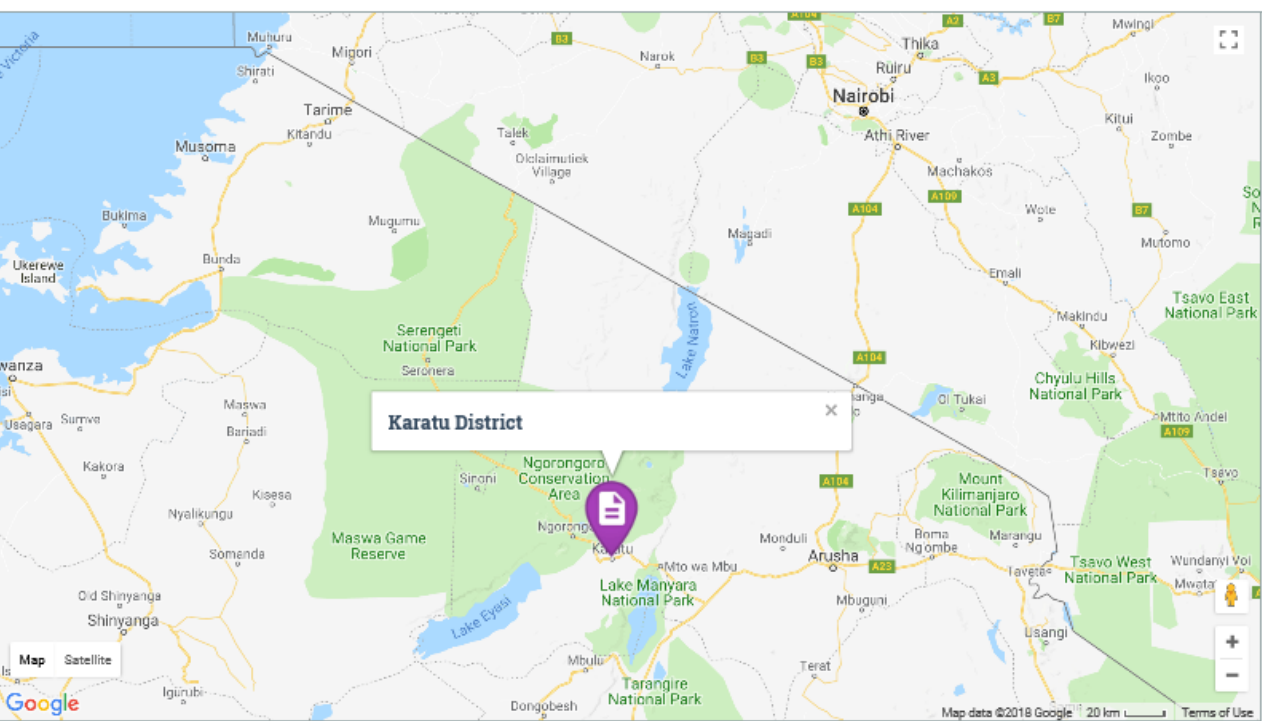


SHALOM ORPHANAGE CENTER (KARATU, TANZANIA)

MISSION:

- Improve the life of abandoned and orphaned children in Karatu and provide them with a home
- Ensure these poor and disadvantaged children are loved and raised as a family, regardless of religion, tribe or ethnicity
- To provide every child with the opportunity to use their skills and gifts to reach their full potential and see their dreams become reality
- **Funding:** Donations only (not regular)
- **Director:** Warra Elisamia Nnko (**Mama Warra**)
- **Staff:** 20 (careworkers/cooks/cleaning/garden)
- **Orphans:** 80 (between 0 and 22 years of age)





PROJECT: SOLAR PANELS

1. Orphanage
2. Guesthouse



COMPLETED:

- Solar Panels donated by German Company
- Top-Level Planning
- Volunteer Team (June 2018) Project Scouting
- Orphanage Energy Consumption Measured
- Orphanage Circuitry Determined

ON-GOING:

- Searching for Volunteers and/or NGO for support
- Fundraising for Transportation (5.000 €), Installation Costs, etc.

TO DO:

- Calculations
- Drawings
- Detailed Planning

1. ORPHANAGE

1.1 ELECTRICITY CONSUMPTION

➤ Measured Consumption at the Orphanage

- Avg/hr \approx 0.85 kWh
- 1 Day MAX \approx 12 kWh
- 1 Day MIN \approx 4 kWh

➤ Electricity is bought Pre-Paid

I.e. One can only use as much as has been paid for

➤ Orphanage buys 160 kWh at a time for 50,000 TSH (25\$) which lasts them approximately 5 days

➤ Per month this equates to 150\$ in electric utility bills

➤ The Voltage provided to the buildings can fluctuate between 190 ~ 220 V

➤ Both the Orphanage has a Triple Phase connection.

- 3 Live
- 1 neutral
- Earth found in the mains box

➤ Orphanage has 5 electric circuits (next slide)

➤ A, V and P are known for the individual electronic equipment's (light bulb, white goods, etc.)

