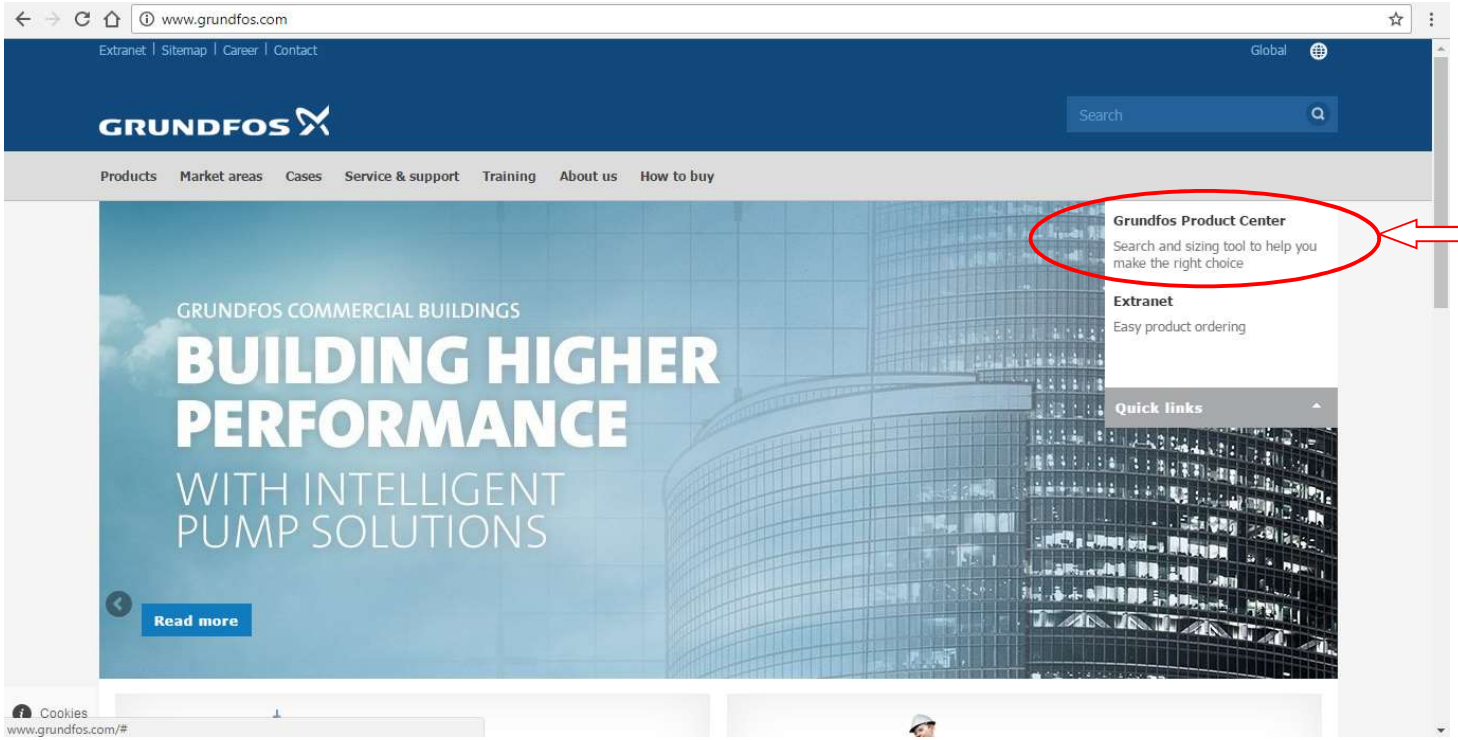
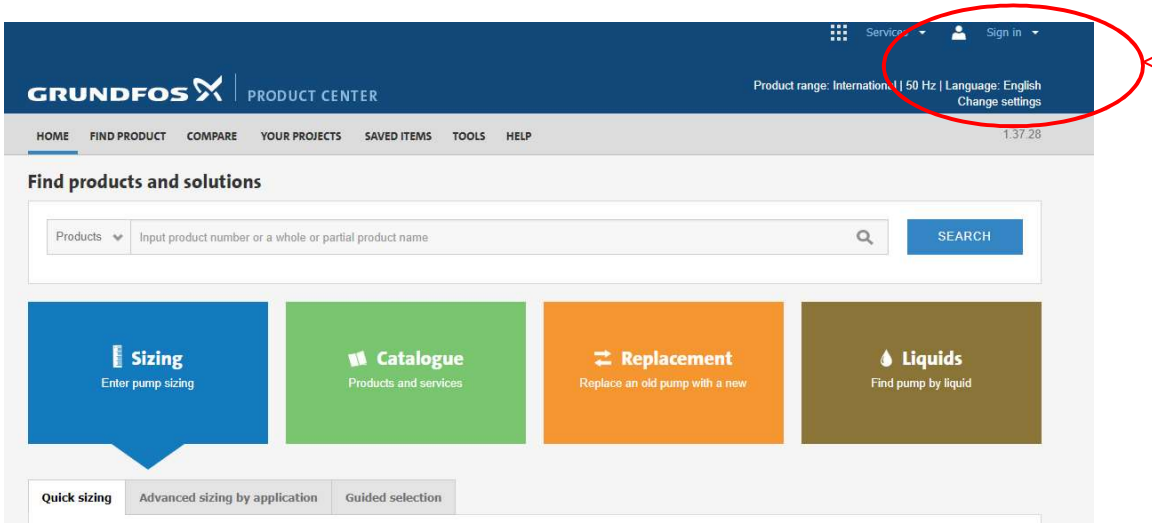
Example of using Grundfos Sizing Software

