

Designing & Sizing of Solar Photovoltaic Systems

Conference Name: DALILA Final Conference

Theme: The Role of Renewable Energy in the Energy Sector

Date: 22nd November 2023

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Existing Solar Technologies

Solar Photovoltaic (PV)



Solar Hot Water



Concentrated Solar Power (CSP)



There are three existing and utilized solar technologies; solar photovoltaic, solar hot water, and concentrated solar power.

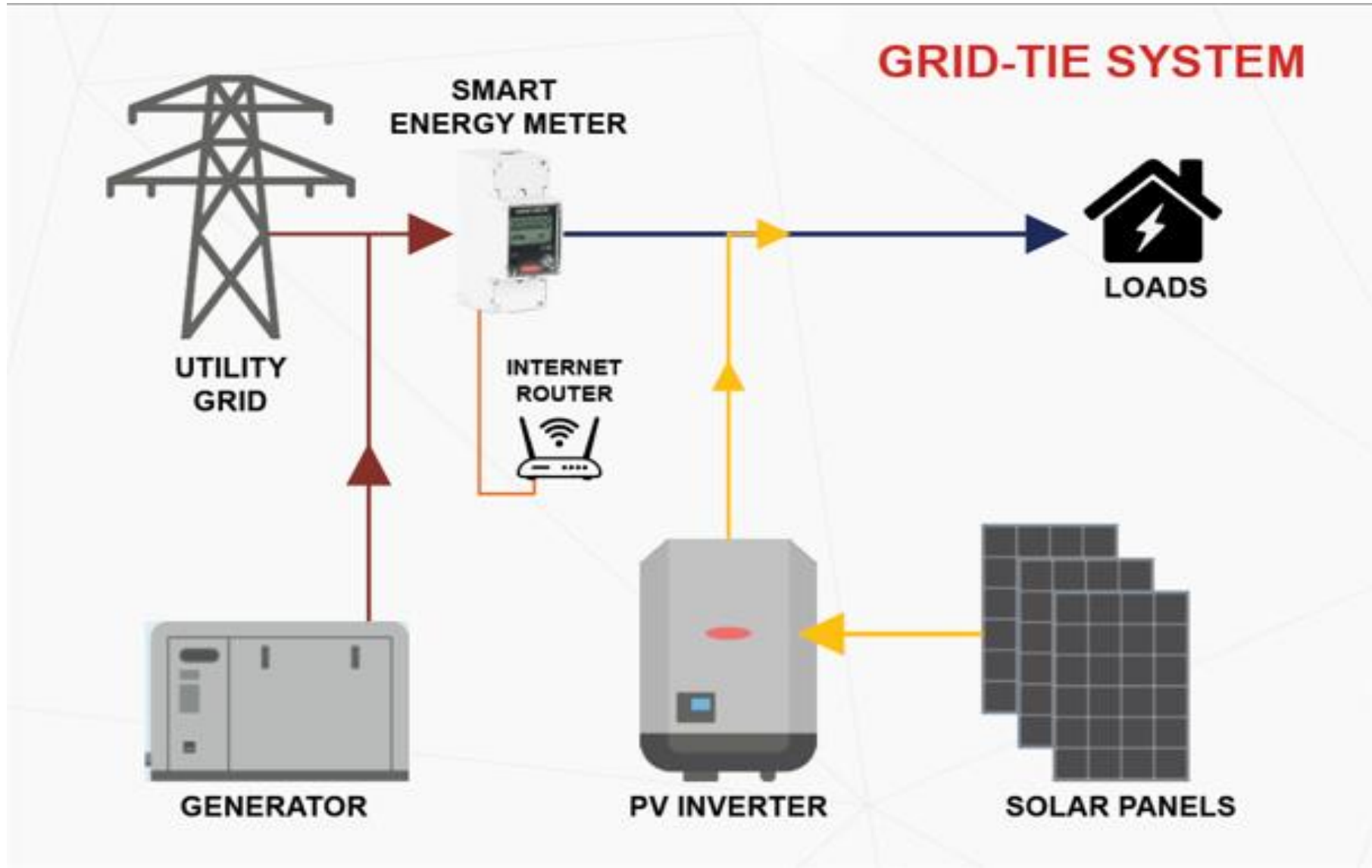
This presentation focuses on solar **photovoltaic systems, or PV systems**, which can be used to generate electricity from dispersed sites like residential rooftops etc.