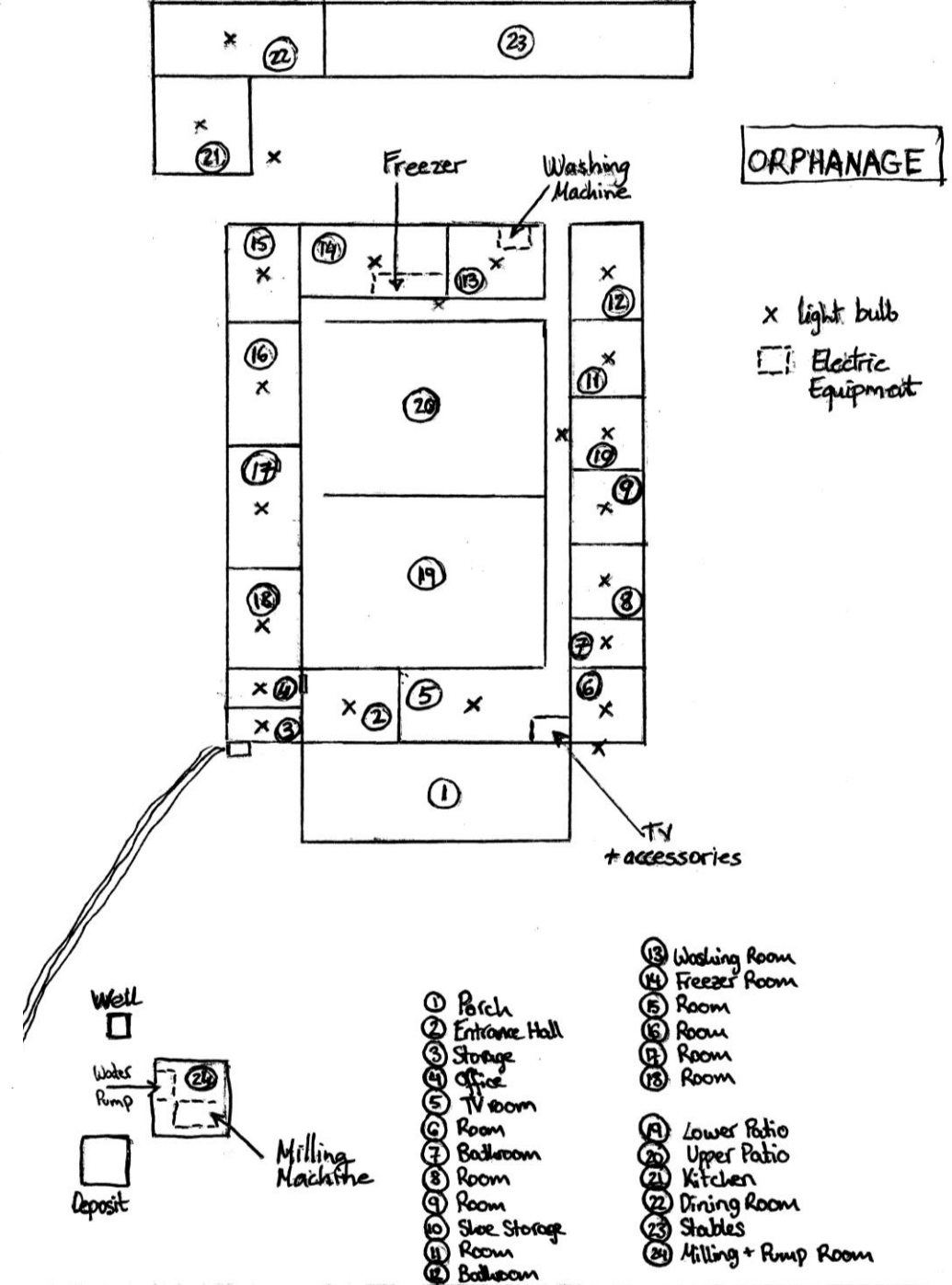
➤ Calculations for complete circuits still to be made

1. ORPHANAGE

1.2 ELECTRICITY LAYOUT DRAWING

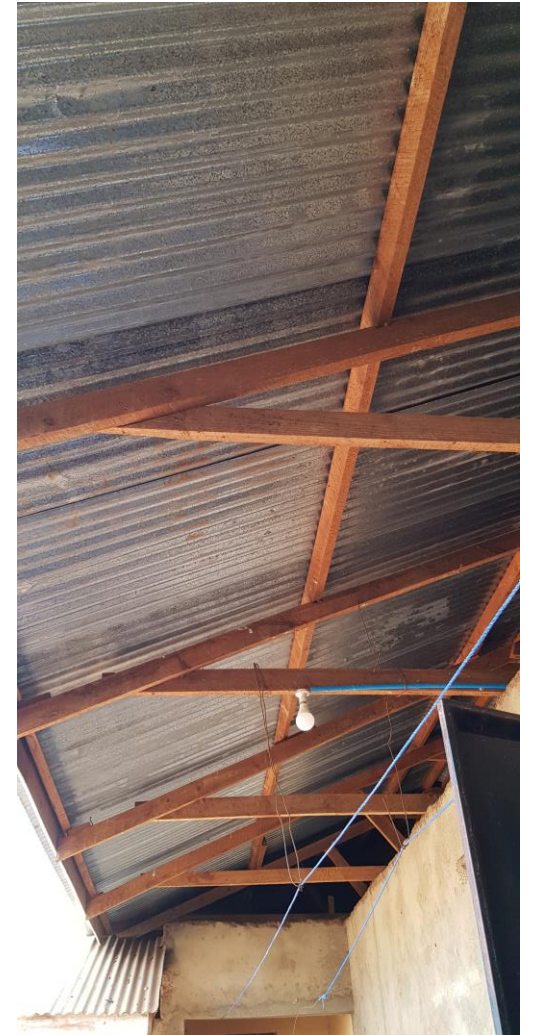
1	2	3	4	5	6	7	8	9	10	11	12

- | | |
|--|------------------------------------|
| 1 not working or not being used | 8 not working or not being used |
| 2 not working or not being used | 9 not working or not being used |
| 3 Office, Storage, Entrance Hall, TV Room - Lights ②③④⑤⑥ | 10 not working or not being used |
| 4 Outside Light, lights rooms ⑦⑧ ⑨⑩, Corridor Light, Radio Light, ⑪⑫ ⑬ and Washing Machine | 11 Light Rooms ②③④⑤ and Freezer |
| 5 not working or not being used | 12 TV+accessories and light room ⑥ |
| 6 Lights Rooms ⑦⑧ | |
| 7 not working or not being used | |



1. ORPHANAGE

1.3 ROOF STRUCTURE PICTURES



- 360° video of orphanage roof available
- Structure consists of a thin metal sheet with underlying wooden structure
- Gaps between wooden beams not always the same
- At first glance, structure does not look sufficiently stable to carry additional weight. Roof renovation probably necessary

