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- Inverter application – Slide 1-12 and online material: https://www.ingeconsuntraining.info/?page_id=7049
- Inverter capability – Slide 13-18 and online material: https://www.ingeconsuntraining.info/?page_id=7049
- Inverter communication and settings – Slide 19-21
- Inverter Monitoring Slide 22-26 and online : https://www.ingeconsuntraining.info/?page_id=3385
- Ingecon online training material - Slide 26-28
- Ingecon SUN Planner slide 29 and online https://www.ingeconsuntraining.info/?page_id=1861
- Pylontech Ingecon comparable battery - Slide 31-33 and online: https://www.ingeconsuntraining.info/?page_id=15937
- Battery properties Slide 34-36
- Building Off Grid system to match winter consumption -Slide 37-38, attachment document “A REPORT TO THE AUSTRALIAN ENERGY REGULATOR 2015”

Course duration : 6 hours



IS STORAGE 1Play

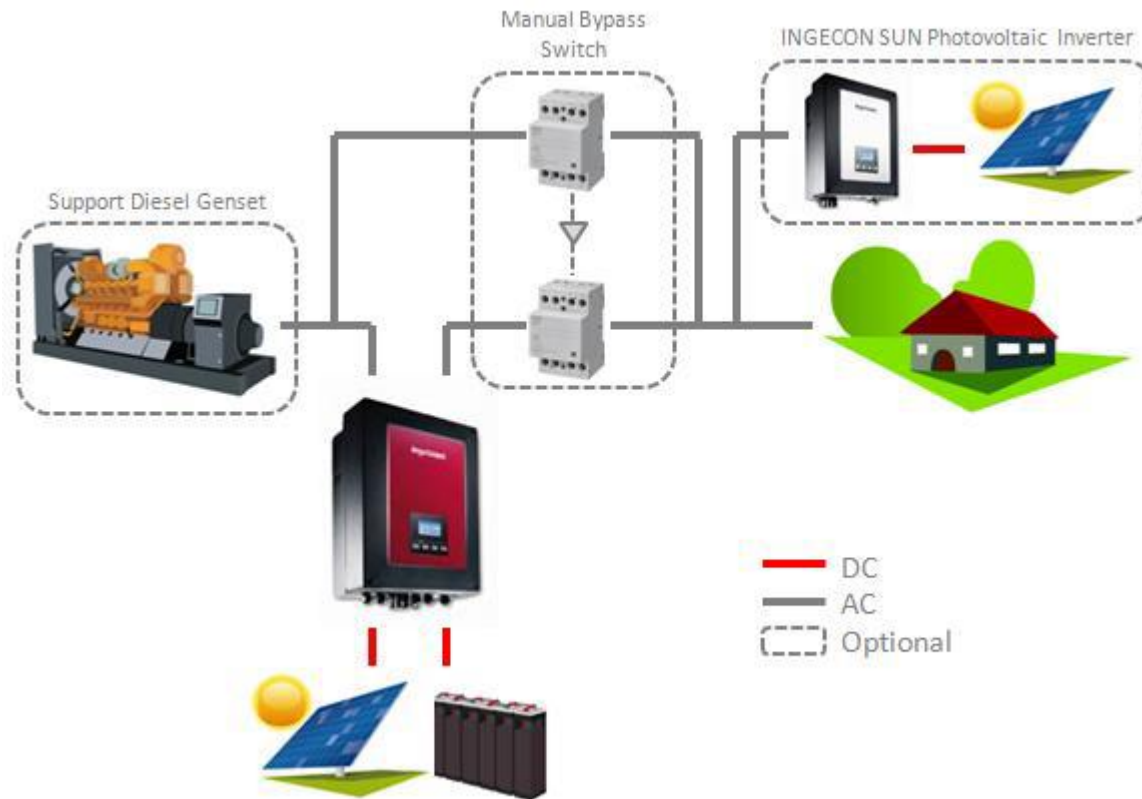
Single-phase battery inverter with an integrated photovoltaic input for residential and commercial use.