Step 1: Go to www.Grundfos.com and click on **Grundfos Product Center**

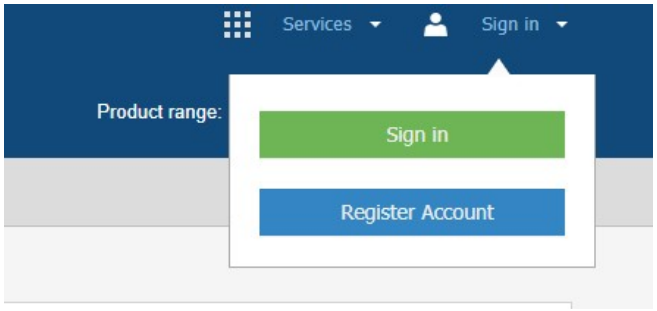


Click on Grundfos Product Center

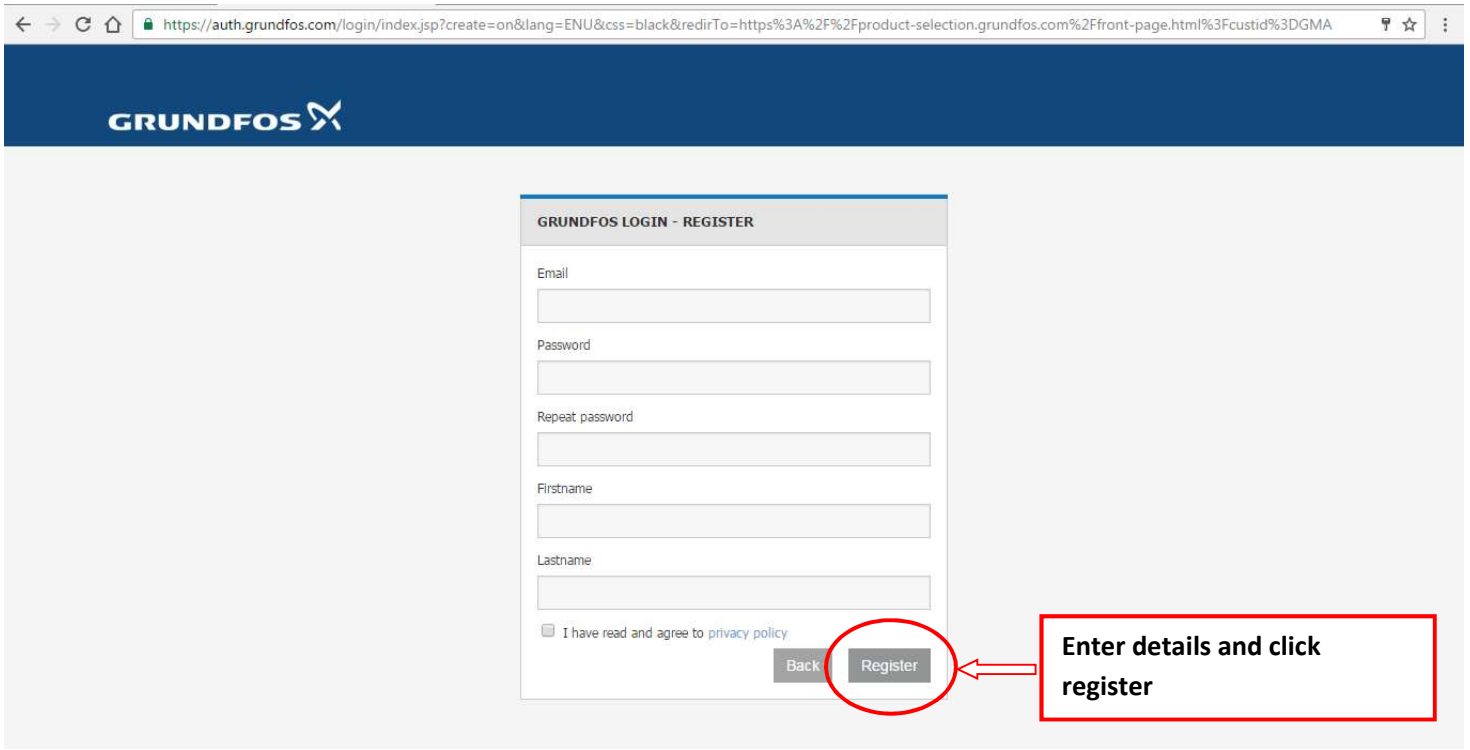
Step 2: Click on **Sign in >> Register account**



