REFERENCE CITY:

KAILUA, KONA

BY VANESSA PARTIDA



KAILUA, KONA
HAWAII



TRADITIONAL RESIDENTIAL BUILDING



KONA HAS A TROPICAL, SEMI-ARID CLIMATE WITH WARM TEMPERATURES YEAR-ROUND, TYPICAL OF ITS LATITUDE IN THE TROPICS. IT IS THE WARMEST PLACE IN THE UNITED STATES OF AMERICA IN JANUARY ON AVERAGE. THE COOLEST MONTH IS FEBRUARY, WITH AN AVERAGE TEMPERATURE OF 81.2 °F, WHILE THE WARMEST IS AUGUST, WITH AN AVERAGE OF 86.9 °F . IN ADDI-

TION TO BEING THE WARMEST PLACE IN THE UNITED STATES IN JANUARY, IT IS ALSO THE CITY WITH THE HIGHEST RECORD LOW IN THE UNITED STATES WITH AN ALL-TIME LOW TEMPERATURE OF 56 °F. HUMIDITY IS GENERALLY BETWEEN 50% AND 70%. KONA IS GENERALLY DRY, WITH AN AVERAGE ANNUAL PRECIPITATION OF 32.05 INCHES . MORNINGS ARE TYPICALLY CLEAR, WHILE THERMAL CLOUDS CREATED IN THE DAY RAISE THE TEMPERATURE DURING THE DAY.

THE CLIMATE

KONA, HAWAII



YEARLY WEATHER

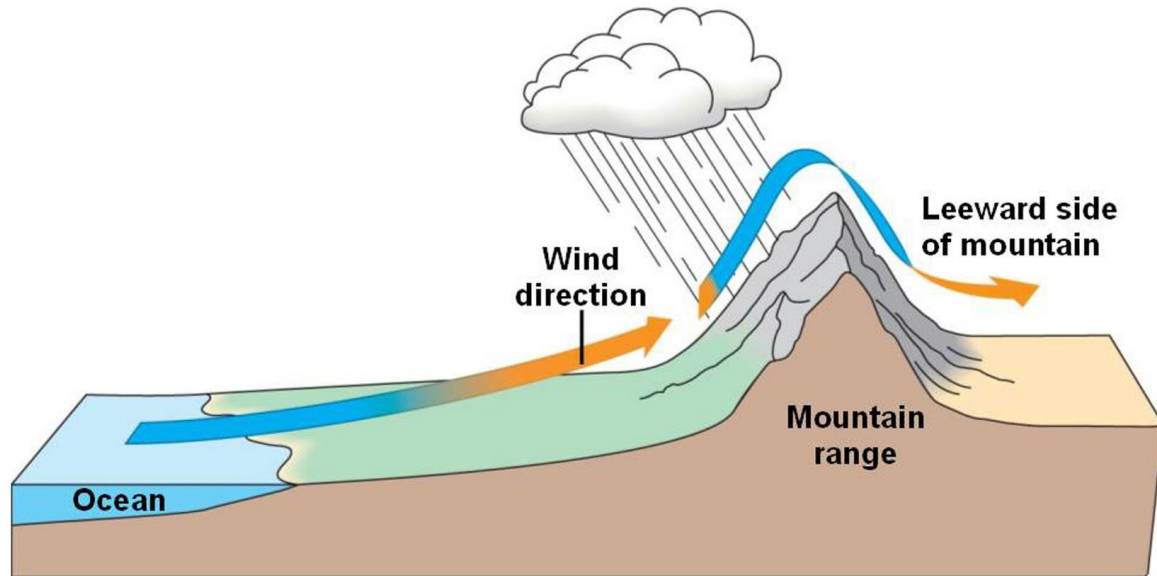
KAILUA, KONA

MONTH	TEMPERATURE (°F)	RAINFALL (IN)	CLOUD FREQUENCY (%)
January	71.21	2.428	43.51
February	71.22	1.585	49.70
March	71.86	2.202	62.45
April	73.13	2.266	69.40
May	74.56	2.551	67.85
June	75.91	2.440	70.49
July	76.97	2.872	63.54
August	77.71	2.210	58.86
September	77.31	2.868	53.86
October	77.07	2.092	53.00
November	74.87	1.678	50.86
December	72.53	1.776	44.12
Annual	74.53	26.967	57.30

KONA LIES ON THE LEEWARD (DRY) SIDE OF THE BIG ISLAND AND HAS VERY LITTLE PRECIPITATION. IT IS THE ONLY REGION IN THE ISLANDS WHERE SUMMER RAINFALL EXCEEDS WINTER RAINFALL. THE WETTEST MONTH IS SEPTEMBER.