1. ORPHANAGE

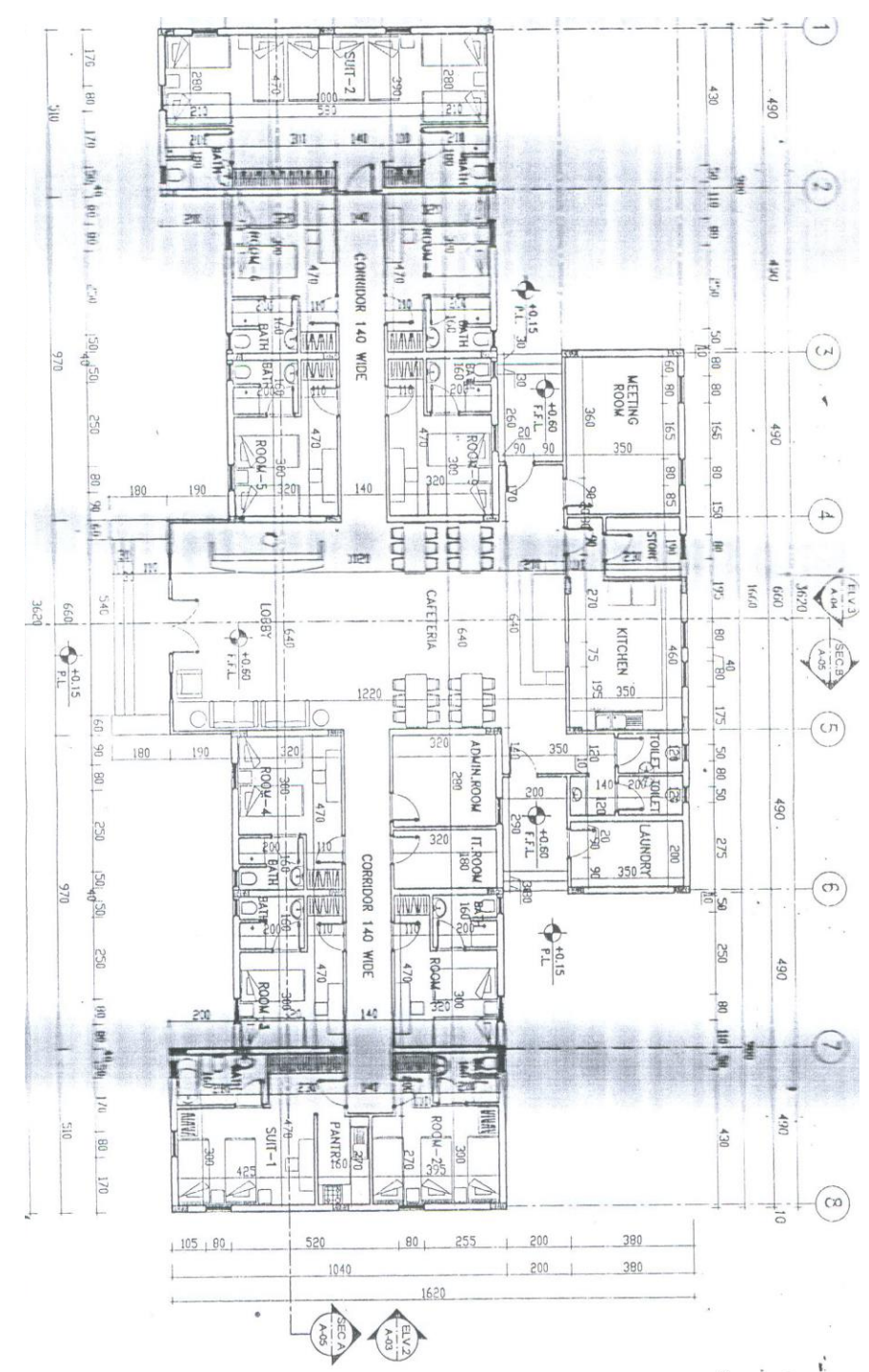
1.4 ROOF VIDEO



2. GUESTHOUSE

2.1 ELECTRICITY CONSUMPTION

- Consumption TBD, as building is still under construction
- However, total consumption could be estimated through the sum of individual room estimates
- Guesthouse will contain:
 - A fully equipped Kitchen
 - 12 en-suite rooms
 - 1 IT room
 - Laundry room, Etc.
- Electric supply is Triple Phase
- Electrical circuits TBD
- Roof structure drawings, pictures and videos available

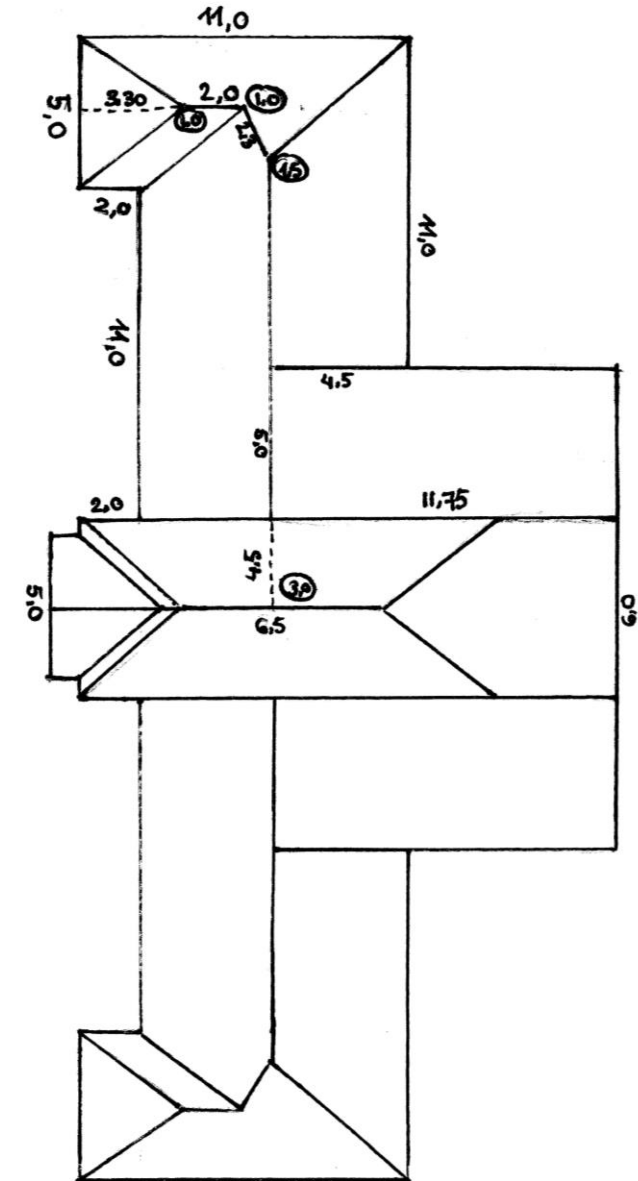


2. GUESTHOUSE

2.2 ROOF STRUCTURE PICTURES



- 360° video of guesthouse roof available (next slide)
- Structure consists of a thin metal sheet with underlying wooden structure
- Gaps between wooden beams are consistent
- Foundation and Walls meet loading requirements for a 4-story building (this should be investigated and confirmed)
- New Roof Structure