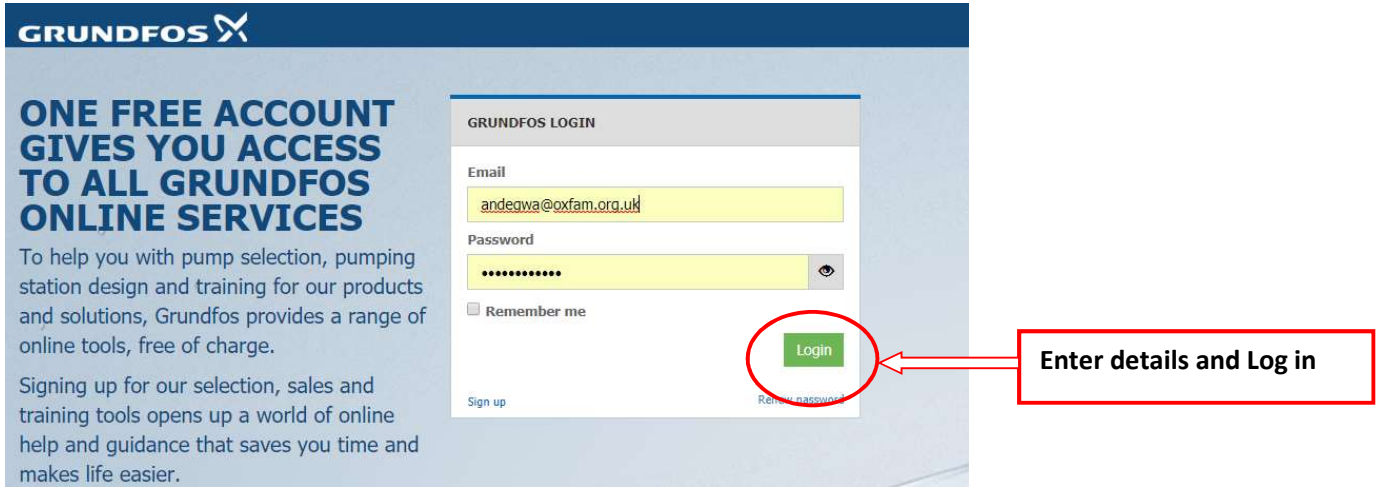
Register account



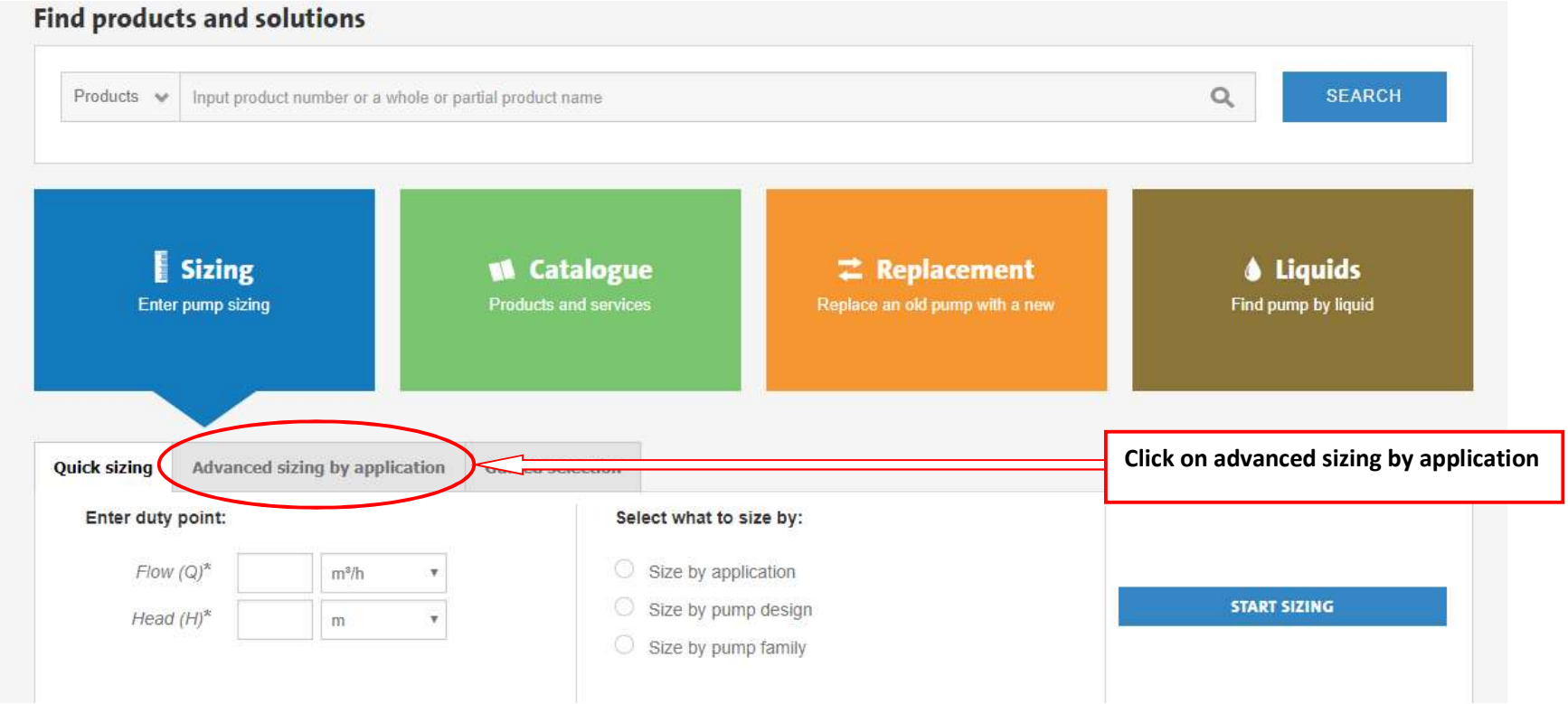
Step 3: Create a user profile by entering your names, e-mail address, password & other details and click **register**