IN GENERAL IT RAINS IN THE LATE AFTERNOON OR IN THE EARLY EVENING.

APRIL, MAY, AND JUNE ARE THE MOST CLOUDY MONTHS, WITH CLOUDS BLOCKING THE SUN ON AVERAGE 70% OR MORE OF THE TIME. DECEMBER AND JANUARY ARE THE SUNNIEST MONTHS, WITH A CLOUD COVER OF LESS THAN 50%.







Kalaoa

Honua'ula
Forest Reserve

Kailua-Kona

Holualoa

Google



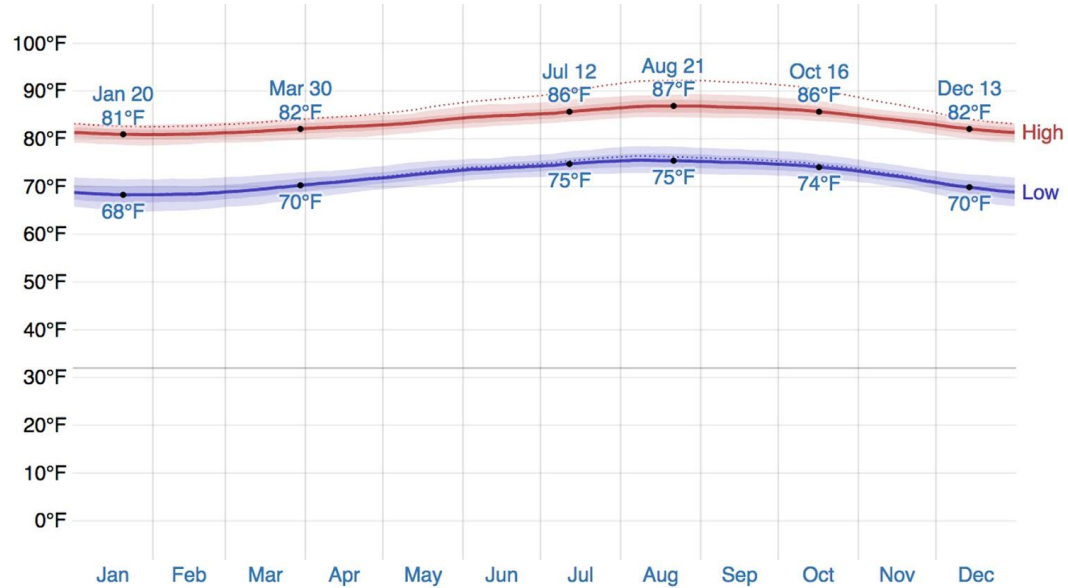
3D





TEMPERATURE

Average High and Low Temperature



The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

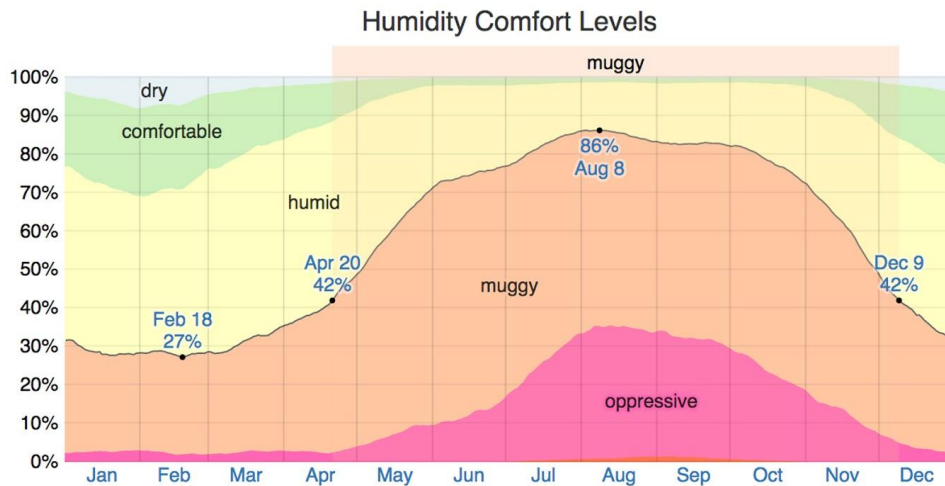
HUMIDITY

We base the humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night.