2. GUESTHOUSE

2.3 WOODEN STRUCTURE VIDEO

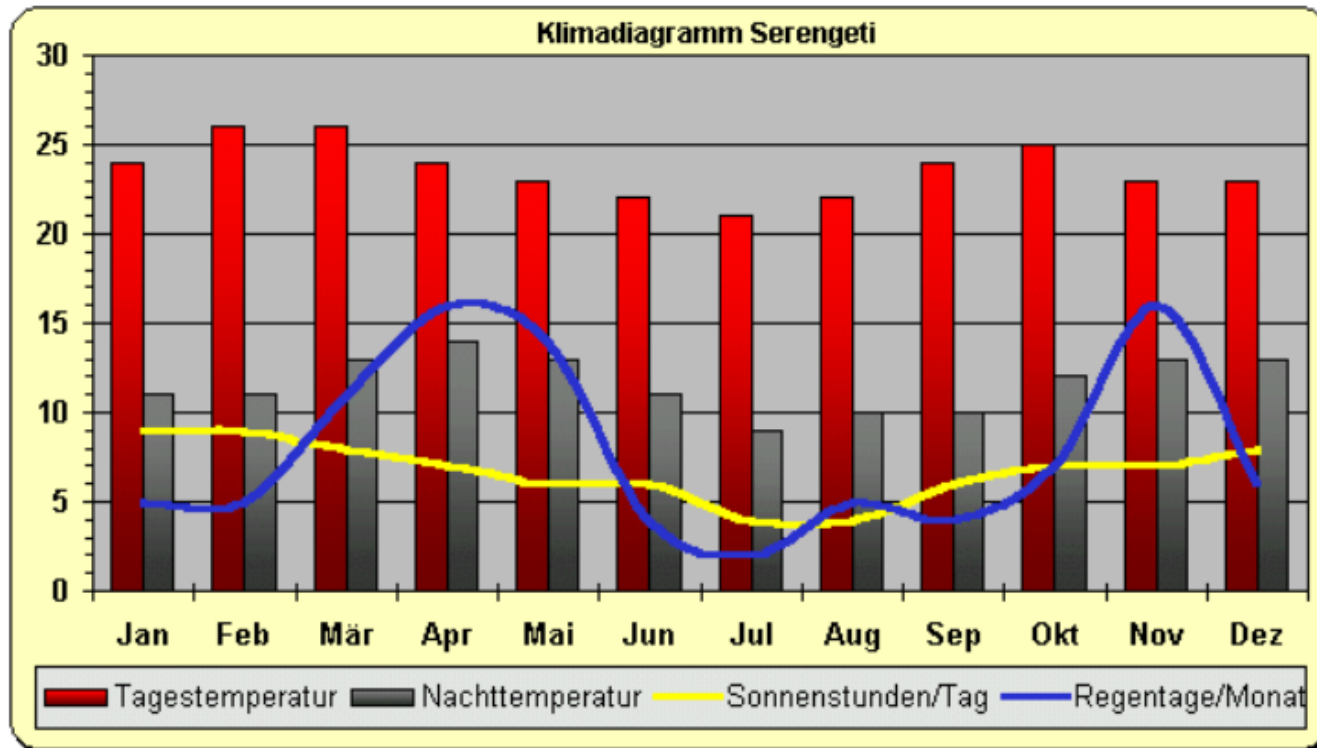


2. GUESTHOUSE

2.4 ROOF VIDEO



3. CLIMATE DATA

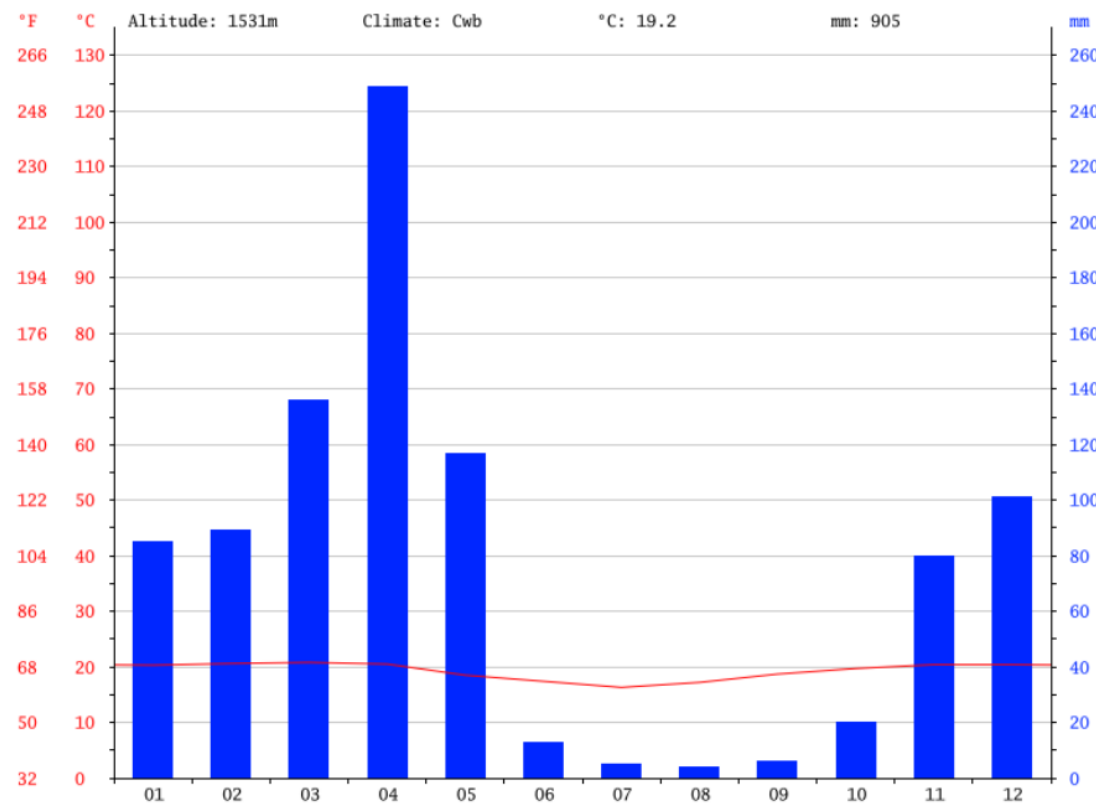


Tansania Klima (Nordosten): Serengeti

Source: CLIMATE-DATA.ORG

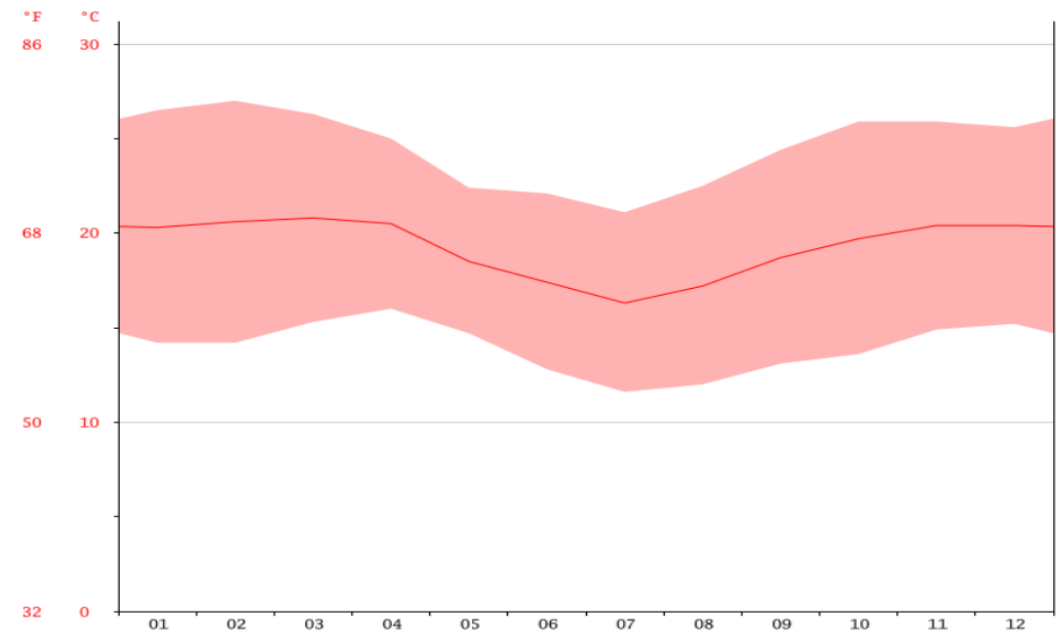
In Karatu ist das Klima gemäßigt warm. Im Sommer fallen in Karatu deutlich mehr Niederschläge als im Winter. Die effektive Klimaklassifikation nach Köppen und Geiger ist Cwb. Die Jahresdurchschnittstemperatur in Karatu liegt bei 19.2 °C. Über ein Jahr verteilt summieren sich die Niederschläge zu 905 mm auf.

KLIMADIAGRAMM FÜR KARATU



Am wenigsten Niederschlag gibt es im Monat August. Die Niederschlagsmenge im August beträgt 4 mm. Im Gegensatz dazu ist der April der niederschlagsreichste Monat des Jahres mit 249 mm Niederschlag.

TEMPERATURDIAGRAMM FÜR KARATU



Im Jahresverlauf ist der März der wärmste Monat mit einer durchschnittlichen Temperatur von 20.8 °C. Im Juli ist die durchschnittliche Temperatur mit 16.3 °C die niedrigste des ganzen Jahres.

KLIMATABELLE KARATU

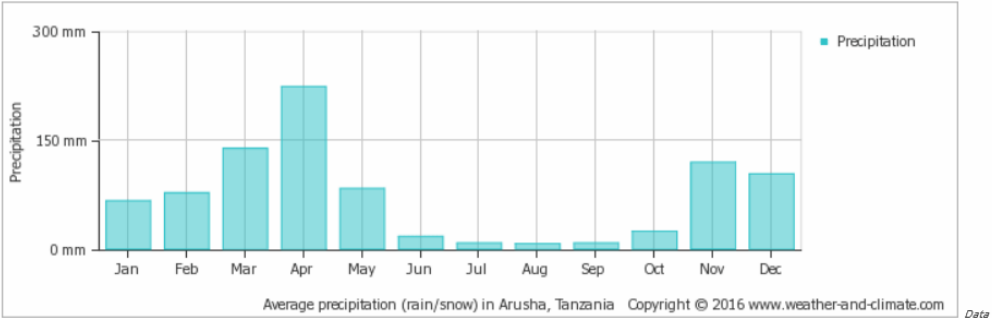
	Januar	Februar	März	April	Mai	Juni	Juli	August	September	Oktober	November	Dezember
ø. Temperatur (°C)	20.3	20.6	20.8	20.5	18.5	17.4	16.3	17.2	18.7	19.7	20.4	20.4