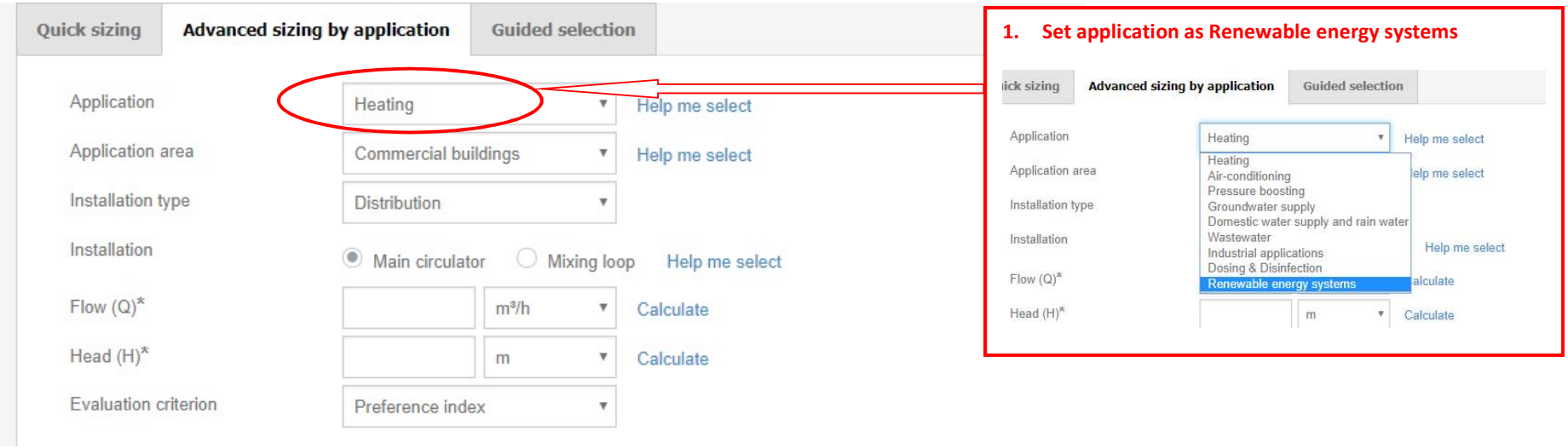
Step 4: Once the account is created, **log in** using your new credentials (Logging in allows you to customize as well as save your designs/projects).



Step 5: Once logged in, scroll down the page and click on "**advanced sizing by application**"

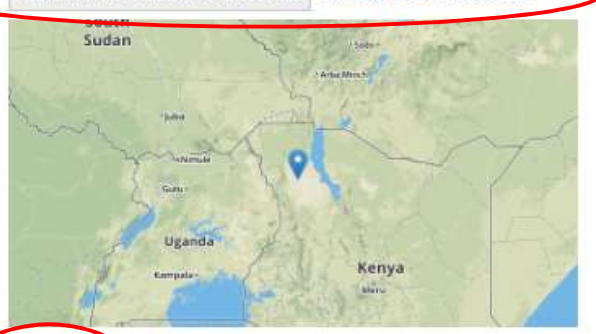


Step 6: This leads to the **data input page** below where you customize the data using the outlined steps


