'POWER TO THE PEOPLE'

Solar PV – Grid connection- ecomonics in FARMING

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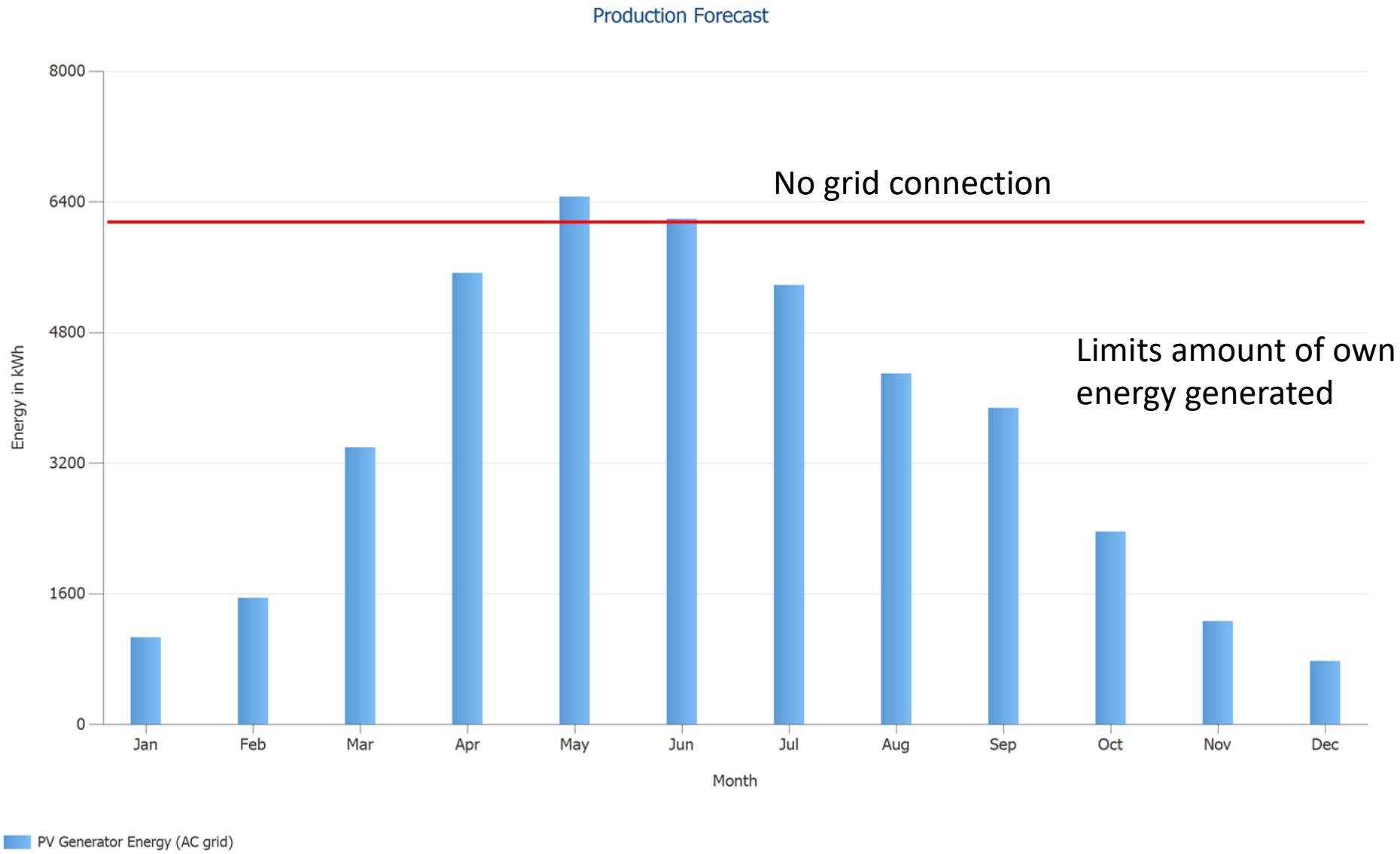
- Solar PV panels generates electricity DC from daylight and inverter coverts generation to AC for use either for self consumption or for export to the grid. The generation is predicable within 2% annually and as no moving parts maintenance issues are low and reliability high.