Types of solar PV Systems design

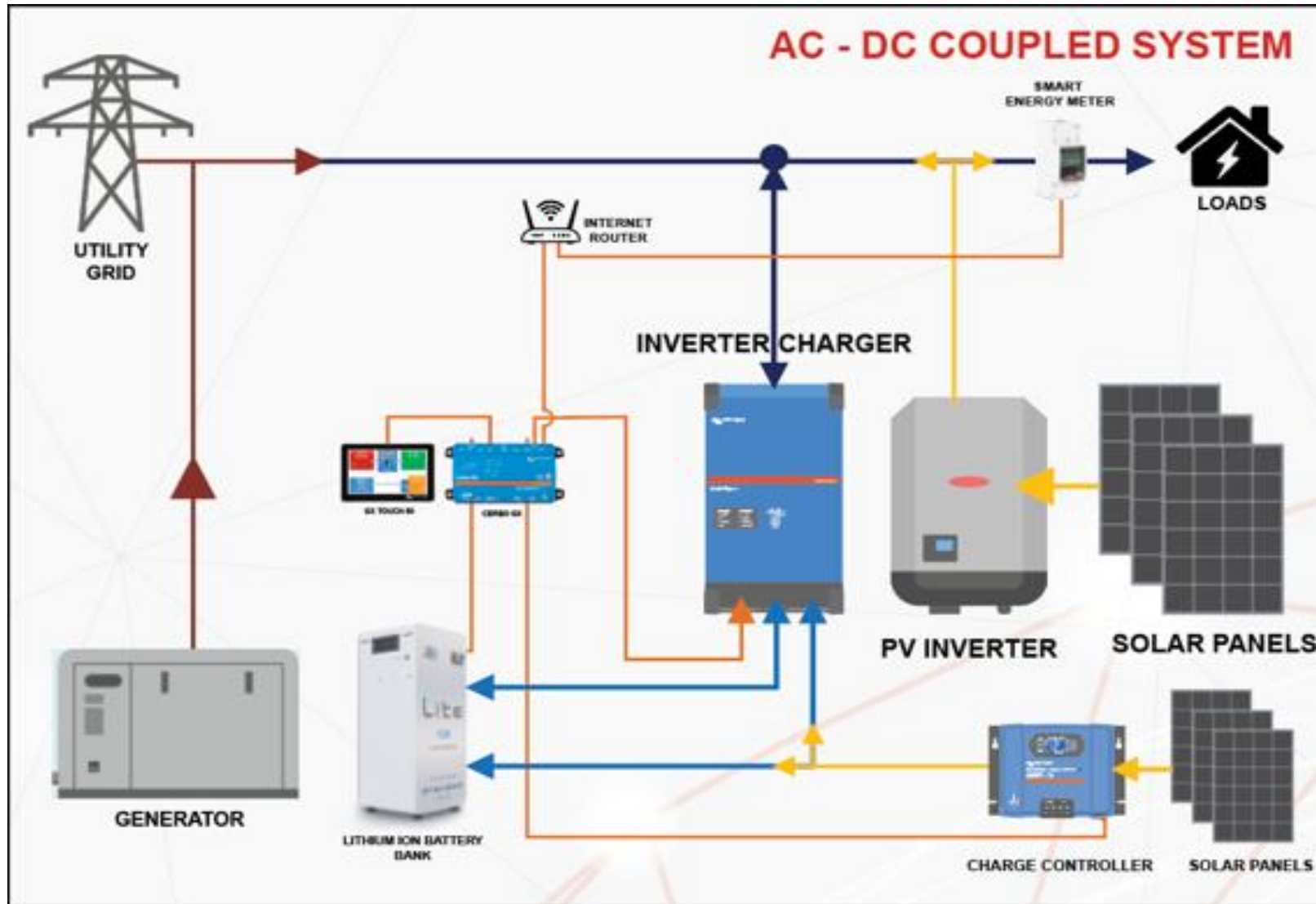
1. Grid-tied PV System
2. AC-DC coupled PV System (Battery-based, grid-tied)
3. Off-Grid PV System
4. Backup System