Kailua-Kona experiences extreme seasonal variation in the perceived humidity.

The muggier period of the year lasts for 7.6 months, from April 20 to December 9, during which time the comfort level is muggy, oppressive, or miserable at least 42% of the time. The muggiest day of the year is August 8, with muggy conditions 86% of the time.

The least muggy day of the year is February 18, with muggy conditions 27% of the time.



The percentage of time spent at various humidity comfort levels, categorized by dew point: dry < 55°F < comfortable < 60°F < humid < 65°F < muggy < 70°F < oppressive < 75°F < miserable.

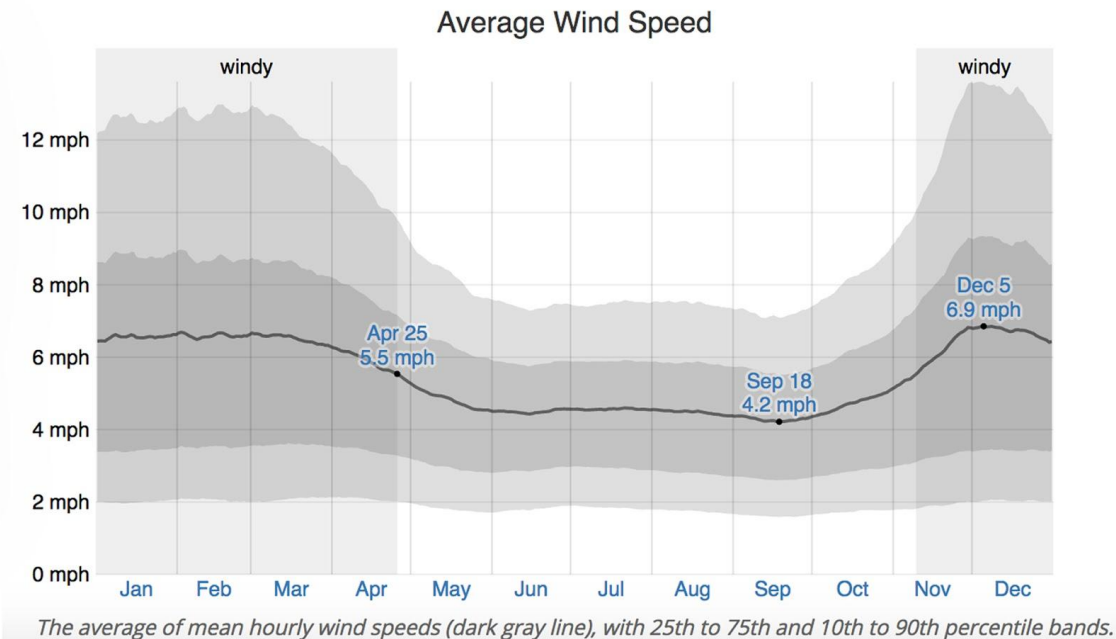
KONA

WIND SPEED

THE AVERAGE HOURLY WIND SPEED IN KAILUA-KONA EXPERIENCES MILD SEASONAL VARIATION OVER THE COURSE OF THE YEAR.

THE WINDIER PART OF THE YEAR LASTS FOR 5.5 MONTHS, FROM NOVEMBER 9 TO APRIL 25, WITH AVERAGE WIND SPEEDS OF MORE THAN 5.5 MILES PER HOUR. THE WINDIEST DAY OF THE YEAR IS DECEMBER 5, WITH AN AVERAGE HOURLY WIND SPEED OF 6.9 MILES PER HOUR.

THE CALMER TIME OF YEAR LASTS FOR 6.5 MONTHS, FROM APRIL 25 TO NOVEMBER 9. THE CALMEST DAY OF THE YEAR IS SEPTEMBER 18, WITH AN AVERAGE HOURLY WIND SPEED OF 4.2 MILES PER HOUR.