- Grants of up to 40-60% can be secured , Vat refundable and 100% ACA in year 1 . Paybacks depending on the electricity price, system cost and generation vary from between 3 and 6 years. A turnkey solution is provided by Local Power.

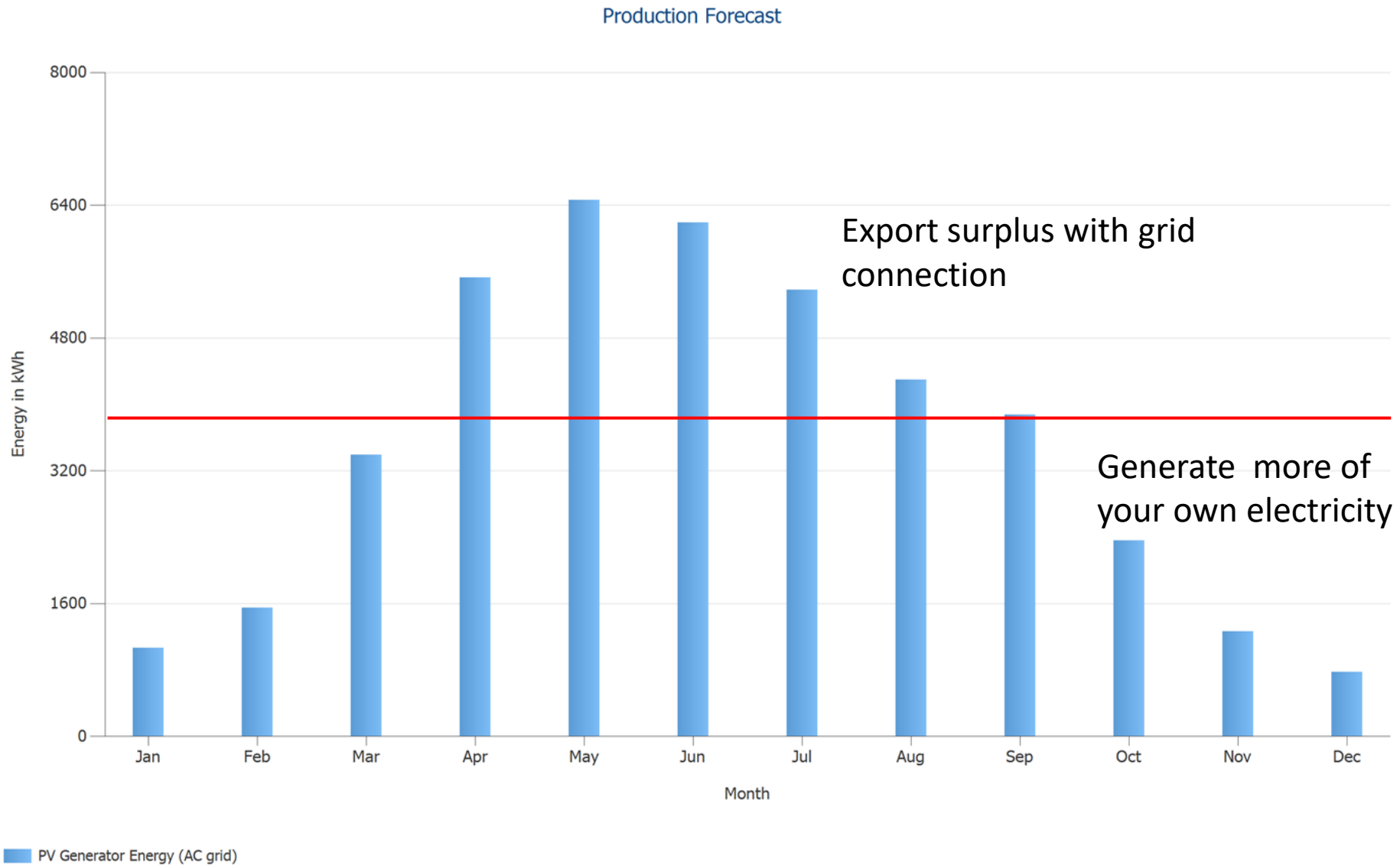
-New developments in 2022 include a premium payment for any surplus generation exported to the grid (will be limits), new planning exclusions for roof top solar PV (currently required for some grant applications) and changes to esb network requirements reducing the complexities and cost of installations up to 50kwp and offering more flexibility