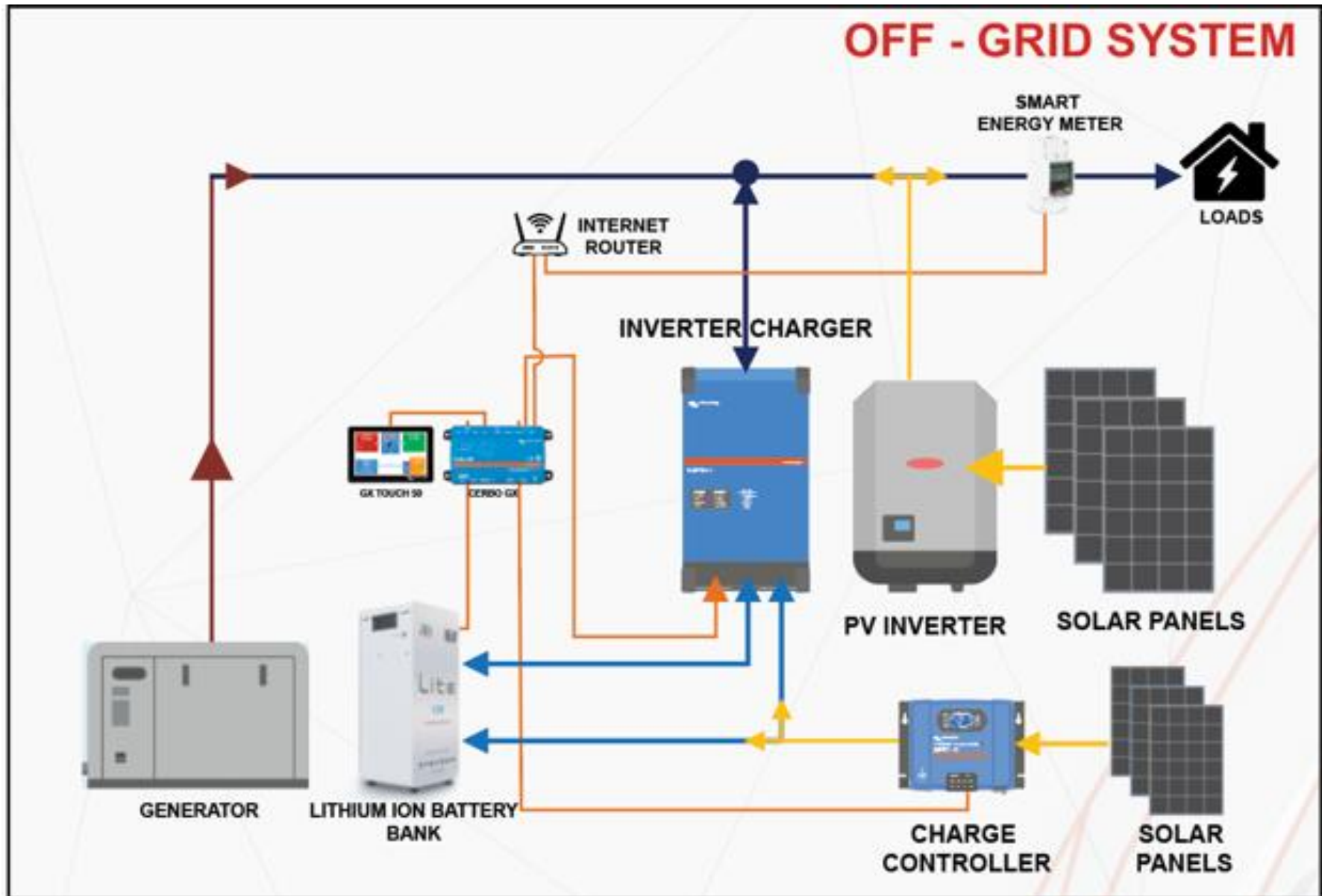
1. Grid-tied PV System - Grid connection