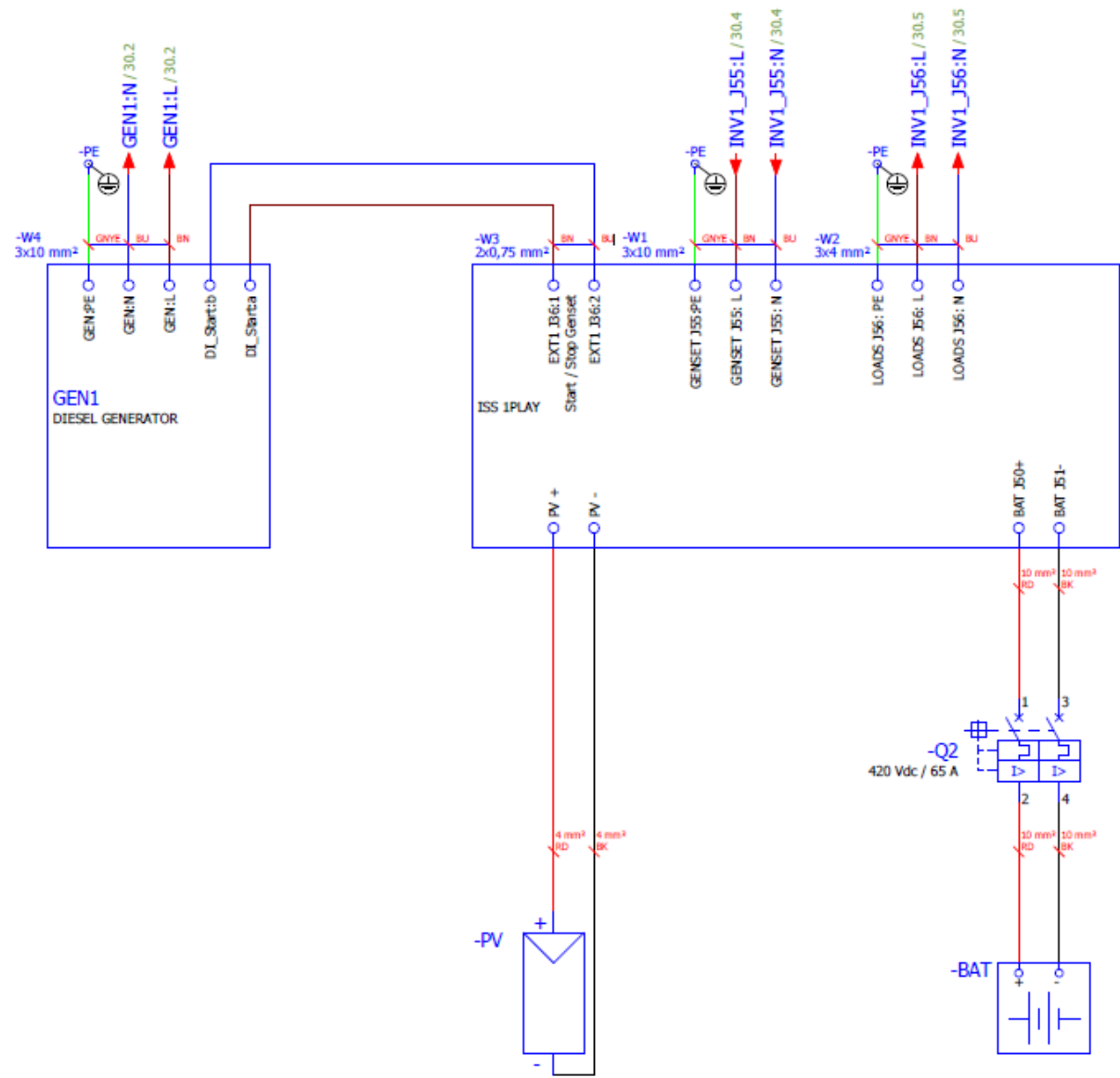
OPERATION

- Stand-alone mode (OFF GRID)
- UPS mode (Back-up)
- Self-consumption mode

Online resource: https://www.ingeconsuntraining.info/?page_id=7049

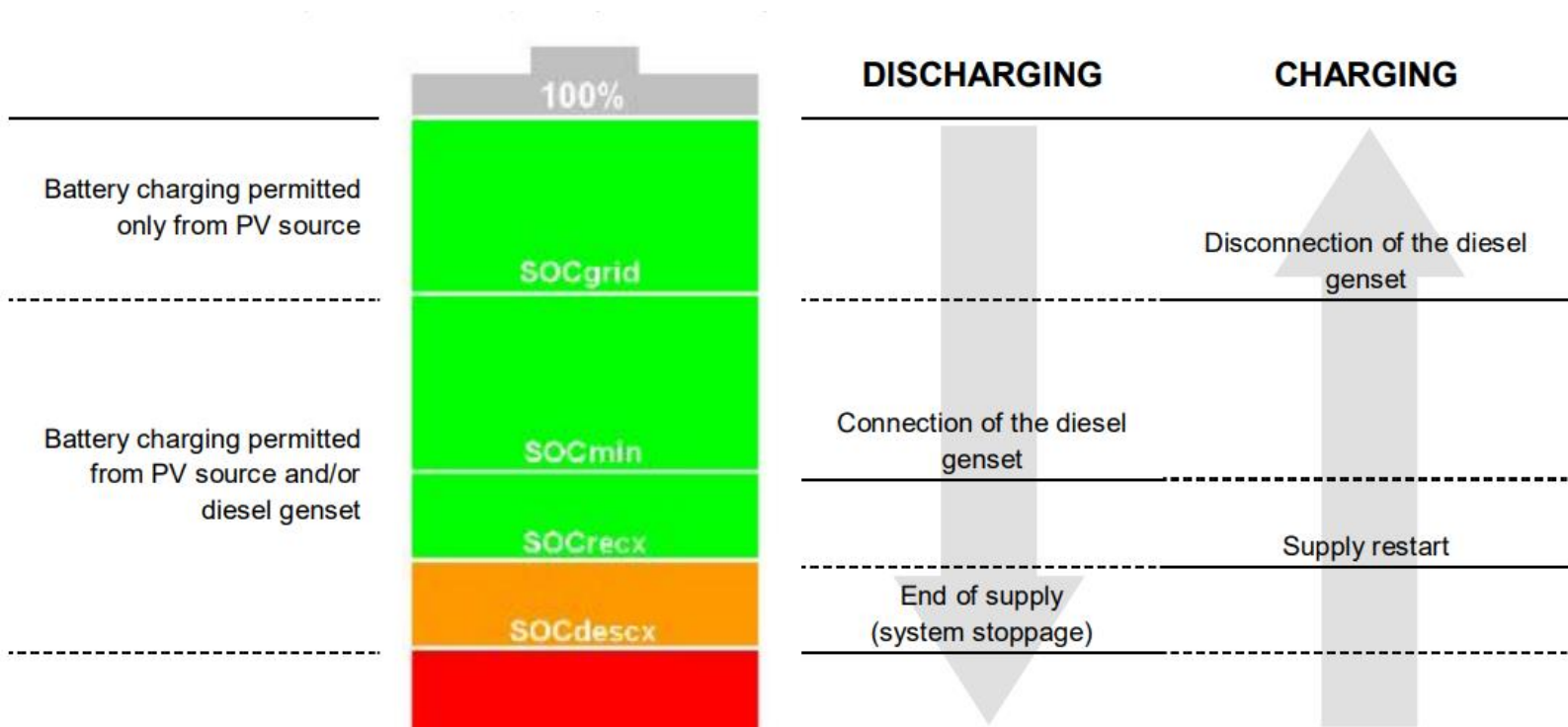
Stand Alone Installations





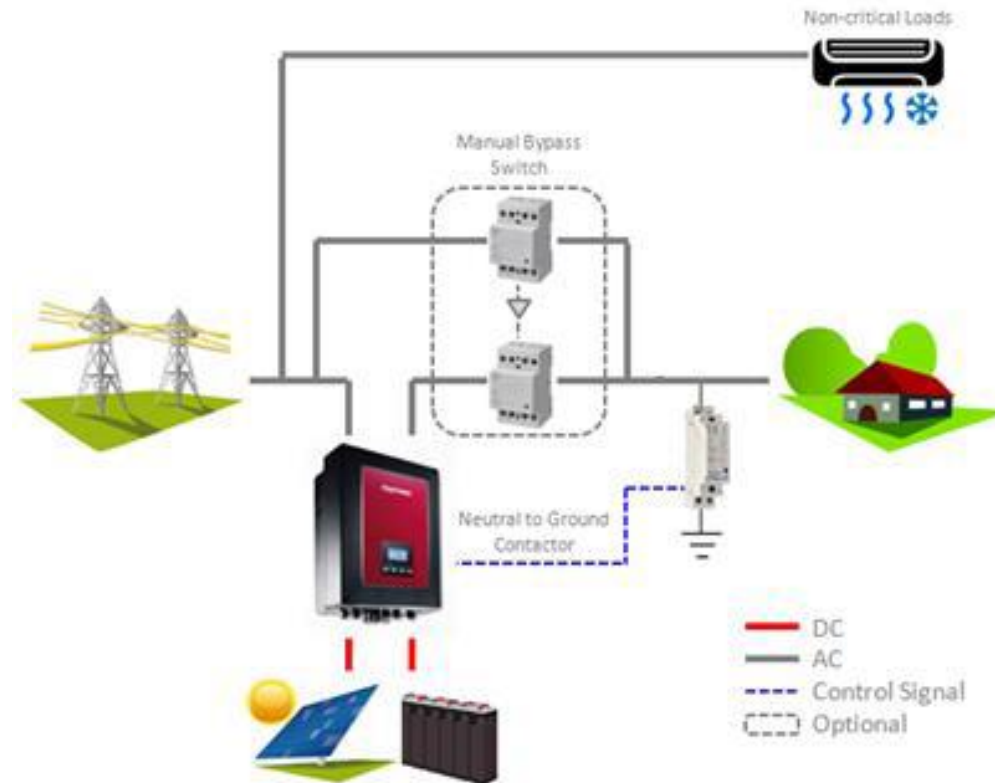
Stand Alone/Off grid

Photovoltaic energy is used as a priority to supply loads and to charge the battery

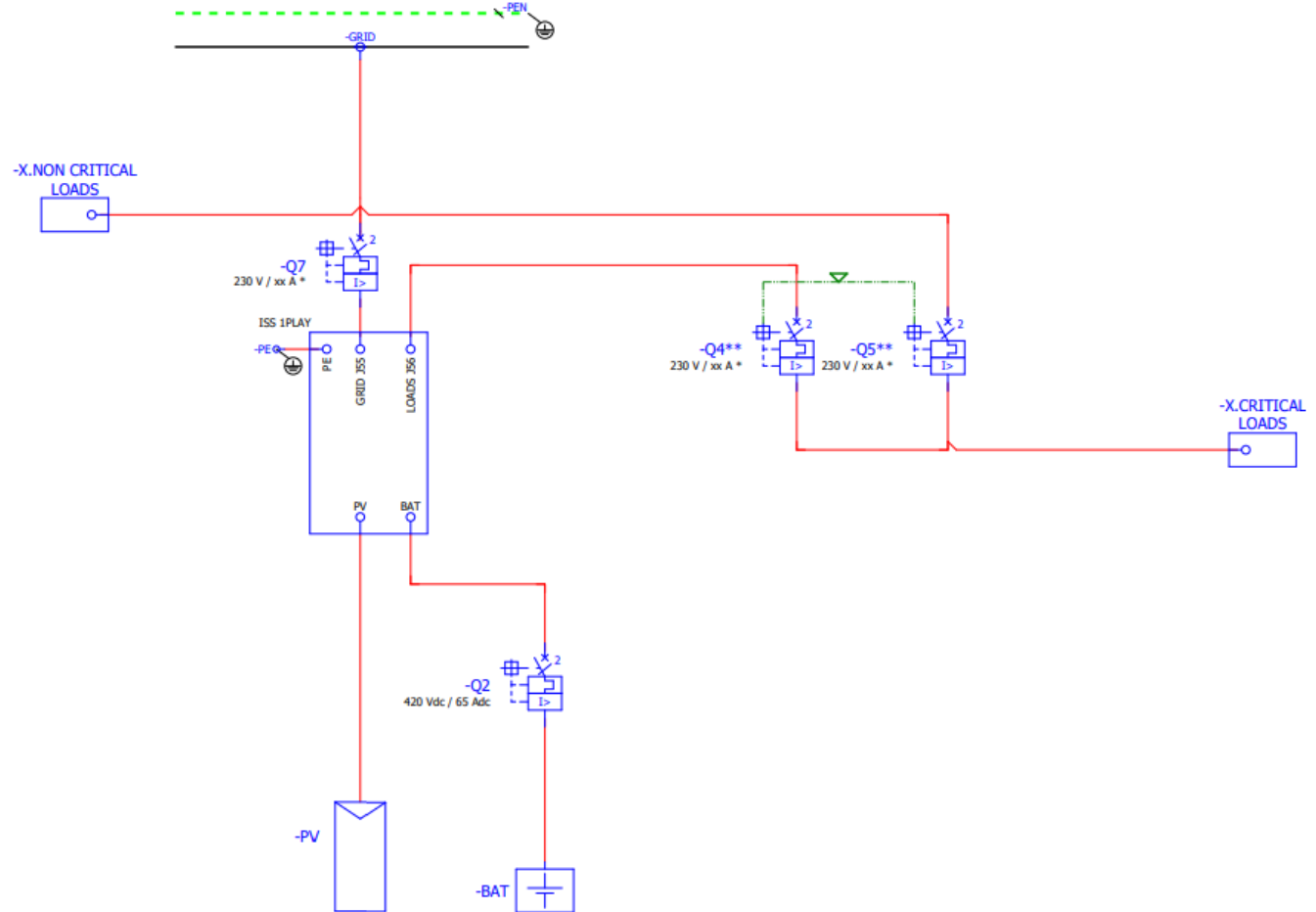


UPS (back-up) installations

When the grid is operational, the priority is to keep the batteries fully charged