Solar Energy

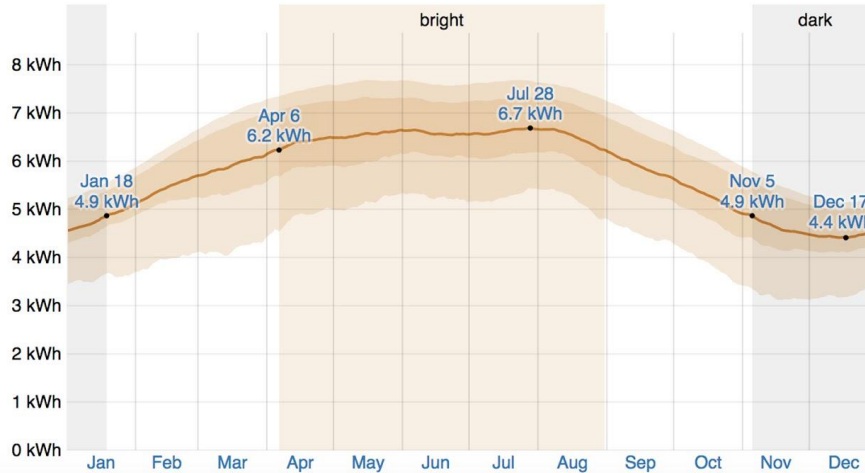
This section discusses the total daily incident shortwave solar energy reaching the surface of the ground over a wide area, taking full account of seasonal variations in the length of the day, the elevation of the Sun above the horizon, and absorption by clouds and other atmospheric constituents. Shortwave radiation includes visible light and ultraviolet radiation.

The average daily incident shortwave solar energy experiences some seasonal variation over the course of the year.

The brighter period of the year lasts for 4.8 months, from April 6 to August 30, with an average daily incident shortwave energy per square meter above 6.2 kWh. The brightest day of the year is July 28, with an average of 6.7 kWh.

The darker period of the year lasts for 2.4 months, from November 5 to January 18, with an average daily incident shortwave energy per square meter below 4.9 kWh. The darkest day of the year is December 17, with an average of 4.4 kWh.

Average Daily Incident Shortwave Solar Energy

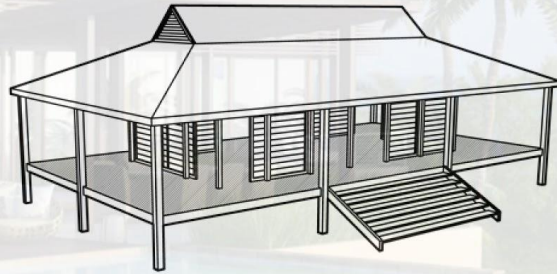


The average daily shortwave solar energy reaching the ground per square meter (orange line), with 25th to 75th and 10th



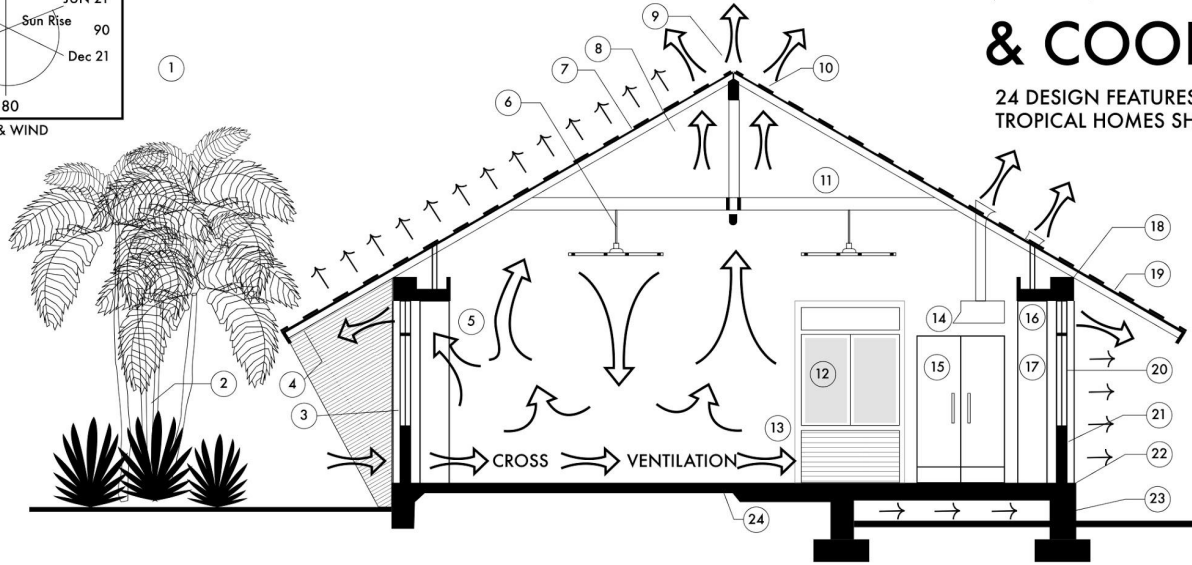
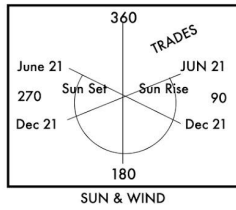
56