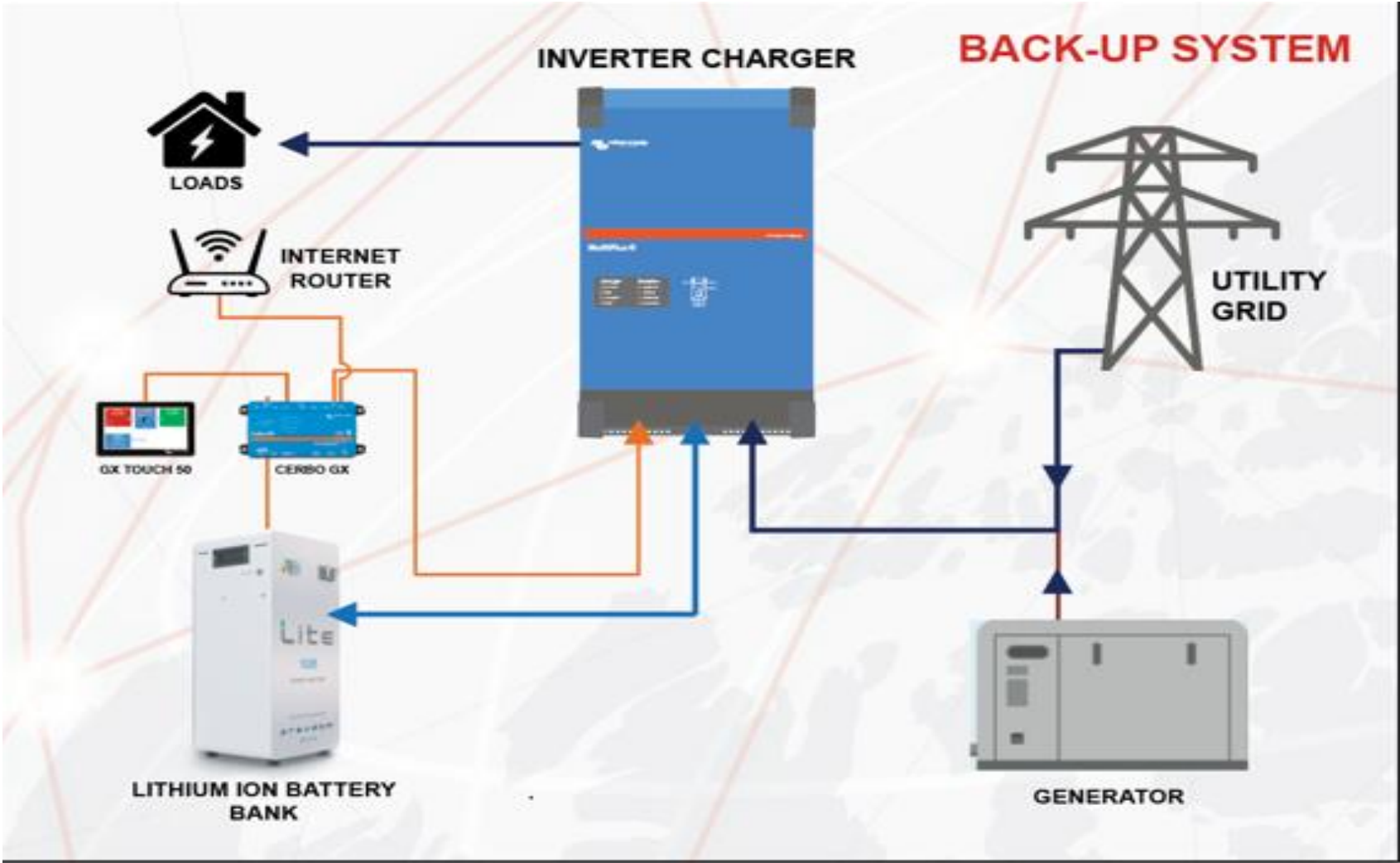
2. Battery-based, grid-tied (AC-DC Coupled system)