UPS (back-up) installations

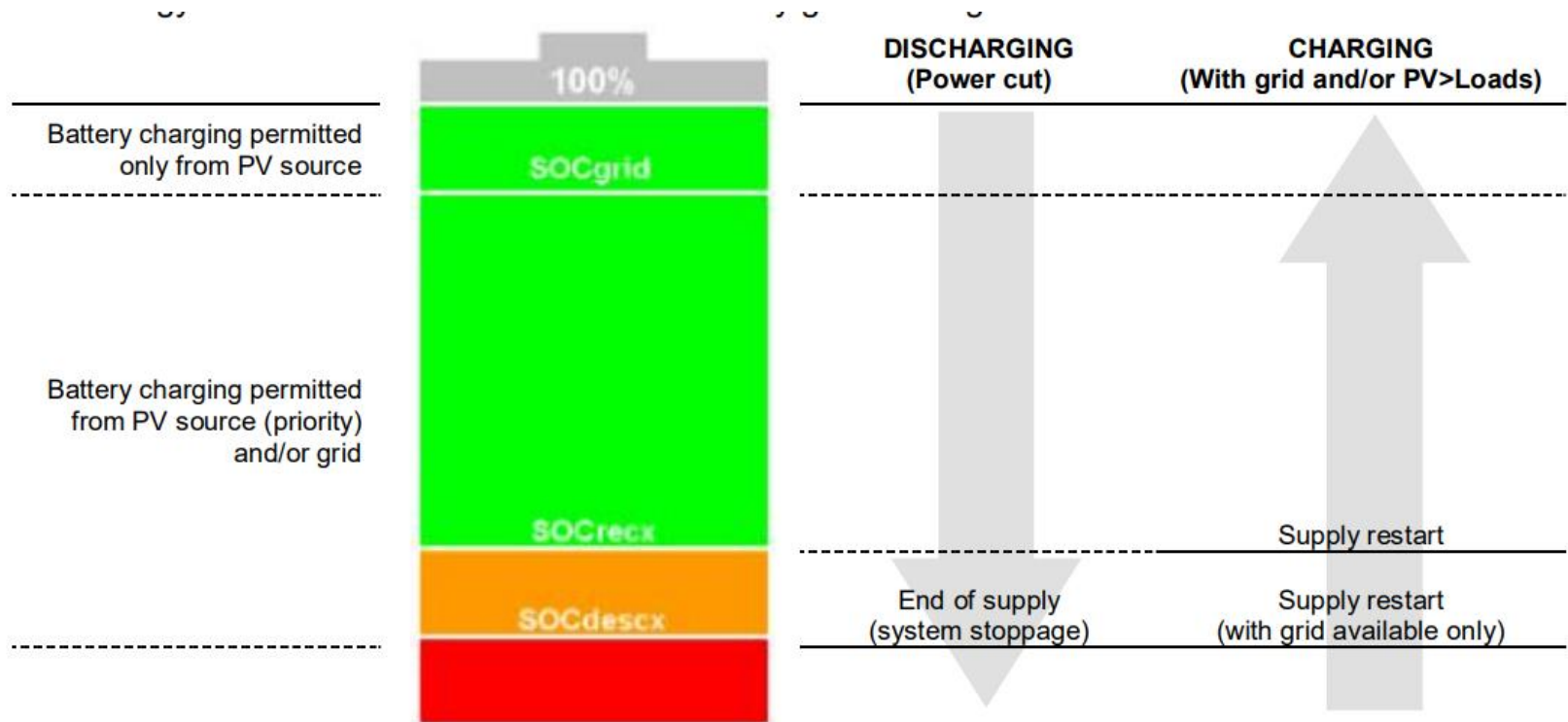


* The nominal current depends on the power of the installation

** -Q4 and -Q5 are interlocked. In normal operating conditions -Q4 should be closed. -Q5 should only be operated in case of failure or inverter maintenance.

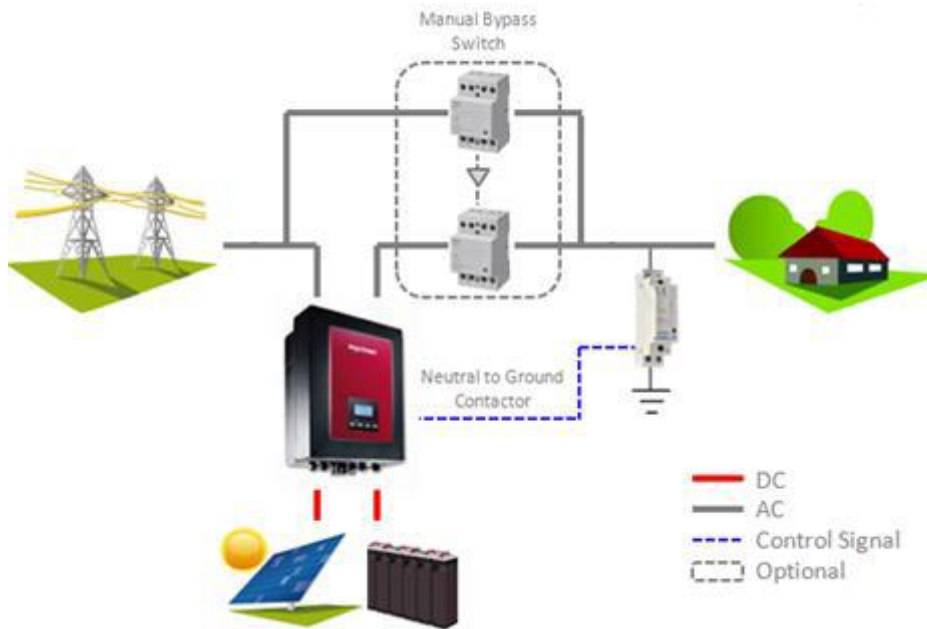
UPS (back-up) installations

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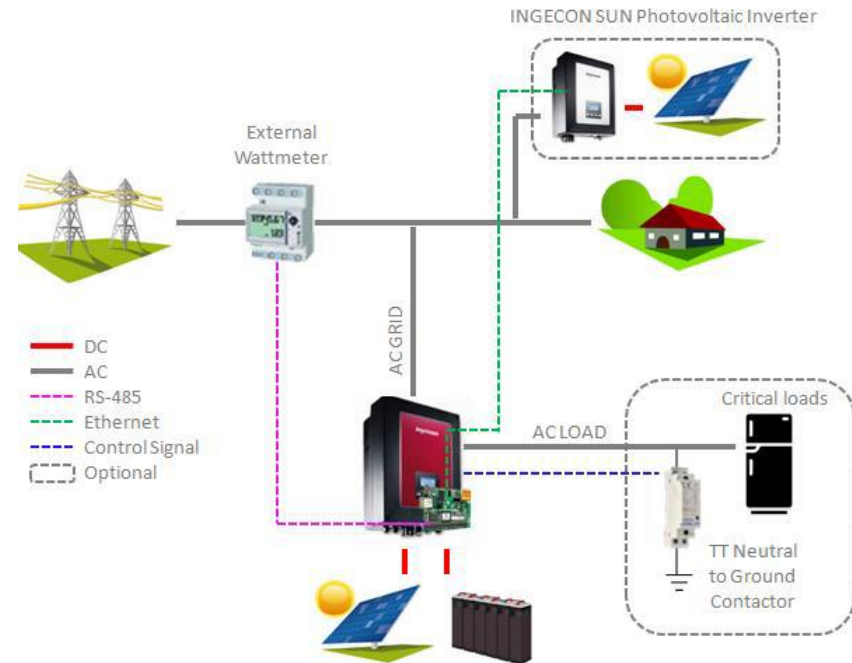


Self-consumption installations

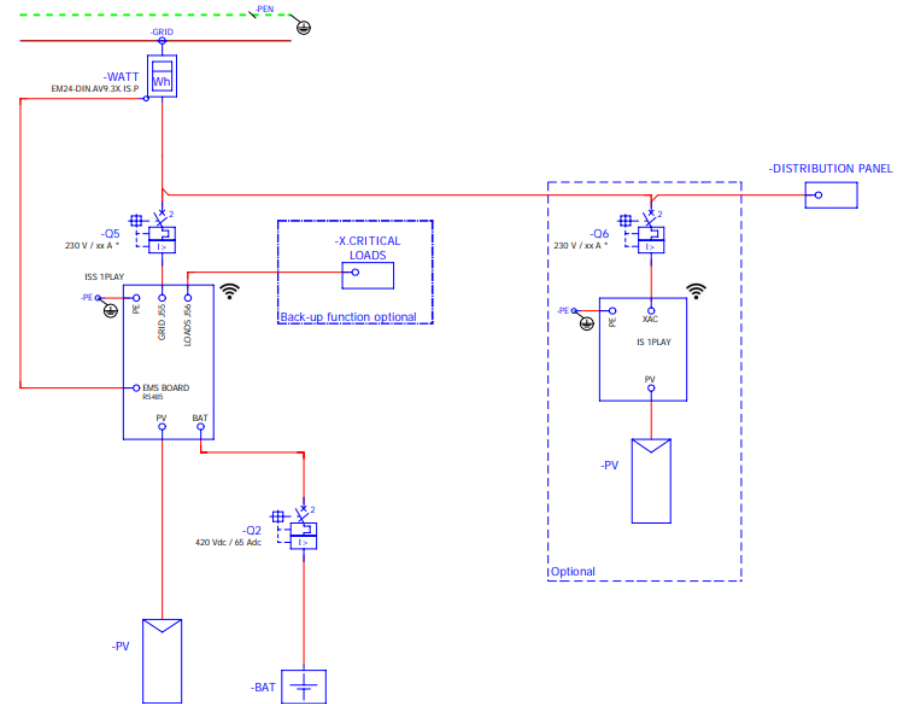
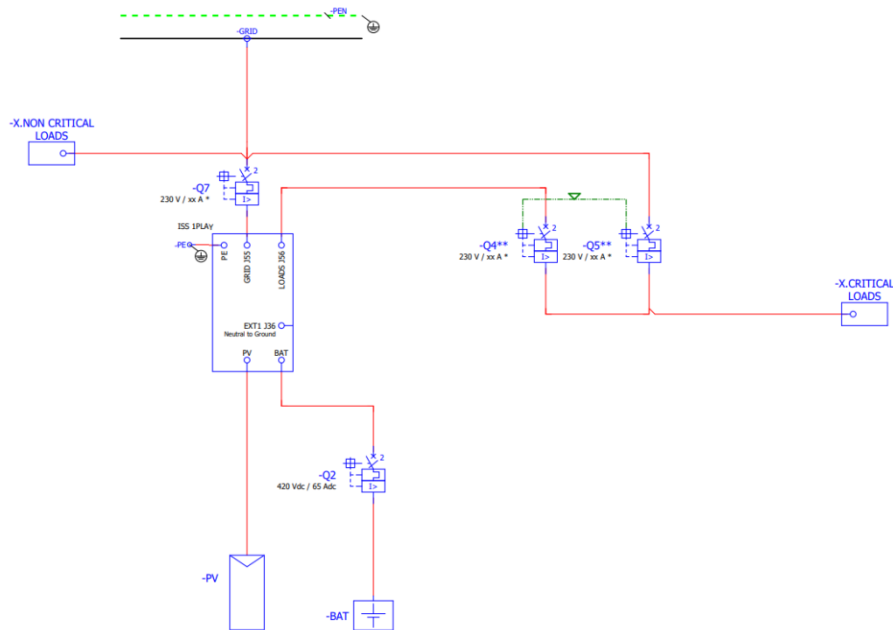
Managed by Inverter