Min. Temperatur (°C)	14.2	14.2	15.3	16	14.7	12.8	11.6	12	13.1	13.6	14.9	15.2
Max. Temperatur (°C)	26.5	27	26.3	25	22.4	22.1	21.1	22.5	24.4	25.9	25.9	25.6
ø. Temperatur (°F)	68.5	69.1	69.4	68.9	65.3	63.3	61.3	63.0	65.7	67.5	68.7	68.7
Min. Temperatur (°F)	57.6	57.6	59.5	60.8	58.5	55.0	52.9	53.6	55.6	56.5	58.8	59.4
Max. Temperatur (°F)	79.7	80.6	79.3	77.0	72.3	71.8	70.0	72.5	75.9	78.6	78.6	78.1
Niederschlag (mm)	85	89	136	249	117	13	5	4	6	20	80	101

Der Niederschlag variiert um 245 mm zwischen dem trockensten Monat August und dem niederschlagsreichsten Monat April. Zwischen dem wärmsten Monat März und dem kältesten Juli liegt eine Differenz von 4.5 °C.

AVERAGE MONTHLY SNOW AND RAINFALL IN KARATU (MILLIMETER)

- A lot of rain (rainy season) falls in the months: March, April, November and December.
- Karatu has dry periods in June, July, August, September and October.
- On average, April is the wettest month.
- On average, August is the driest month.
- The average amount of annual precipitation is is: 873.0 mm (34.37 in)

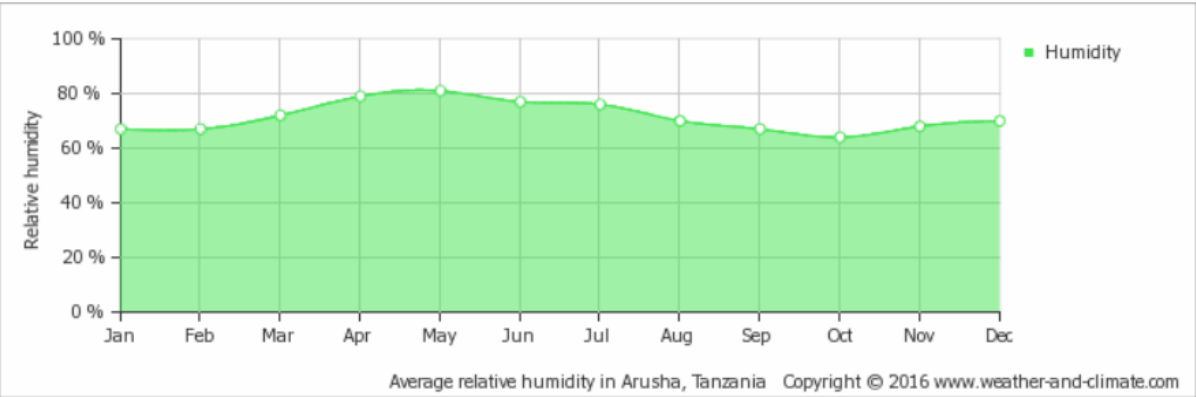
This is the mean monthly precipitation over the year, including rain, snow, hail etc.
Show [average precipitation in Karatu in Inches »](#)



from nearest weather station: Arusha, Tanzania (140.2 KM).