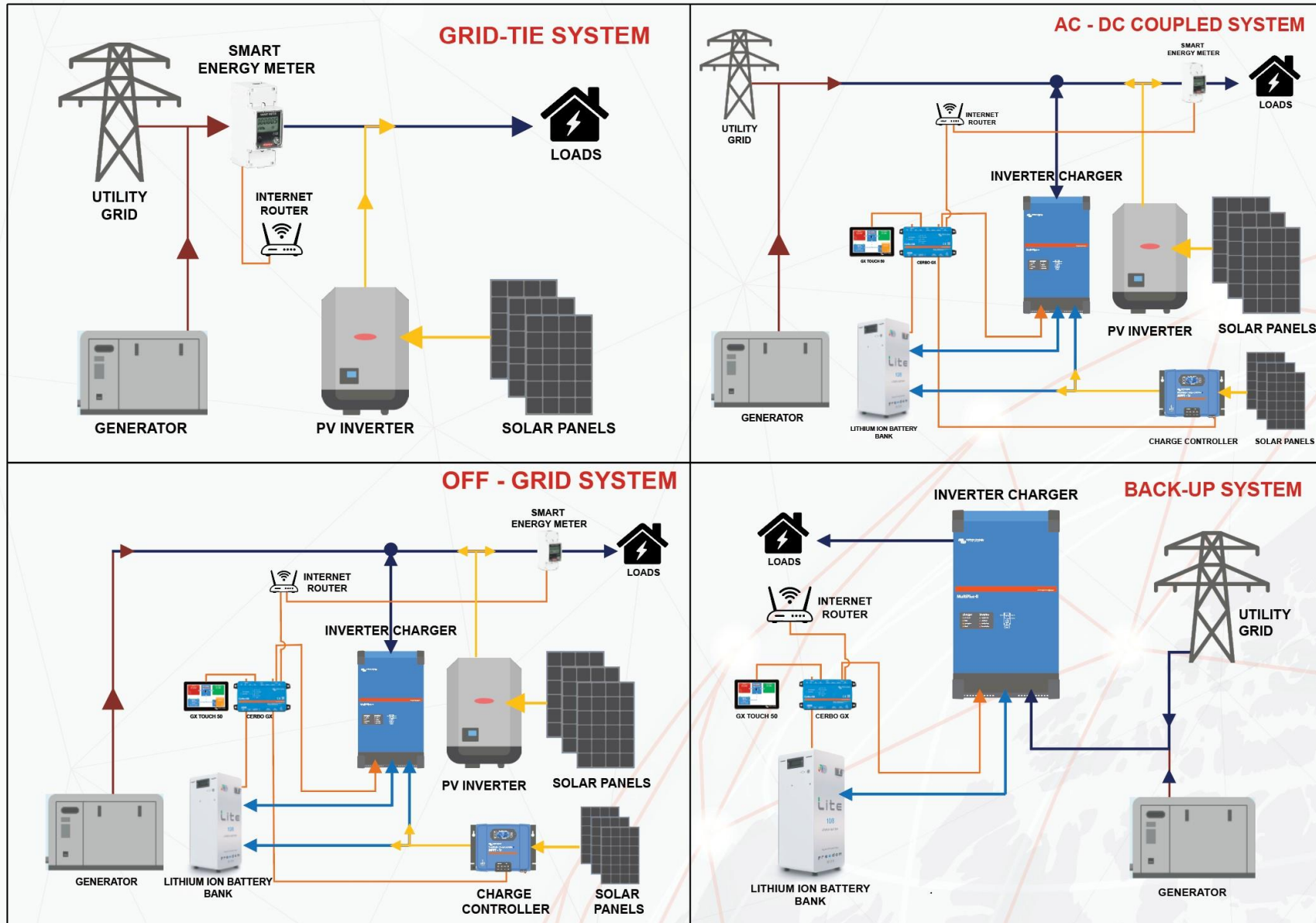
3. Off-Grid PV system – only tied to a battery bank & solar panels