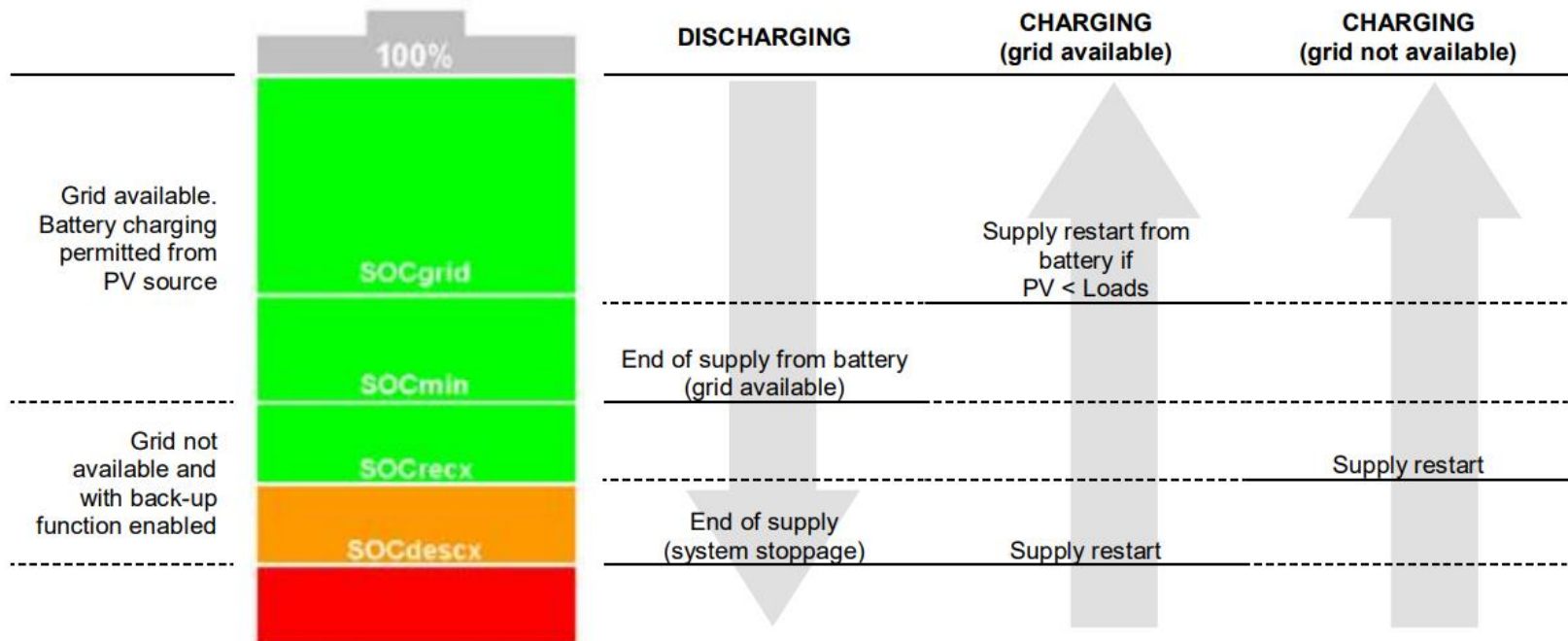
Managed by Meter



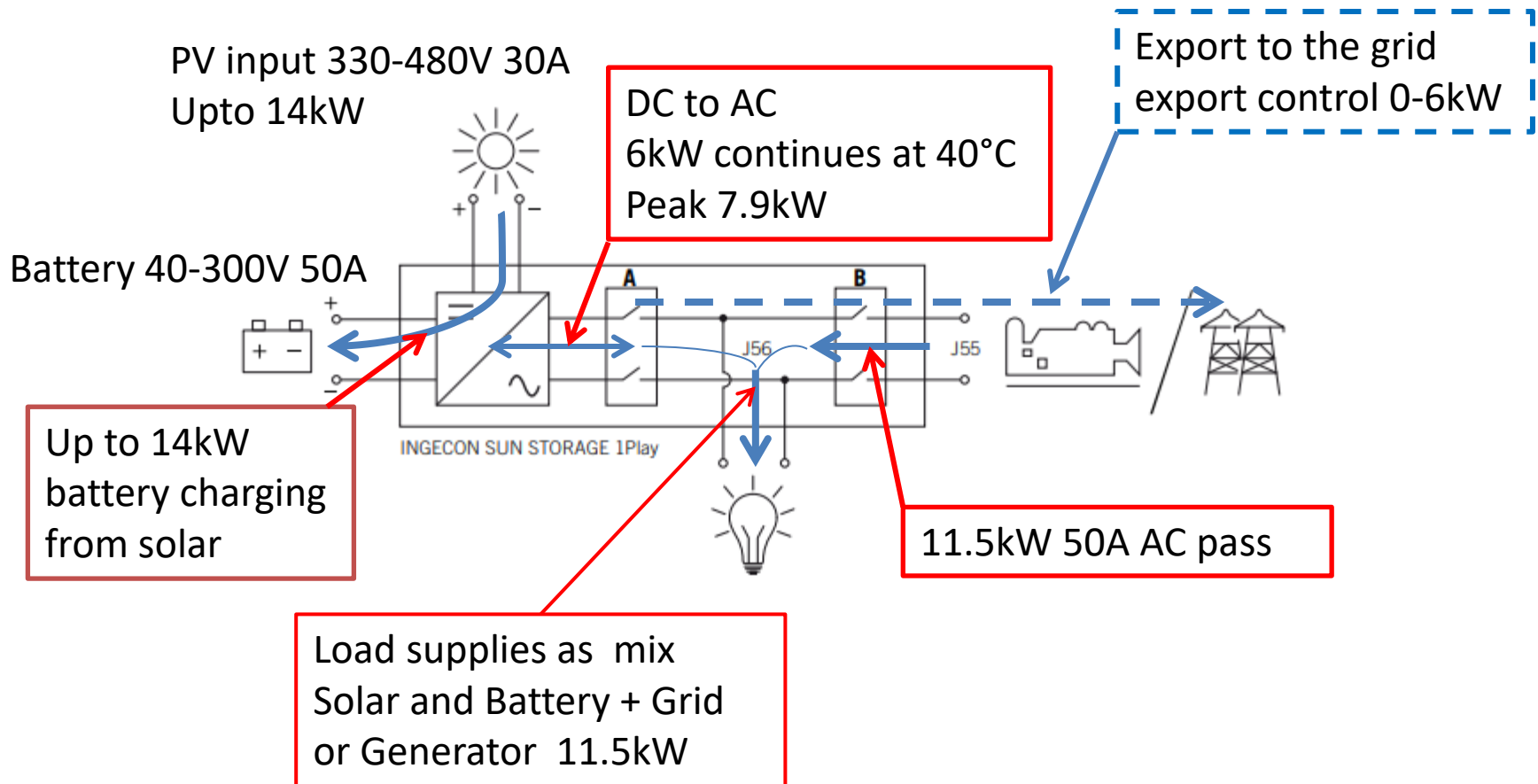
Self-consumption installations



Self-consumption installations

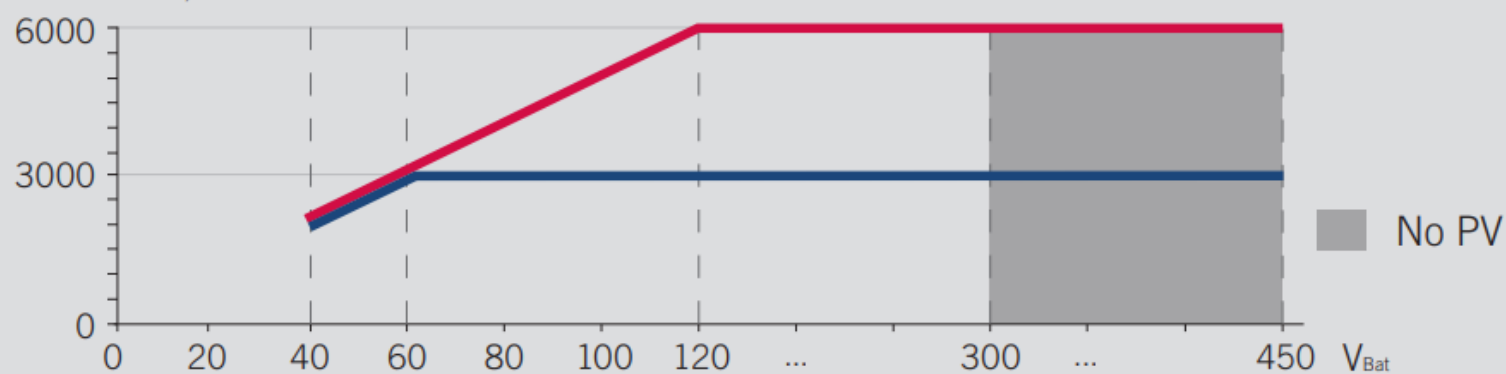


Inverter capability



Output power versus battery voltage

P_{AC} @ 40 °C, $I_{BAT}=50A$



PV input voltage range

- Voc max -550V
- Vmpp max 480V
- $V_{mpp\ min} = V_{ac} \times 1.44$

Off grid installation

$$230V_{ac} \times 1.44 = 331V_{mpp}$$

On grid installation

$$253V_{ac} \times 1.44 = 364V_{mpp}$$

2 Digital inputs

- INVERTER START/STOP
- CONNECT TO GRID
- DRMO COMMAND
- More commands can be introduced