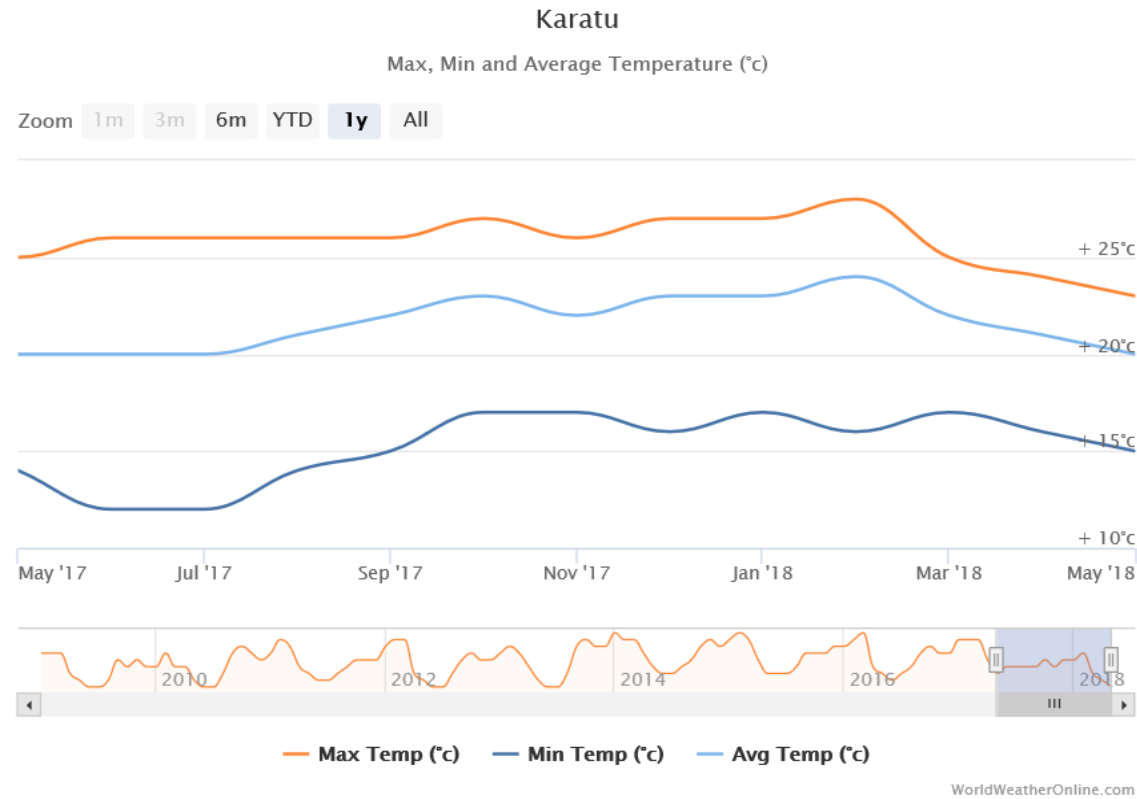
AVERAGE HUMIDITY OVER THE YEAR

This is the mean monthly relative humidity