Quick sizing
Advanced sizing by application
Guided selection
Application
Heating
Help me select
Application area
Commercial buildings
Help me select
Installation type
Distribution
Installation
Main circulator
Mixing loop
Help me select
Flow (Q)*
m³/h
Calculate
Head (H)*
m
Calculate
Evaluation criterion
Preference index
1. Set application as Renewable energy systems
Heating
Air-conditioning
Pressure boosting
Groundwater supply
Domestic water supply and rain water
Wastewater
Industrial applications
Dosing & Disinfection
Renewable energy systems

Application: Renewable energy systems — Help me select

Location: Turkana, Rift Valley Province, Ken — Change System Location



Select type of system: Solar / Wind / Combi — Help me select

Installation: Borehole / Surface pump

Water volume: 100 m³/day — Calculate

Static lift above ground*: 20 m

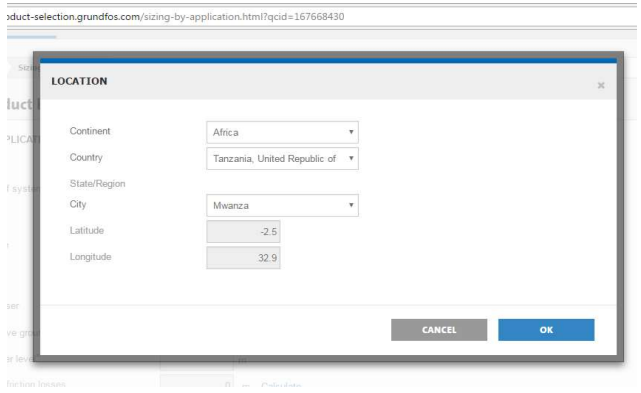
Dynamic water level*: 40 m

Pipe system friction losses: 17.36 m — Calculate

Month for sizing: July — Calculate

Solar modules: PF 270 — Calculate

2. Select location by clicking on change system location

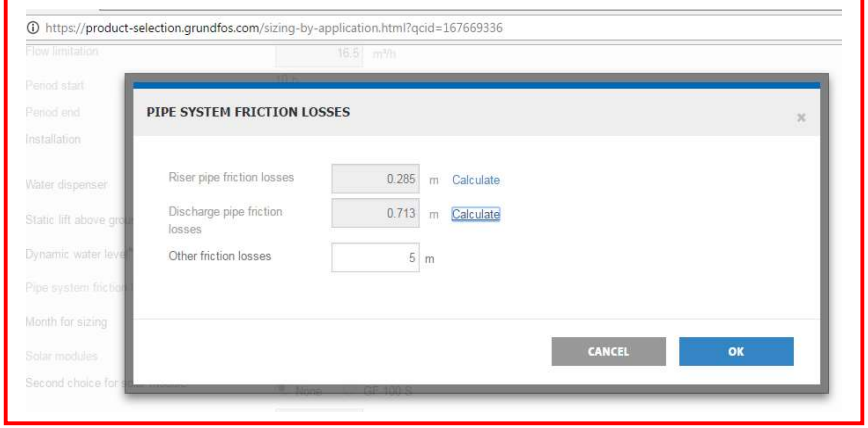


3. Select type of system and Installation type

4. Enter the design water volume

5. Enter the static lift & the dynamic water level

6. Calculate pipe frictional losses by clicking on calculate. Here you'll calculate friction losses both on the riser & discharge pipe



7. Select sizing month based on month with least output (coldest month)

Month for sizing: July — Calculate

Solar modules: GF 270 — Calculate

Second choice for solar module: None

Maximum ambient temperature: 308 K

Expand all | Collapse all | Show full width

Your requirements (Cable size (pump), Cable length (pump), Cable loss (pump))

Cable size (pump): Any (mm2)

Cable length (pump): m

Cable loss (pump): 2 %

Operational conditions (Minimum ambient temperature, Sun tracking, User-defined day)

Pump design (Pump material, Pump outlet)

System configuration (Water dispenser, Solution, Switch box, Control unit, Level switch ...)

Water dispenser

Solution: Integrated or external / Integrated / External (RSI)

Switch box: IO50

Control unit: CU 200 control unit / CIU 273 (Remote management) / None

Level switch

Include battery back-up

Frequency: 50 Hz / 60 Hz

Solar inverter RSI

Wirekits for solar modules

Standard range 3x380VAC
Low voltage range 3x220VAC

8. Customize the solar module characteristics based on the module to be used in the design. You can also use the provided Grundfos module for design)

9. Enter cable length and allowable losses

10. Select the system configuration
The RSI inverter is selected based on the power range for the country of operation

Step 7: After checking all required data has been input, click on Start Sizing. The system will do a background run and return results with several options of all suitable products for your design