2 Digital out puts

- GENERATOR ON/OFF
- LOW BAT. VOLTAGE
- HIGH BAT. VOLTAGE
- ON/OFF BY COM.
- CONNECTED TO GRID
- More commands can be added

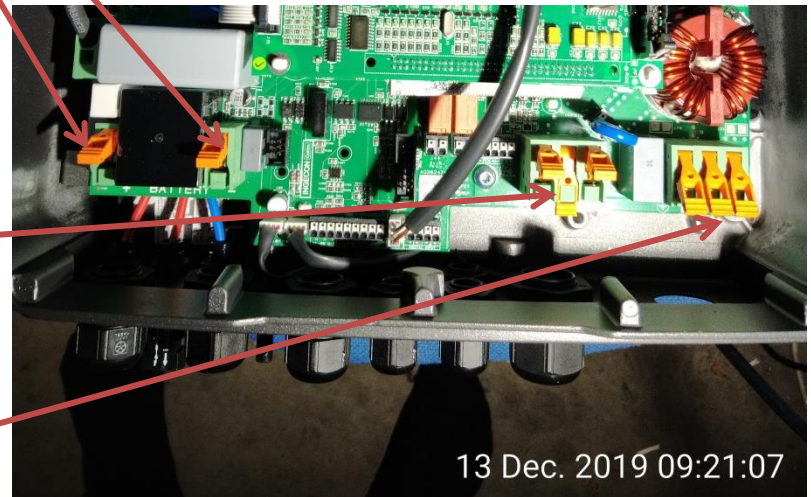


Cable connection

Battery 4-16mm cable



Loads 4-16mm cable

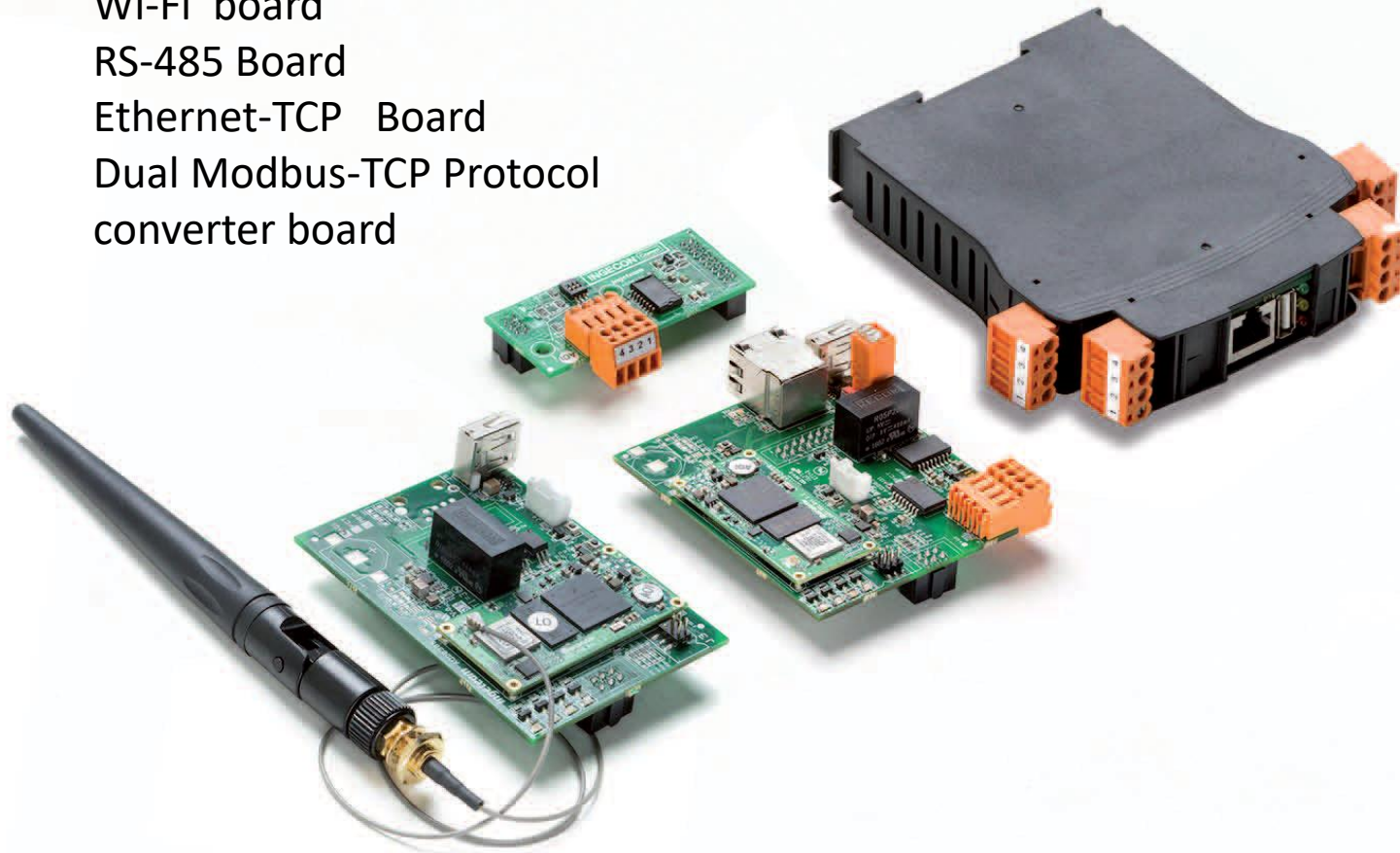


Grid/Generator 4-16mm cable

13 Dec. 2019 09:21:07

Communication hardware

Wi-Fi board
RS-485 Board
Ethernet-TCP Board
Dual Modbus-TCP Protocol
converter board



Remote access to setting

← → ↻ ⓘ Not secure | 169.254.1.1/#comms/info

Apps Platform Home Webmail - Main UP OneUp Ingeteam Device C... Ingecon - Sun plan... Land Planning Maps Onli... https://myhr.sydne... Solar Homes Package ANZ Internet

Ingeteam 11/27/2019 11:46:53 ⌚

Device Status

Serial Interface

Wi-Fi

Network Services

User Settings

Utils

Device Update

Bus Devs Update

Strategy Panel


Device status

Device ID	0AM172B16A41
FW Version	AAX1055AL
HW Type	AAX0075
IS Monitor	connected
VPN	connected
Uptime	0/0/0 5:29:9
Time Zone	Australia/Melbourne

Bus Devices

Ingeteam devices connected to the serial bus of the communication board

E10017210353
ABH1002AA



IS Storage 1Play
RS485 1
PAC: 2.208 kW

Inverter settings menu

Inverter settings

← → ↻ ⓘ Not secure | 169.254.1.1/#localinverters/config?id=1&canid=-1

Apps Platform Home Webmail - Main OneUp Ingeteam Device C... Ingecon - Sun plan... Planning Maps Onlin... https://myhr.sydney... Solar Homes Package ANZ Internet Banki... Gmail - Inbox - fiv... Passwords Account Manager » Other bookmarks

Ingeteam 11/27/2019 11:54:32 Basic ▾

Main Monitor Configuration Graph

Config Commands

Last update: 11:54:09 [Read](#) [Write](#) [Export CSV](#)

Categories

search for... [search](#)

- 1- DC BATTERY TYPE
 - 1.1- Lead-Acid Battery Settings
- 2- AC INSTALLATION TYPE
- 3- GENERATOR SETTINGS
- 4- GRID SETTINGS
 - 4.1- Connection and Reconnection
- 5- NETWORK QUALITY SERVICES
 - 5.1- Pac vs OverFac Algorithm
 - 5.2- Pac vs UnderFac Algorithm
 - 5.3- Pac vs OverVac Algorithm
 - 5.5- Qac vs Vac Algorithm
 - 5.6- CosPhi vs Pac Algorithm
 - 5.7- LVRT and HVRT
- 6- OPERATION MODE
- 7- DIGITAL OUTPUT / INPUT
- 8- OTHER SETTINGS
 - 8.1- Communication Settings