4. Backup system - only tied to a battery bank & grid (no solar panel)



SOLAR - RENEWABLE ENERGY SYSTEM



Solar PV -Mounting

Solar PV systems can be ground mounted, or Roof mounted



Ground Mounted



Roof Mounted

PV System DESIGN Tips

1. Conduct site survey /ask for required info like loads, etc.[Site Survey Checklist.docx](#)
2. Do design (based on the client requirements)
3. Prepare bill of material (BoM)
4. Design diagrams/sketches
5. Prepare Quotation for client (based on BoM)
6. Go for installation (once quotation accepted by client)
7. After installation , prepared Installation report including (as build drawings),Operation & maintenance manual etc



Typical example of Installed PV system

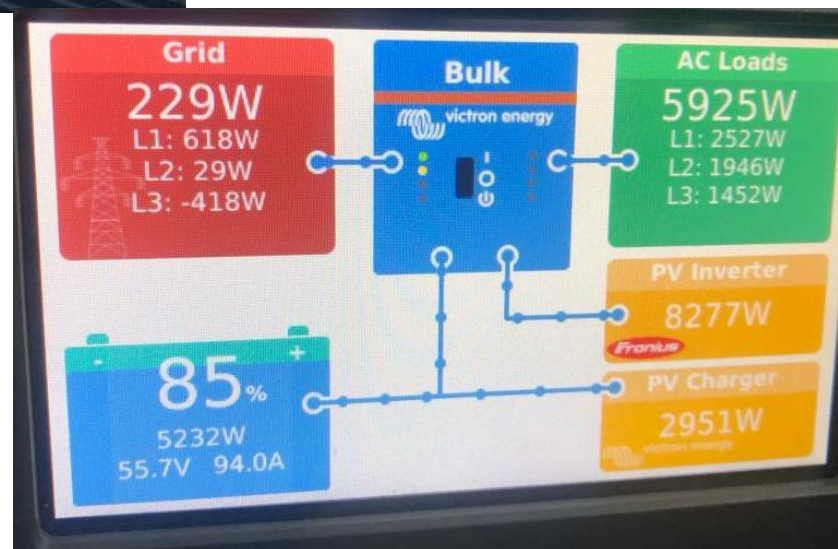


DHL -Dar es salaam-Grid tie PV System
36.72kWp =68 @ 540Watts

Roof mounted



Inaya -Zanzibar-AC-DC coupled PV System
11.88kWp =22 @ 540Watts



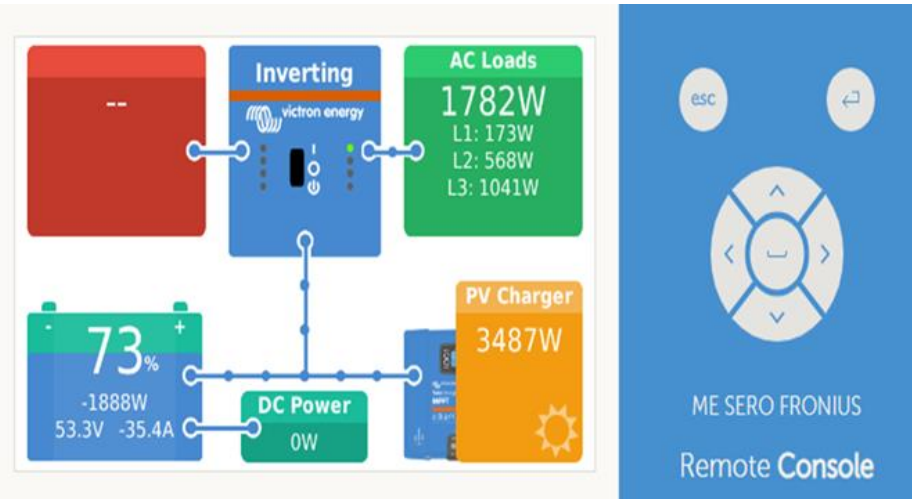


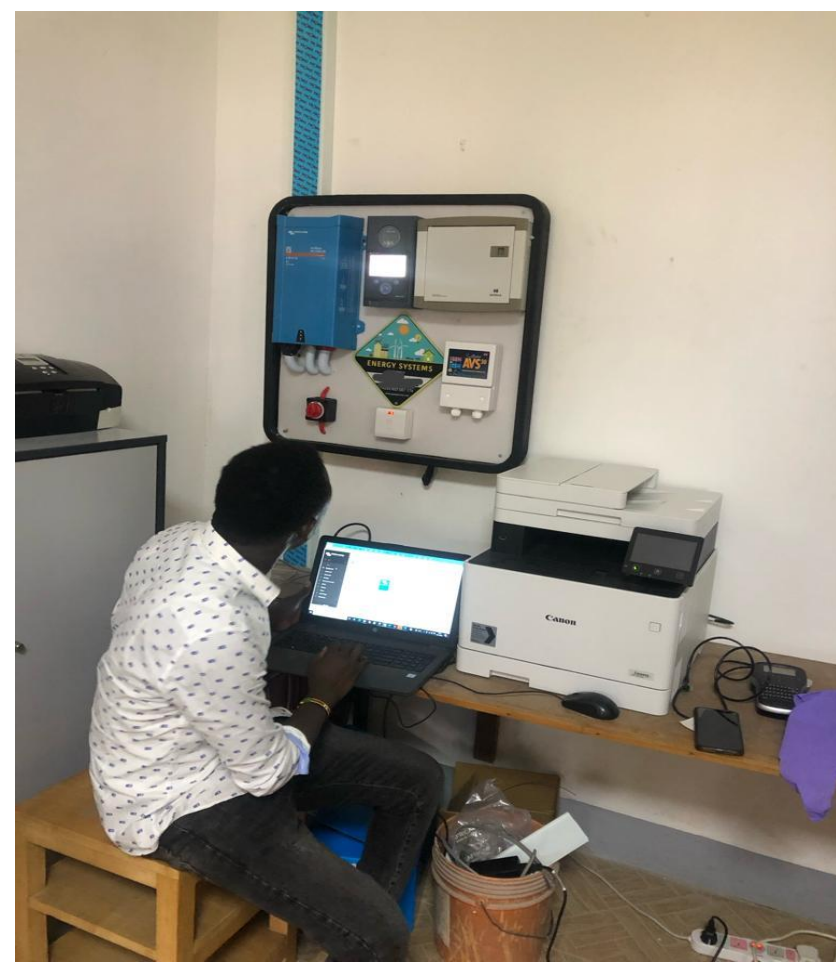
UNDP-Dodoma , AC-DC coupled PV System
(Ground mounted)
146.25kWp =450 @ 325Watts





Miracle Seronela Base (Serengeti) -Off grid PV System (roof mounted)
37.80kWp = 70 @ 540Watts





Backup system
only tied to a battery bank & grid (no solar panel)

Other Installed PV system



Kibosho Hospital –AC/DC Coupled rooftop PV
System

20.6kWp = 75@ 275Watts

Other Installed PV system



Kimarishe Lodge/Serengeti National park –Offgrid PV System
(Ground mount)
243kWp =450@ 540Watts

E-Mobility



EV-chargers /Powered by solar system
UNDP-Dodom



SOLAR DESIGN SOFTWARE & SIMULATION TOOLS

- Helioscope

[Helioscope 2022\TWC-kubukubu-Optional 1.pdf](#)

[Tobbaco Allience -HelioScope\1.08MW Allience.pdf](#)

- Pvsyst
- PVSOL
- RETScreen
- Hommer
- SolarPlus V4
- Excel design worksheet

[Excel design sheet\kiligolf-Design , projects.xlsx](#)

[Excel design sheet\ncmc - Solar system.xlsx](#)

[Excel design sheet\Killi -PV Design 2021.xls](#)



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THANK YOU**

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