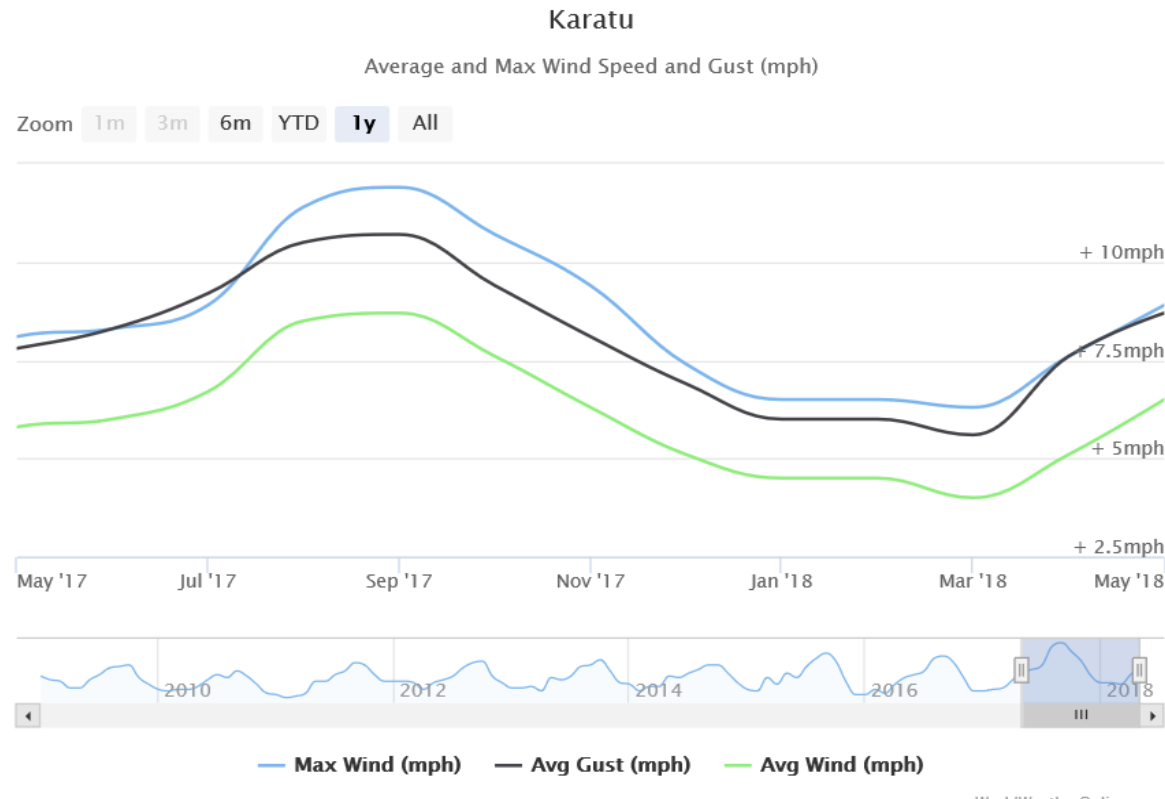


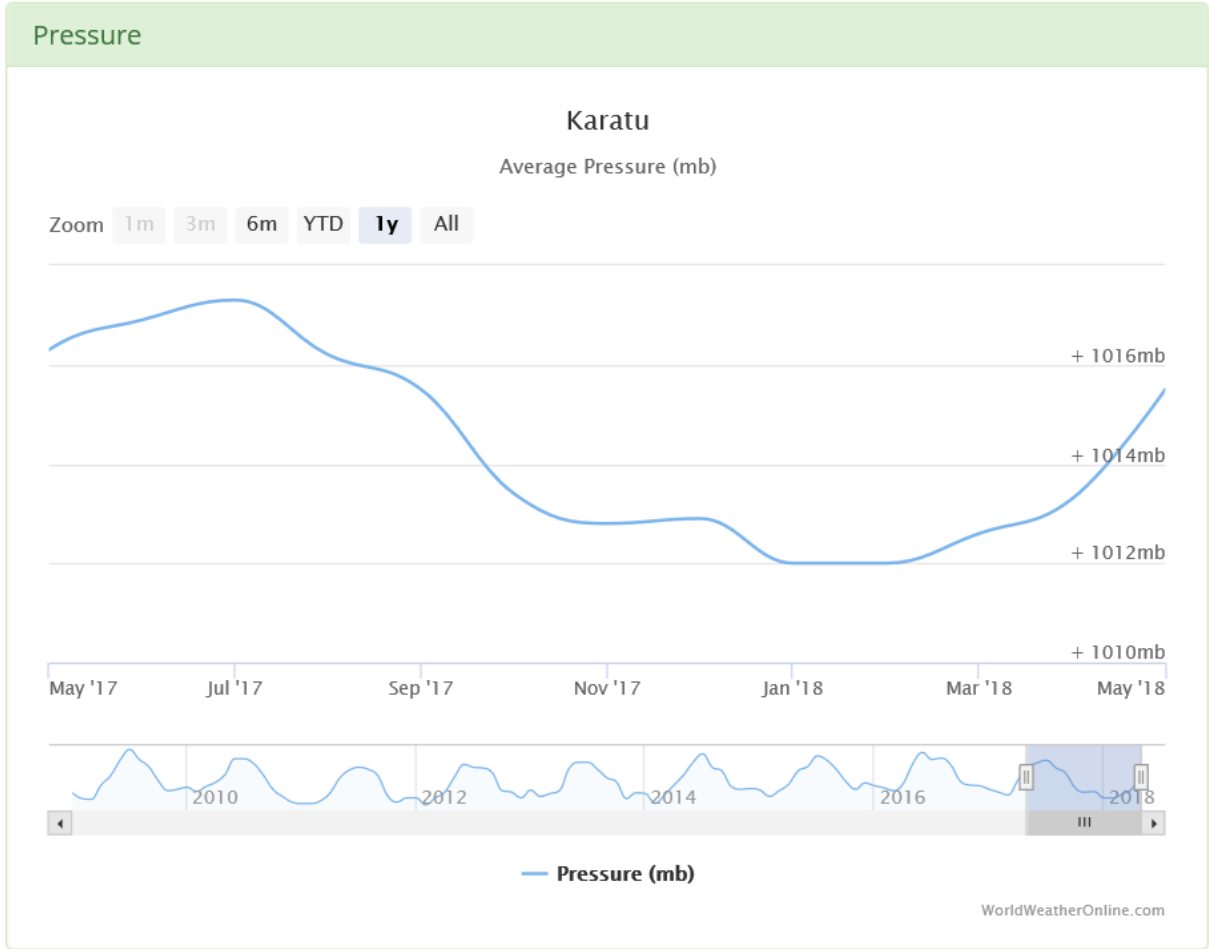
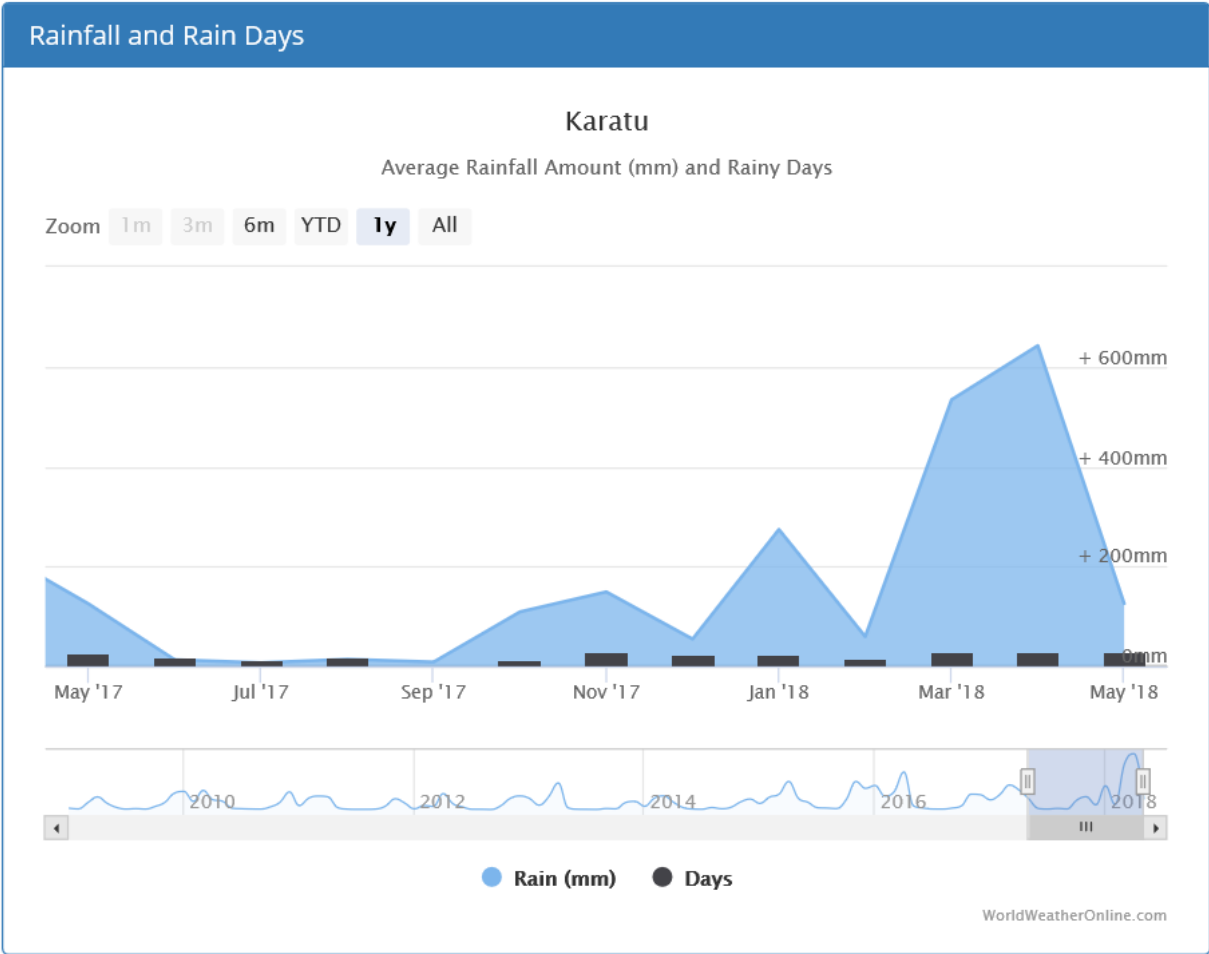
Max Rainfall: 105 mm/hr