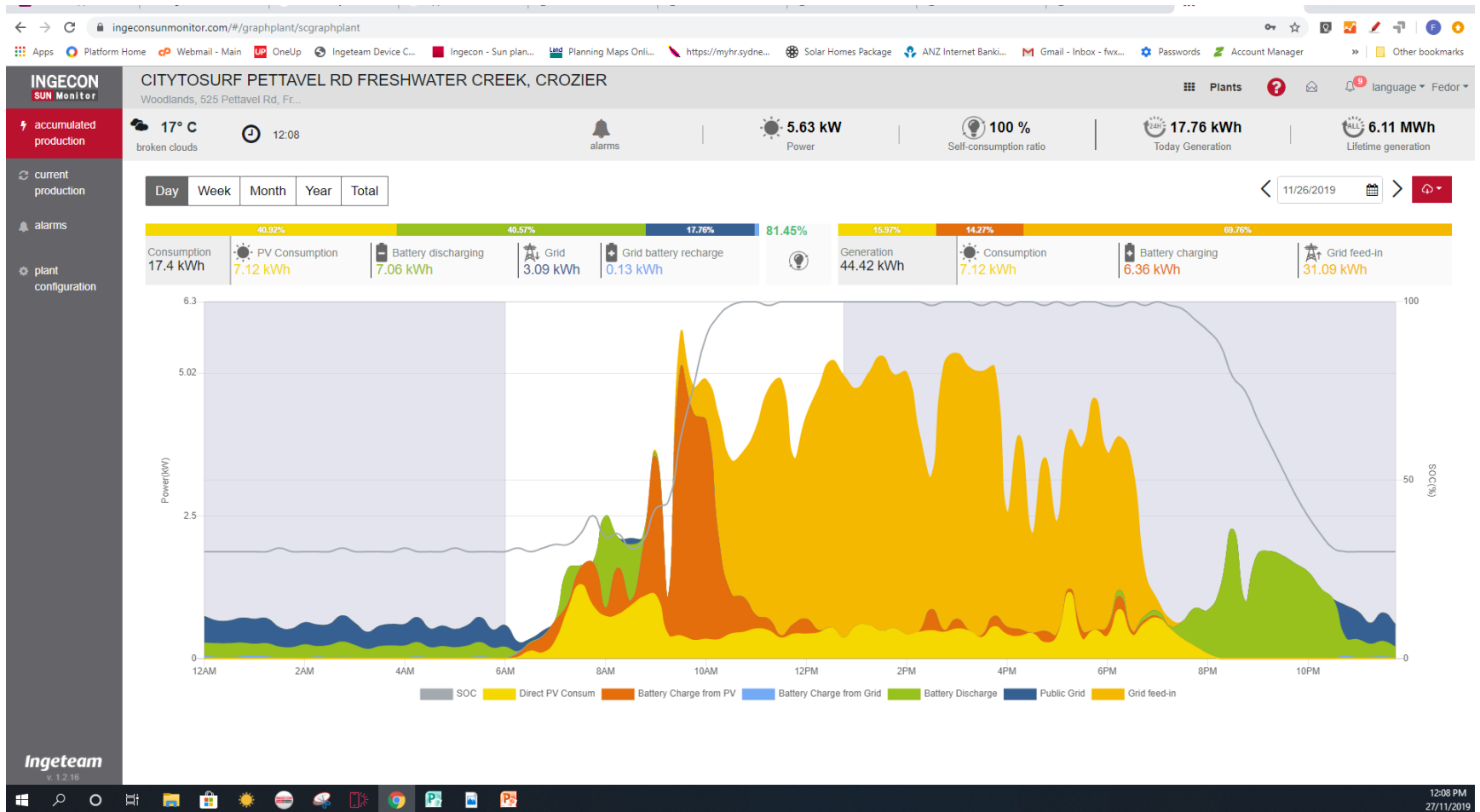
Name	Value
Type of Battery	NO CONFIGURATION ▾
CAN Baud Rate for BMS	500 kb/s