-Battery storage is still on the expensive side but will have a significant roll to play in levelling peaks and buffering between usage and generation to ensure self consumption optimized going forward

Example of a monthly production forecast



Example of a monthly production forecast



solarweb sign in - Search

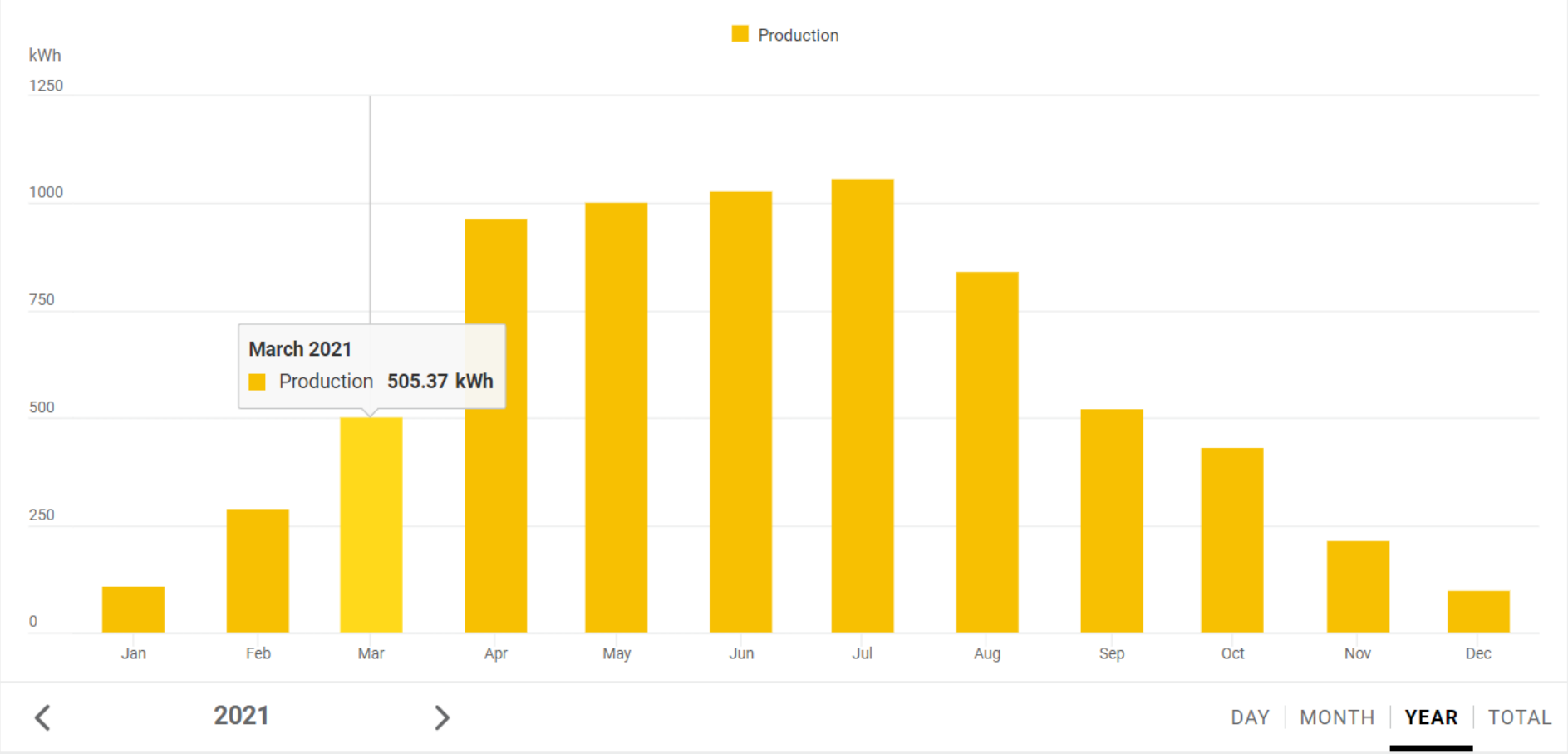
Energy balance

https://www.solarweb.com/Chart/Chart?pvSystemId=e7fd157b-c332-4d14-baff-67d45945ef38