Max, Min and Average Temperature



Max and Average Wind Speed and Wind Gust

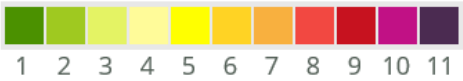
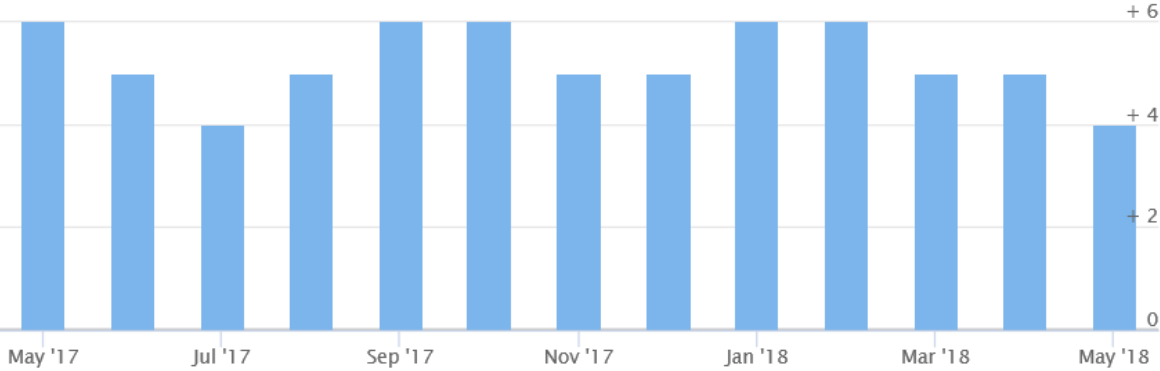




UV Index

Karatu
Average UV Index

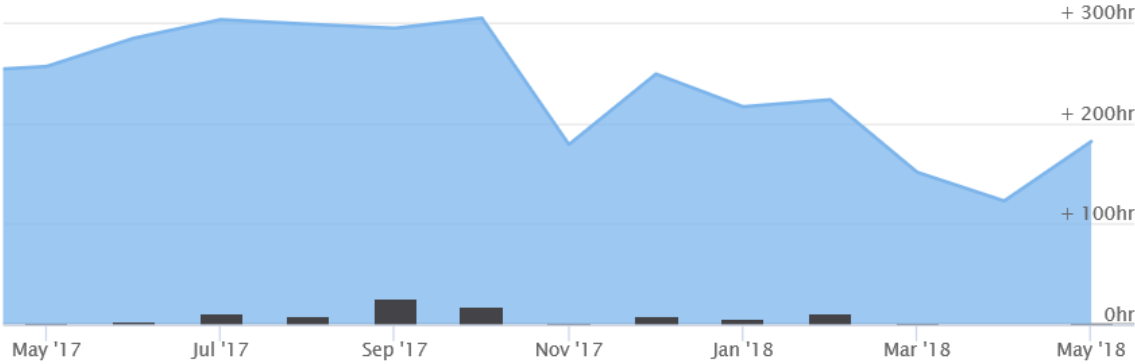
Zoom 1m 3m 6m YTD 1y All



Sun Hours and Sun Days

Karatu
Average Sun Hours and Sun Days

Zoom 1m 3m 6m YTD 1y All



4. SOLAR INSTALLATION

4.1 SOLAR MODULES



Similar Modules

CS6K-270 | 275 | 280P

Die Module von Canadian Solar nutzen die neueste, innovative Zelltechnologie, wodurch die Modulleistung und Systemzuverlässigkeit erhöht wird. Gewährleistet wird dies durch 16 Jahre Erfahrung in der Modulherstellung, ausgereiftes Moduldesign, strenge BOM Qualitätsprüfung, ein automatisiertes Herstellungsverfahren sowie 100% EL-Tests.



*Auf Anfrage ist dieses Produkt mit schwarzem Rahmen erhältlich.

ELEKTRISCHE DATEN | STC*

CS6K	270P	275P	280P
Max. Nennleistung (Pmax)	270 W	275 W	280 W
Opt. Betriebsspannung (Umpp)	30,8 V	31,0 V	31,3 V
Opt. Betriebsstrom (Impp)	8,75 A	8,88 A	8,95 A
Leerlaufspannung (Uoc)	37,9 V	38,0 V	38,2 V
Kurzschlussstrom (Isc)	9,32 A	9,45 A	9,52 A
Modulwirkungsgrad	16,50%	16,80%	17,11%
Betriebstemperatur	-40°C ~ +85°C		
Maximale Systemspannung	1000 V (IEC) oder 1000 V (UL)		
Brandverhalten des Moduls	TYP 1 (UL 1703) oder KLASSE C (IEC 61730)		
Max. Strangsicherung	15 A		
Anwendungsklasse	Klasse A		
Leistungstoleranz	0 ~ + 5 W		

* Unter Standardtestbedingungen (STC): Einstrahlung 1000 W/m², Luftmasse AM 1,5 und Zelltemperatur 25°C.

MECHANISCHE DATEN

Spezifikation	Daten
Art der Zellen	Polykristallin, 6 Zoll
Zellanordnung	60 (6 × 10)
Abmessungen	1650×992×40 mm
Gewicht	18,2 kg
Frontabdeckung	3,2 mm gehärtetes Glas
Rahmenmaterial	Eloxierte Aluminiumlegierung
Anschlussdose	IP68, 3 Dioden
Kabel	4 mm ² (IEC), 12 AWG (UL), 1000 mm
Steckverbindungen	T4 Serie
Pro Palette	27 Stücke, 538 kg
Pro Container	756 Stücke (40' HQ)

210-235 W Module

4. SOLAR INSTALLATION

4.2 PANEL INSTALLATION





Example:
Support Structure