E10017210353
ABH1002AA
IS Storage 1Play
RS485 1

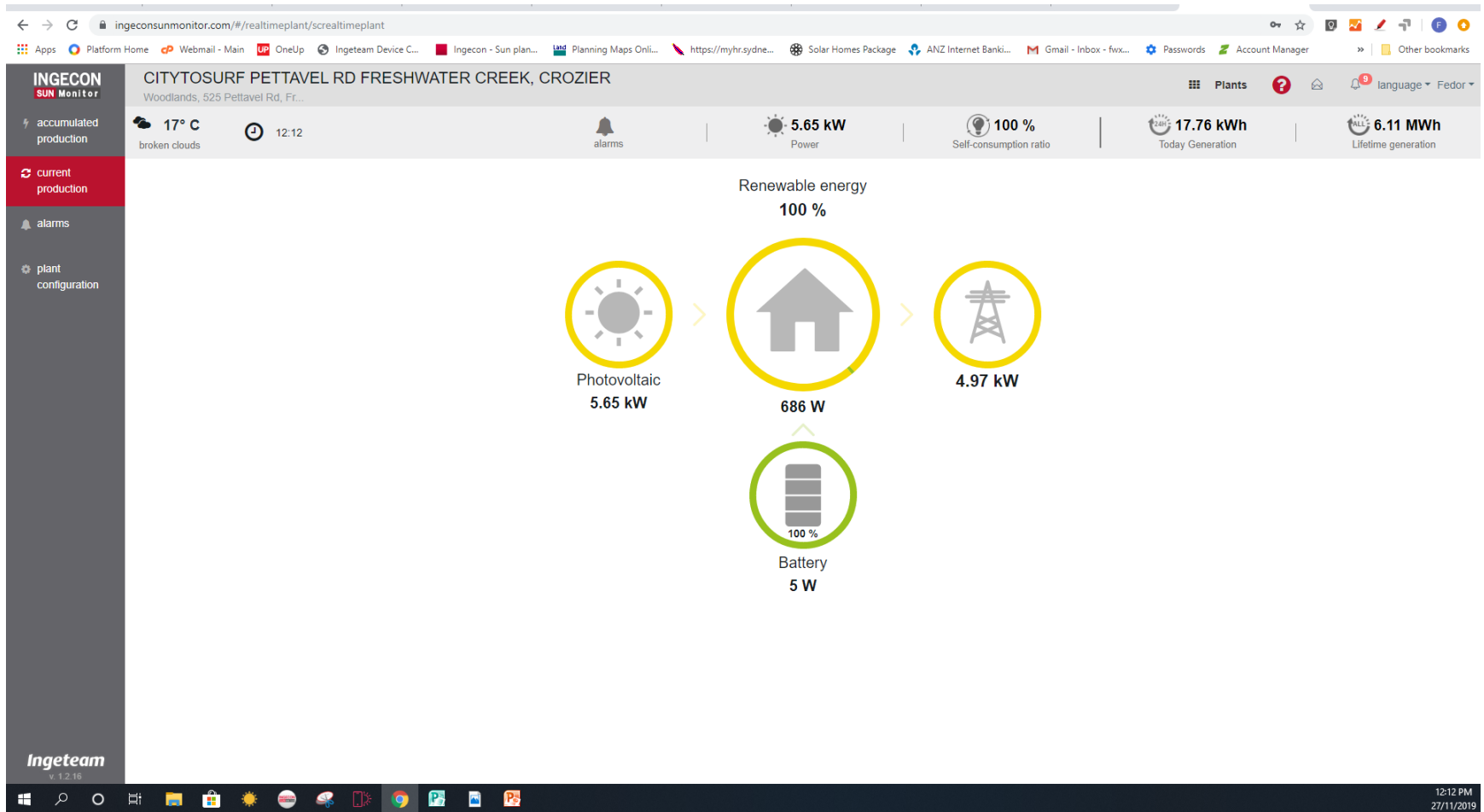
Register on **INGECON**
SUN Monitor

11:54 AM
27/11/2019

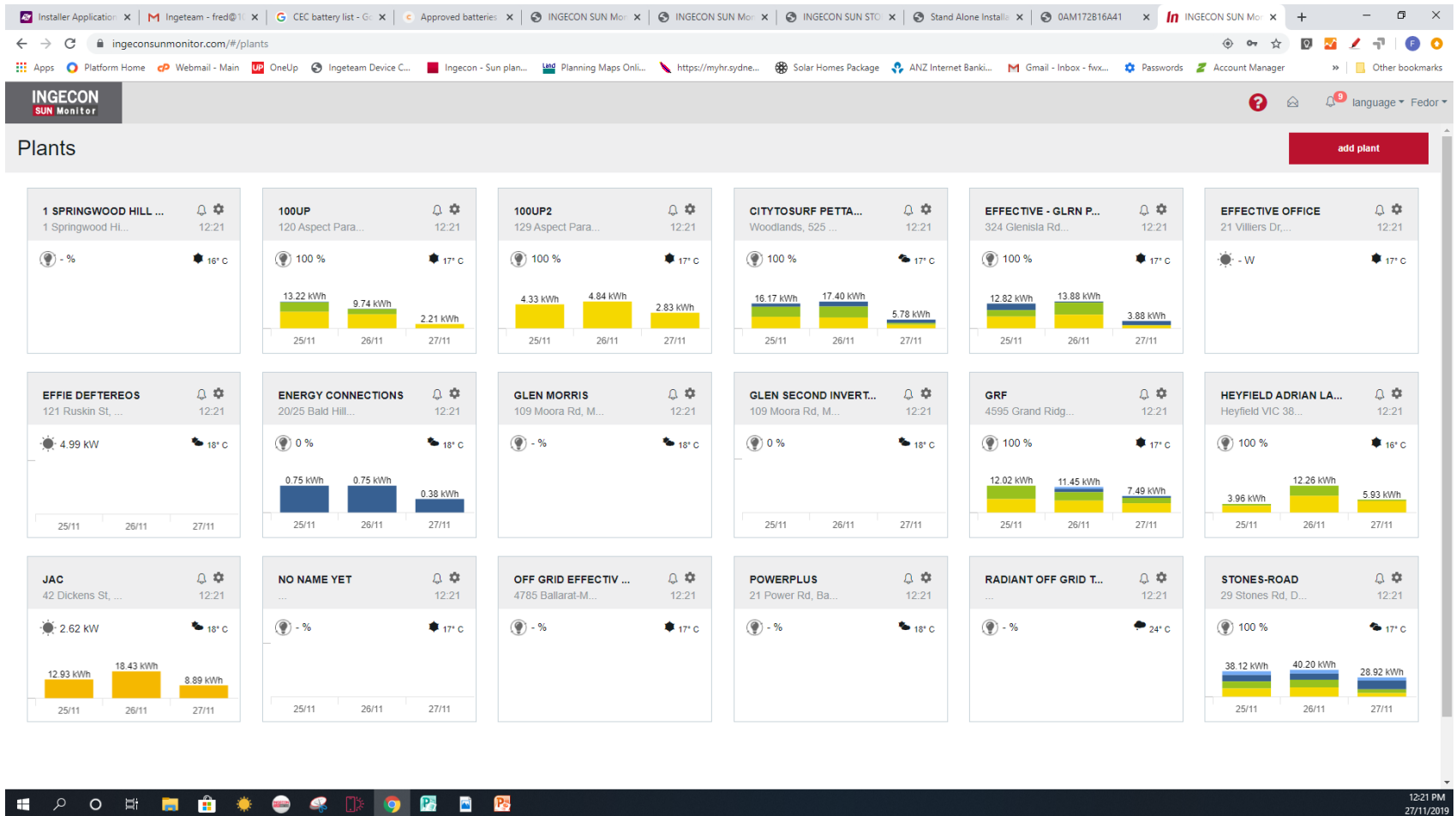
INGECON SUN Monitor



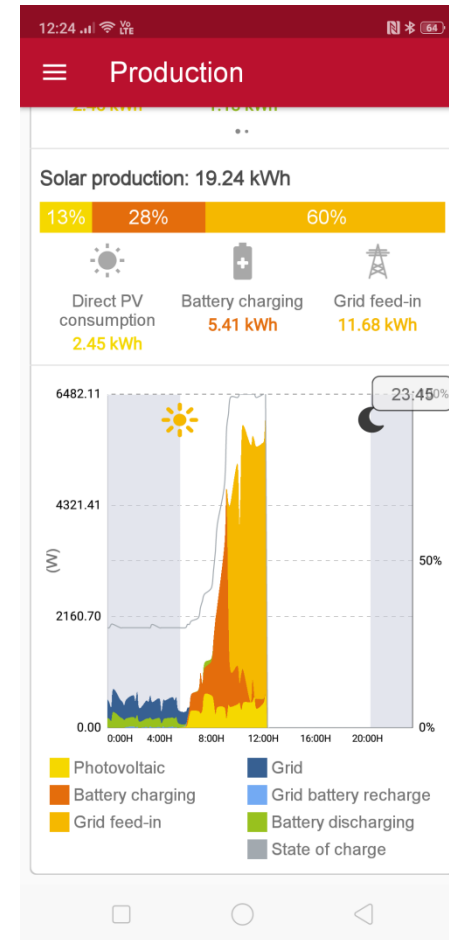
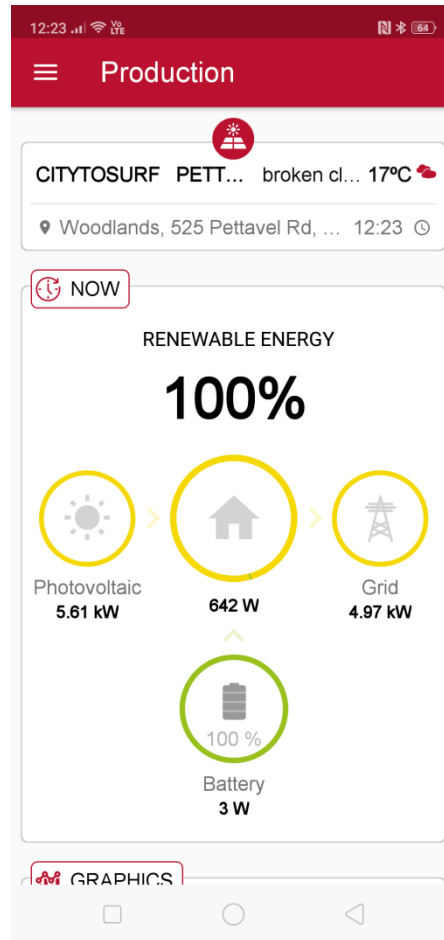
INGECON SUN Monitor



INGECON SUN Monitor



INGECON SUN Monitor mobile APP



Video material

INGECON SUN Monitor

WEBINARS Anytime Anywhere

Welcome to **Webinars Anytime, Anywhere**. We hope you enjoy the course.



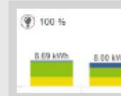
REGISTRATION on the web platform.
Duration: 1 minute and 56 seconds.



USER MENU. Profile and configuration.
Duration: 1 minute and 42 seconds.



PHOTOVOLTAIC GENERATION PLANT REGISTRATION.
Duration: 4 minutes and 42 seconds.



SELF-CONSUMPTION PLANT REGISTRATION.
Duration: 1 minute and 36 seconds.



NAVIGATION within the web interface.
Duration: 6 minutes and 49 seconds.



PLANT CONFIGURATION for photovoltaic and self-consumption plants.
Duration: 6 minutes and 30 seconds.



MOBILE APPLICATION for Android and iOS.
Duration: 9 minutes and 19 seconds.


Video material

[HOME](#) [COURSES](#) [CLIENT AREA](#)


INGECON SUN Manager

WEBINARS Anytime Anywhere


Welcome to **Webinars Anytime, Anywhere**. We hope you enjoy the course.




INTRODUCTION. Downloading, installing and help menu.
Duration: 2 minutes and 35 seconds.



PLANTS. Creating plants and utils menu.
Duration: 7 minutes and 23 seconds.



INVERTERS. Adding INGECON SUN units.
Duration: 4 minutes and 40 seconds.



MENUS. Settings, Online, Reading, Data list, Graphs, Full screen, Help, Utils & Tools.
Duration: 9 minutes and 26 seconds.

Video material

INGECON SUN Planner v2.0

WEBINARS Anytime Anywhere

Welcome to **Webinars Anytime, Anywhere**. We hope you enjoy the course.

SHORT VERSION:



SHORT VERSION. Learn how to use INGECON SUN PLANNER in a quick and simple way.
Duration: 5 minutes and 41 seconds.

EXTENDED VERSION:



INTRODUCTION. Why INGECON SUN Planner?
Duration: 1 minute and 23 seconds.



ACCESS. Registration, program access, menus and projects.
Duration: 5 minutes and 19 seconds.



INVERTER AND PV MODULE SELECTION to set your projects up.
Duration: 3 minutes and 38 seconds.



RESULTS. Presentation of results and analysis.
Duration: 5 minutes and 13 seconds.



ADVANCED OPTIONS to customize your projects.
Duration: 4 minutes and 04 seconds.


INGECON sun Planner designer tool





















Ingeteam

INGECON SUN Planner

[Projects](#)
[Support](#)
[User configuration](#)
[\[Logout \]](#)
[Language](#)

Project edition



 New project

Date	Title	Delete	PDF
2019/11/24 23:52	Maxeon 400		
2019/11/22 00:27	Risen RMS144 405		
2019/11/11 05:20	Seraphim SRP-330-BMB		
2019/11/13 23:56	Q Cells DUO-G5 330		
2019/10/01 04:00	Longi 72cells 355-380		
2019/09/16 09:08	REC N-Peak 320w		
2019/09/19 12:56	LG NEON 350		
2019/11/07 04:49	TrinaSmart 305		
2019/09/07 03:44	Jinko315		
2019/09/06 02:20	Seraphim SRP 300-315		

[Old projects \(Projects that are created before 2013-07-23\)](#)

1 2

PowerCube-X1

Battery System kit for INGETEAM	CEC listing name	Description	
PowerCube-X1-48/192V-9.6kWh 90%DOD	PowerCube-X1-48/192V	BMS SC0500-100S 4 x Battery Modules H48050 X1 Rack or IP55 Cabinet	
PowerCube-X1-48/240V -12kWh 90%DOD	PowerCube-X1-48/240V	BMS SC0500-100S 5 x Battery Modules H48050 X1 Rack or IP55 cabinet	