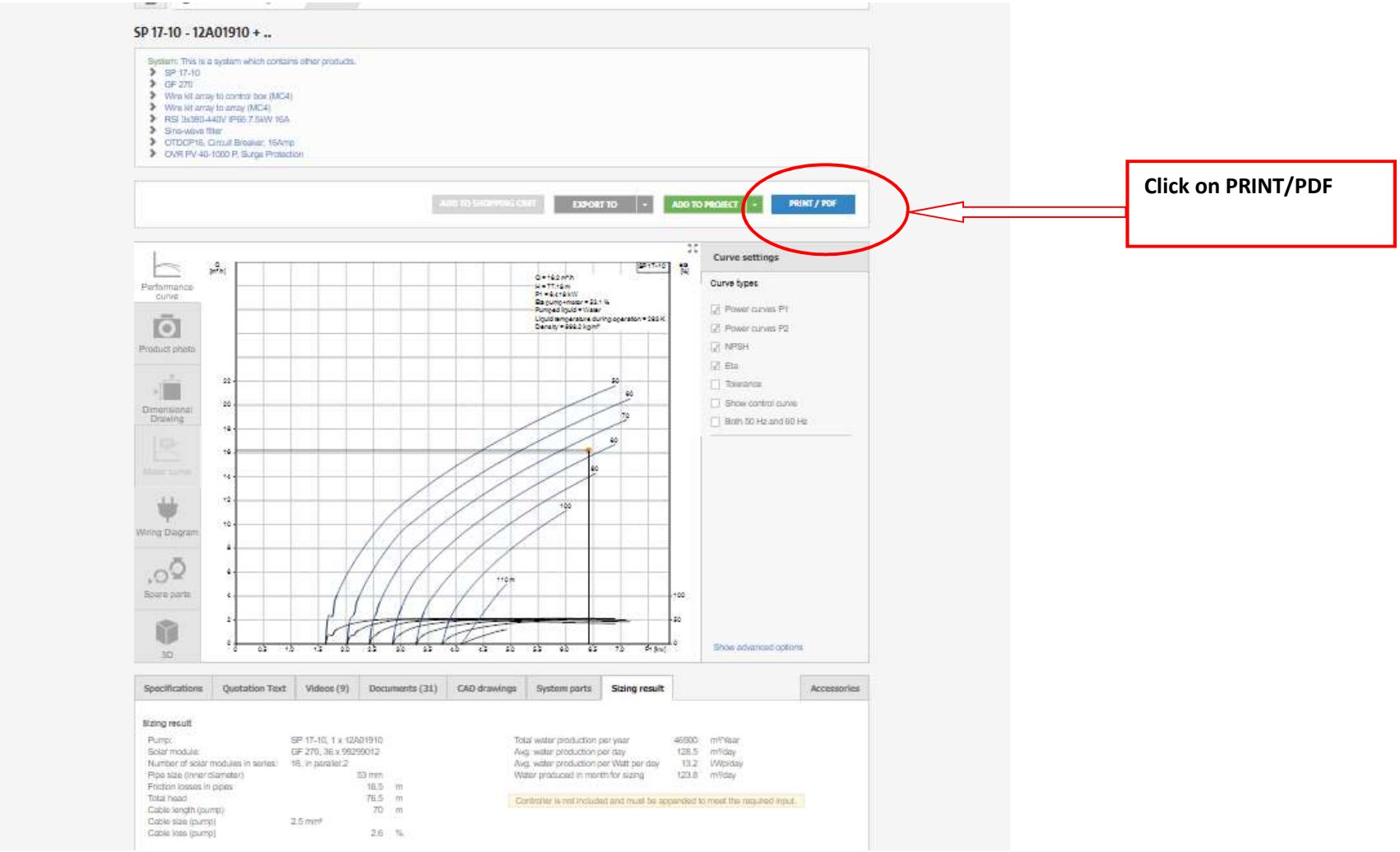
ALL SUITABLE PRODUCTS (8)