Screened porches and patios can provide passive comfort cooling by ventilation in warm weather and can prevent insect problems



68

Traditional passive homes in hot humid climates used light weight construction with openable walls and shaded outdoor porches, raised above ground



VENTILATION & COOLING

24 DESIGN FEATURES THAT ALL TROPICAL HOMES SHOULD EMPLOY

KEY CODE

- | | |
|--|--|
| <p>① ORIENT THE HOUSE FOR SUN & WIND TO MAXIMIZE VENTILATION & COOLING</p> <p>② LANDSCAPING TO SHADE BOTH ROOF AND EXTERIOR WALLS</p> <p>③ REFLECTIVE BARRIERS ON WALLS TO MINIMIZE EFFECT OF SOLAR RADIATION</p> <p>④ WIDE EAVES & LOW WALLS TO MAXIMIZE NATURAL SHADING EFFECT OF ROOF</p> <p>⑤ INTERIOR SOFFITS DEFLECT RISING HOT AIR OUT TRANSOM WINDOWS</p> <p>⑥ ENERGY START (5-STAR RATED) CEILING FANS PROVIDE AIR CIRCULATION</p> <p>⑦ REFLECTIVE BARRIER ON ROOF TO MINIMIZE EFFECT OF SOLAR RADIATION</p> <p>⑧ HIGH TYPED ROOF TO DRAW HOT AIR UP AND AWAY FROM INHABITANTS</p> <p>⑨ RIDGE VENTING TO DRAW HOT AIR UP AND OUT OF THE HOME</p> <p>⑩ HIGH C.F.M. SOLAR POWERED ROOF VENTS TO FORCE HOT AIR OUT EFFICIENTLY</p> <p>⑪ L.E.D. BULBS FOR LOW HEAT TRANSMISSION FROM LIGHTING FIXTURES</p> <p>⑫ ABUNDANT OPENING TRANSOMS AND WINDOWS TO MAXIMIZE VENTILATION</p> | <p>⑬ JALOUSIE WINDOWS TO MAXIMIZE CROSS-FLOW VENTILATION AND HELP FORCE HOT AIR UP</p> <p>⑭ HIGH C.F.M. RANGE HOOD BLOWER REMOVES HOT AIR FROM KITCHEN</p> <p>⑮ ENERGY START APPLIANCES, PUMPS, AND EQUIPMENT GENERATE LESS HEAT</p> <p>⑯ BATHROOM FANS WITH HUMIDISTAT SENSORS REMOVE WARM, MOIST AIR</p> <p>⑰ VENTED CLOSETS WITH CLOSET HEATERS REMOVE WARM, MOIST AIR</p> <p>⑱ CONCRETE'S THERMAL MASS HELPS COOL THE HOME</p> <p>⑲ ROOF SHINGLES WITH HIGH S.R.I. VALUE TO MINIMIZE EFFECT OF SOLAR RADIATION</p> <p>⑳ WALL FINISH WITH HIGH S.R.I. VALUE TO MINIMIZE EFFECT OF SOLAR RADIATION</p> <p>㉑ WINDOWS AND DOORS WITH LOW-E GLASS TO MINIMIZE EFFECT OF SOLAR RADIATION</p> <p>㉒ WATERPROOFING AND VAPOR BARRIER TO PREVENT WATER & MOIST AIR FROM ENTERING THE HOME</p> <p>㉓ POST & PIER FOUNDATIONS PROVIDE SUFFICIENT AIR FLOW UNDER THE HOME</p> <p>㉔ CONCRETE FOUNDATION SEALED TO PREVENT MOISTURE FROM ENTERING THE HOME</p> |
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