High voltage battery system components



Battery H48050 2.4kWh



SC0500-100S Main controller

Parallel battery bank



Off grid system



Charge discharge VS temperature

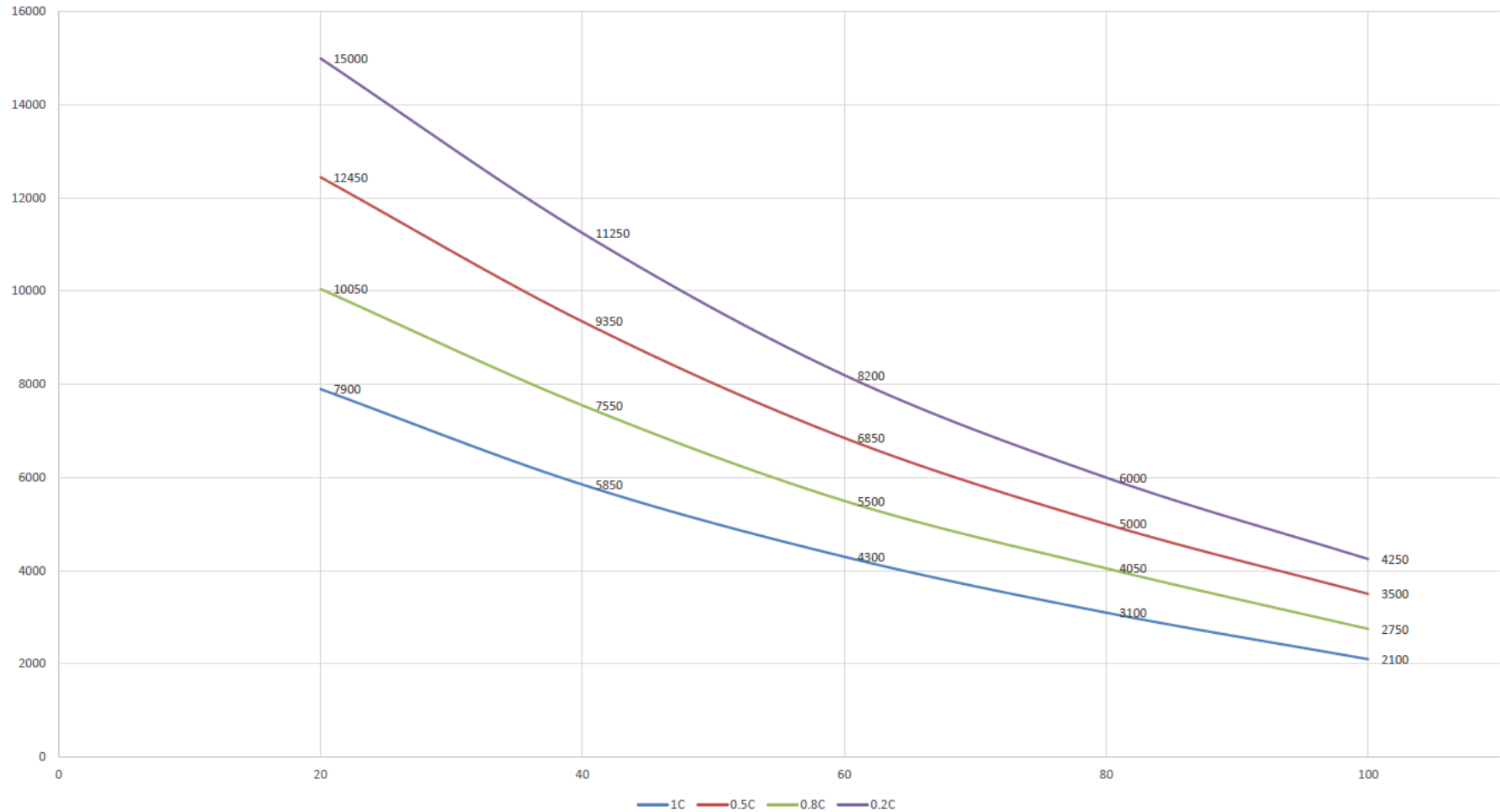
	Cell temperate	Current (c rate)	
status	°C	Charge	Discharge
High temp 2	50	0.05	0
recover	45		
Hi temp 1	45	0.2	0.2
recover	40		
normal		0.5	0.5
Low temp 1	10	0.2	0.5
Recover	12		
Low temp 2	0	0.05	0.1
Recover 2	2		
Low temp 2	-10	0.05	0
Recover 2	-8		

BYD HV battery charge vs temperature

BYD HV battery charge vs temperature

	Cell Temperature	Charge Limit Current
1	<-10°C	0
2	-10°C~0°C	0.2C
3	0°C~10°C	0.5C
4	10~50°C	0.8C
5	>=50°C	0

Cycle Life VS DOD @Varying C-rate



36 Panels - No generator winter

< Jul/2019 >  

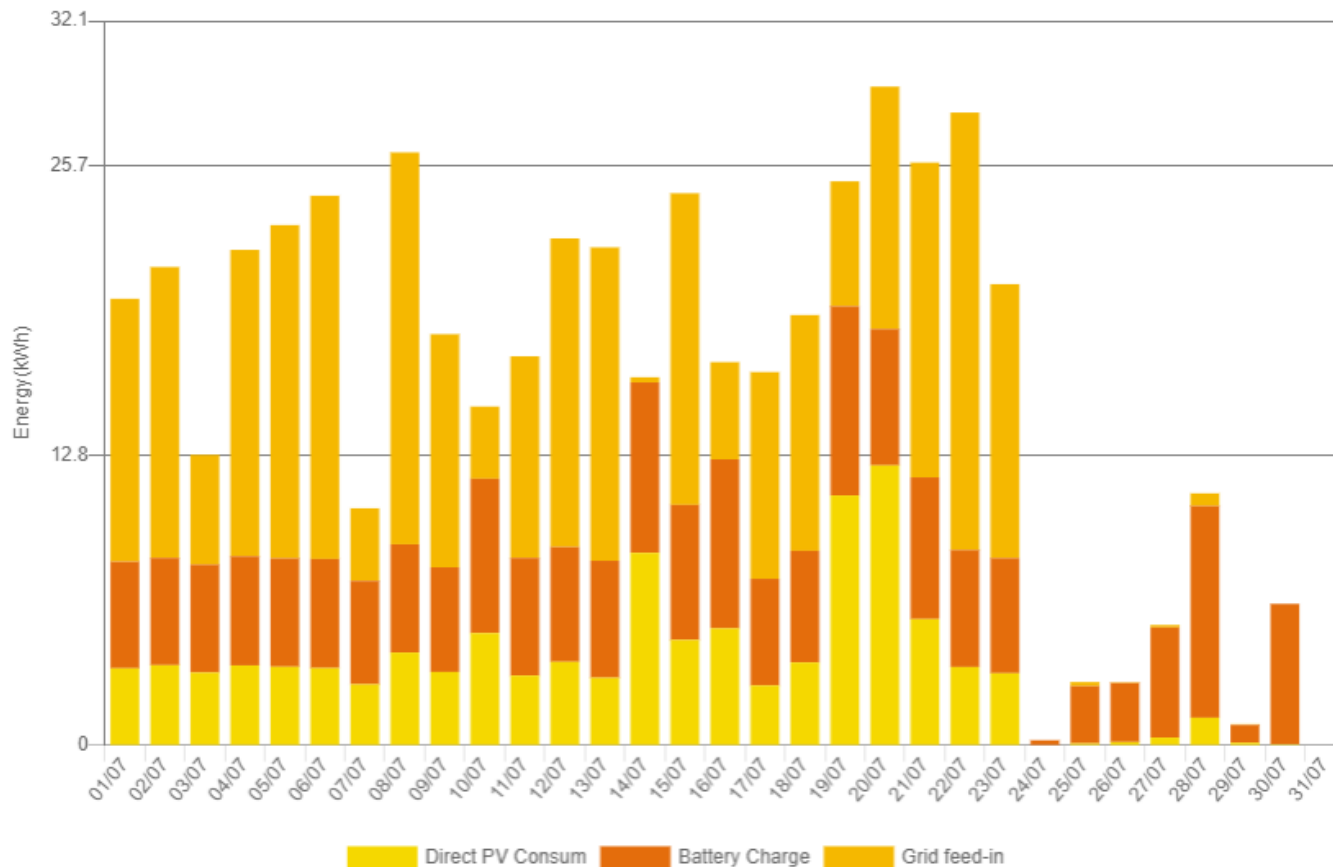
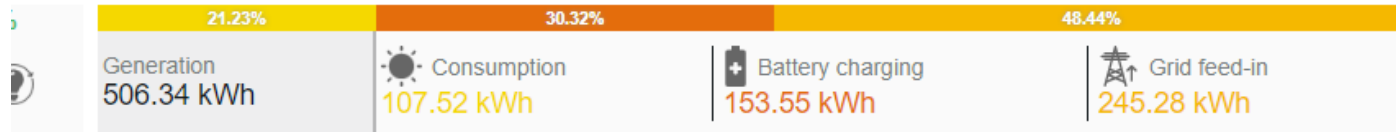


Table 17 Typical electricity use of Victoria households by size, swimming pool and gas connection – kWh per annum

Season	Household size (persons)				
	1	2	3	4	5
	kWh	kWh	kWh	kWh	kWh
Neither gas nor pool					
Summer	841	1364	1509	1085	1897
Autumn	1066	1416	1753	1602	2485
Winter	1494	1828	2508	1661	2402
Spring	1054	1281	1609	1278	2977
Gas but no pool					
Summer	671	987	977	1231	1449
Autumn	477	989	840	866	1103
Winter	858	1158	1293	1508	1776
Spring	635	892	941	1140	1378
Pool but no gas					
Summer	1792	2315	2460	2036	2847
Autumn	1878	2228	2565	2414	3298
Winter	2135	2470	3150	2302	3043
Spring	1819	2046	2374	2043	3742
Both pool and gas					
Summer	1622	1938	1927	2182	2399
Autumn	1296	1801	1653	1679	1915
Winter	1499	1799	1934	2150	2418
Spring	1400	1657	1706	1905	2143
No pool and no control for gas					
Summer	702	1045	1098	1222	1472
Autumn	767	1098	1235	1401	1730
Winter	973	1260	1568	1523	1810
Spring	710	952	1093	1153	1453
Pool and no control for gas					
Summer	1630	1972	2025	2150	2399
Autumn	1556	1886	2023	2189	2518
Winter	1574	1861	2169	2124	2411
Spring	1442	1683	1825	1884	2184

Source: ACIL Allen Consulting

36PV 2x12kWh

Approx. price \$32k

36PV 12kWh

Approx. price \$25k

Two inverters

www.100up.com.au