Batch actions: EXPORT TO | ADD TO PROJECT

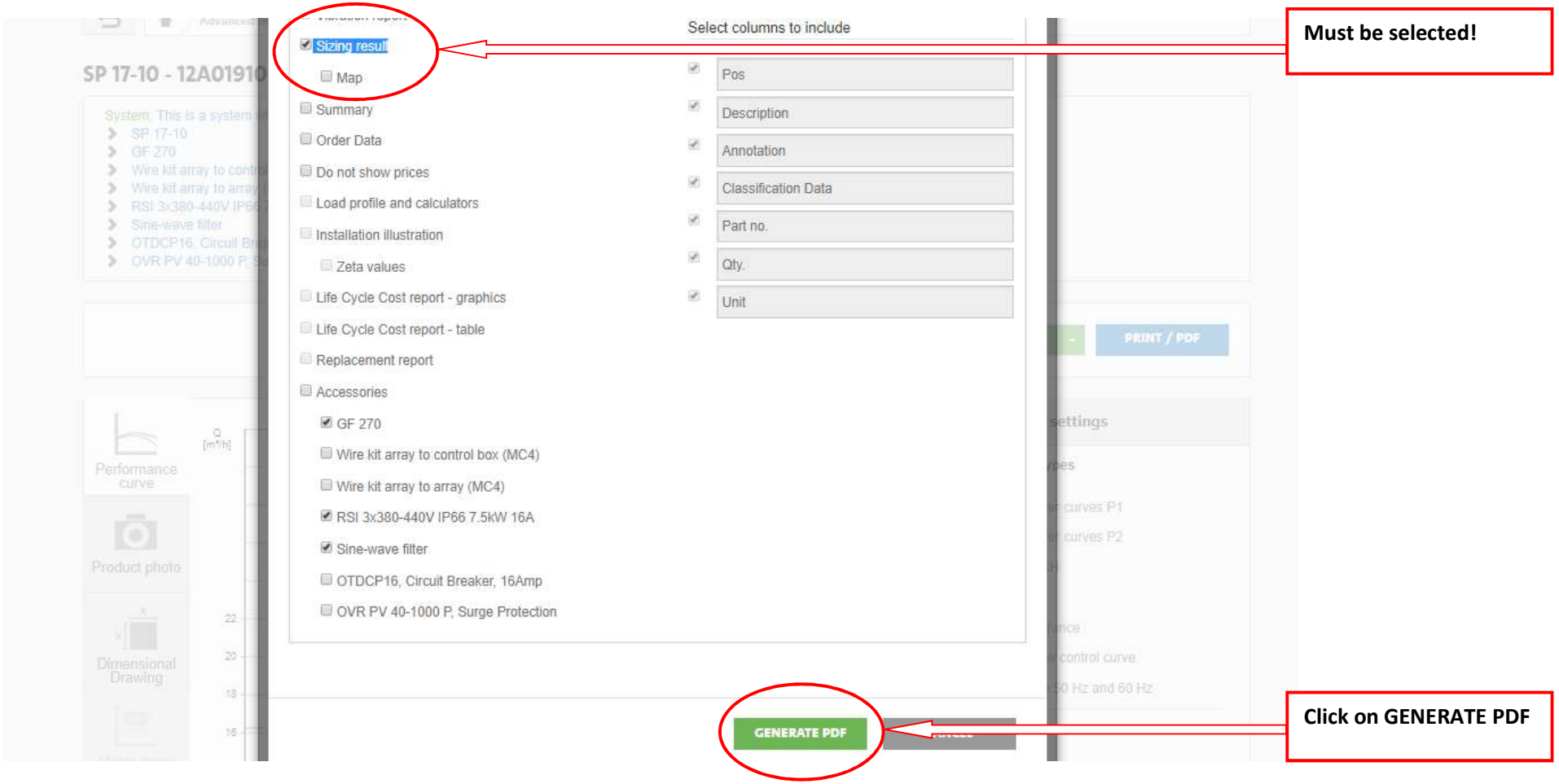
Table size: Show full width

		System	Product No	Info	Pump	Product number	Solar Inverter	Product number	Solar modules	Solar array power [kWp]	Water [m³/year]	Average water [m³/day]	Water [l/Wp/day]	Water in month for sizing [m³/day]	January	April	July
☐		X	12A01911 + ..		SP 17-11	99044363	RSI 3x380-440V IP66 11kW 23A	99299012	36 x GF 270	9.72	50600	138.6	14.3	130.9	142.9	134.6	130.9
☐		X	12A01910 + ..		SP 17-10	99044352	RSI 3x380-440V IP66 7.5kW 16A	99299012	36 x GF 270	9.72	46900	128.5	13.2	123.8	131.1	126.2	123.8
☐		X	98699361 + ..		SP 14-23	99044352	RSI 3x380-440V IP66 7.5kW 16A	99299012	36 x GF 270	9.72	46700	128.1	13.2	121.8	131.5	124.8	121.8
☐		X	12A01909 + ..		SP 17-9	99044352	RSI 3x380-440V IP66 7.5kW 16A	99299012	36 x GF 270	9.72	45700	125.1	12.9	120.8	127.7	122.6	120.8
☐		X	98699360 + ..		SP 14-20	99044352	RSI 3x380-440V IP66 7.5kW 16A	99299012	36 x GF 270	9.72	45900	125.9	13	120.4	129.1	122.7	120.4
☐		X	12A01908 + ..		SP 17-8	99044352	RSI 3x380-440V IP66 7.5kW 16A	99299012	36 x GF 270	9.72	41100	112.6	11.6	109.1	114.3	111.1	109.1
☐		X	98699359 + ..		SP 14-17	99044351	RSI 3x380-440V IP66 5.5kW 12A	99299012	36 x GF 270	9.72	41000	112.3	11.6	108.1	114.6	109.7	108.1
☐		X	13A01908 + ..		SP 30-8	99044363	RSI 3x380-440V IP66 11kW 23A	99299012	36 x GF 270	9.72	42200	115.7	11.9	104.3	122.3	109.7	104.3

Step 8: Double click on any of the options to view more details. To print or save the selection, click on PRINT/PDF



Step 9: Select preferences to view and click on generate PDF. At minimum ensure ‘sizing result’ is selected



Step 10: Save PDF in a desired location on your computer/drive and open to view sizing details

GLOBAL SOLAR & WATER INITIATIVE

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Email: Andegwa@oxfam.org.uk
Date: 06/09/2018

12A01910 SP 17-10

Sizing results - summary

Water production, Peak flow and Price
Total water production per year: 46900 m³
Avg. water production per day: 128.5 m³/day
Average water production per watt per day: 13.2 l/Wp/day

Solar module configuration:
Number of solar modules in series: 18, in parallel: 2
Solar array rated power: 9.72 kW
Solar array rated volts: 568.8 V
Sun tracking: No (fixed)
Tilt angle: 3 deg.

Typical performance at [illegible] radiation 800 W/m²
Flow: 16.2 m³/h
Total [illegible]: 76.5 m

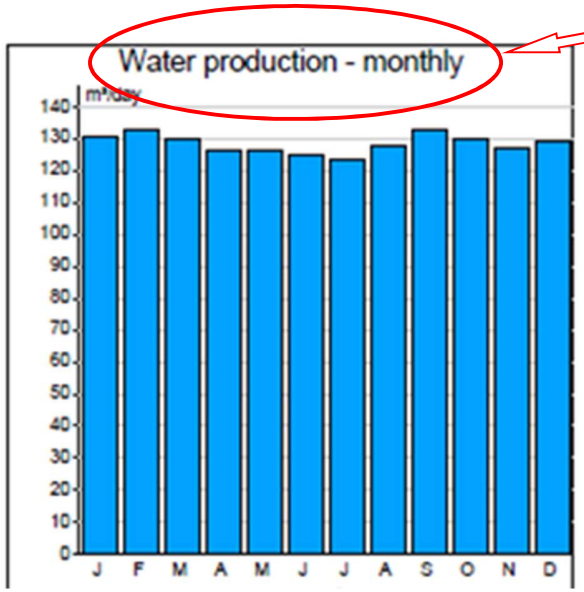
Cables and pipes:
Pump cable length: 70 m
Pump cable size: 2.5 mm²
Total cable loss: 2.6 %

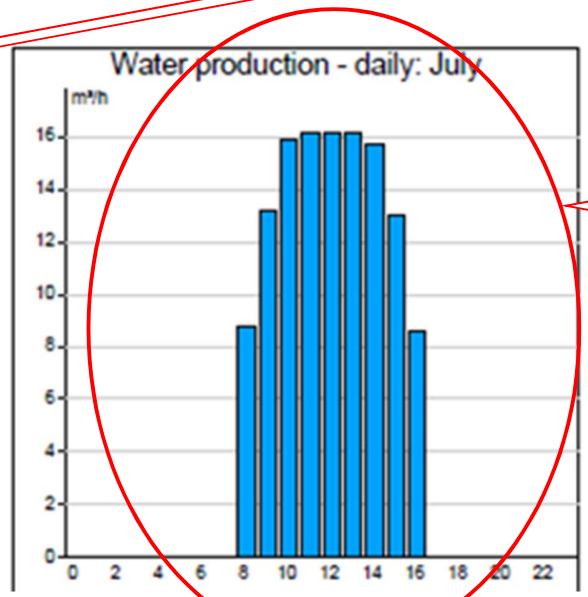
Pipe Length: 150 m
Pipe diameter: 53 mm
Friction loss: 16.5 m

System performance - monthly average

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Water production [m³/day]	131.1	133.2	130	126.2	126.4	125	123.8	127.9	133	129.8	126.9	129.2
Energy production [kWh/day]	55.0	56.1	54.5	52.6	52.8	52.1	51.5	53.5	56.1	54.3	52.8	54.0
Radiation horizontal [kWh/m² day]	7.3	7.8	7.3	6.7	6.8	6.6	6.5	7.0	7.8	7.2	6.7	7.0
Radiation tilt [kWh/m² day]	7.4	7.8	7.3	6.6	6.6	6.4	6.3	6.8	7.7	7.2	6.7	7.1
Avg. Temp. [K]	23.	24.	25.	25.	25.	24.	23.	23.	23.	24.	24.	23.

Solar data location: Latitude: 3 DD, Longitude: 35 DD





Solar PV details.

36 modules will be installed, 2 strings in parallel, each having 18 modules connected in series

123.8m³/day pumped during July, which is the month with least output for our location. As it is higher than the Daily Required Output (100m3/day), it means the solar system alone will provide all the water needed all the year round.

Amount of water pumped daily by month

Amount of water pumped per hour in in the worst month of July. Pump will start running at 0730hrs and stop at 16:30hrs. Output will peak at 16.2m³/hr at noon.