Amazon | Booking.com | Acer | Other favourites

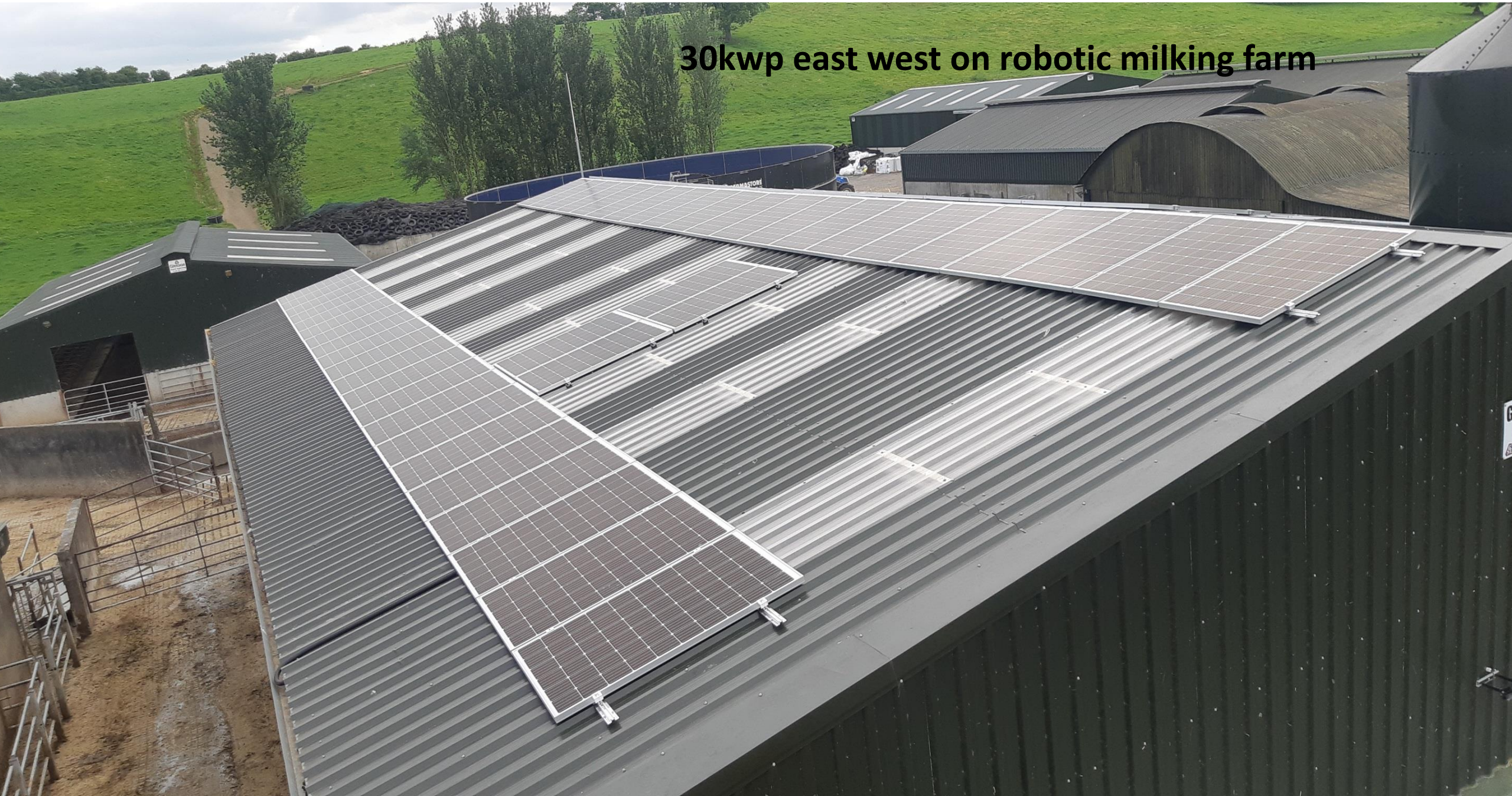
Fronius | Mel Lennon | Product registration | 10+

PRODUCTION | CONSUMPTION | RETURN ON INVESTMENT PREMIUM | EXPENSE PREMIUM | 7.09 MWh



9°C
Mostly sunny

10:10
17/03/2022


30kwp east west on robotic milking farm

solarweb sign in - Search | Energy balance

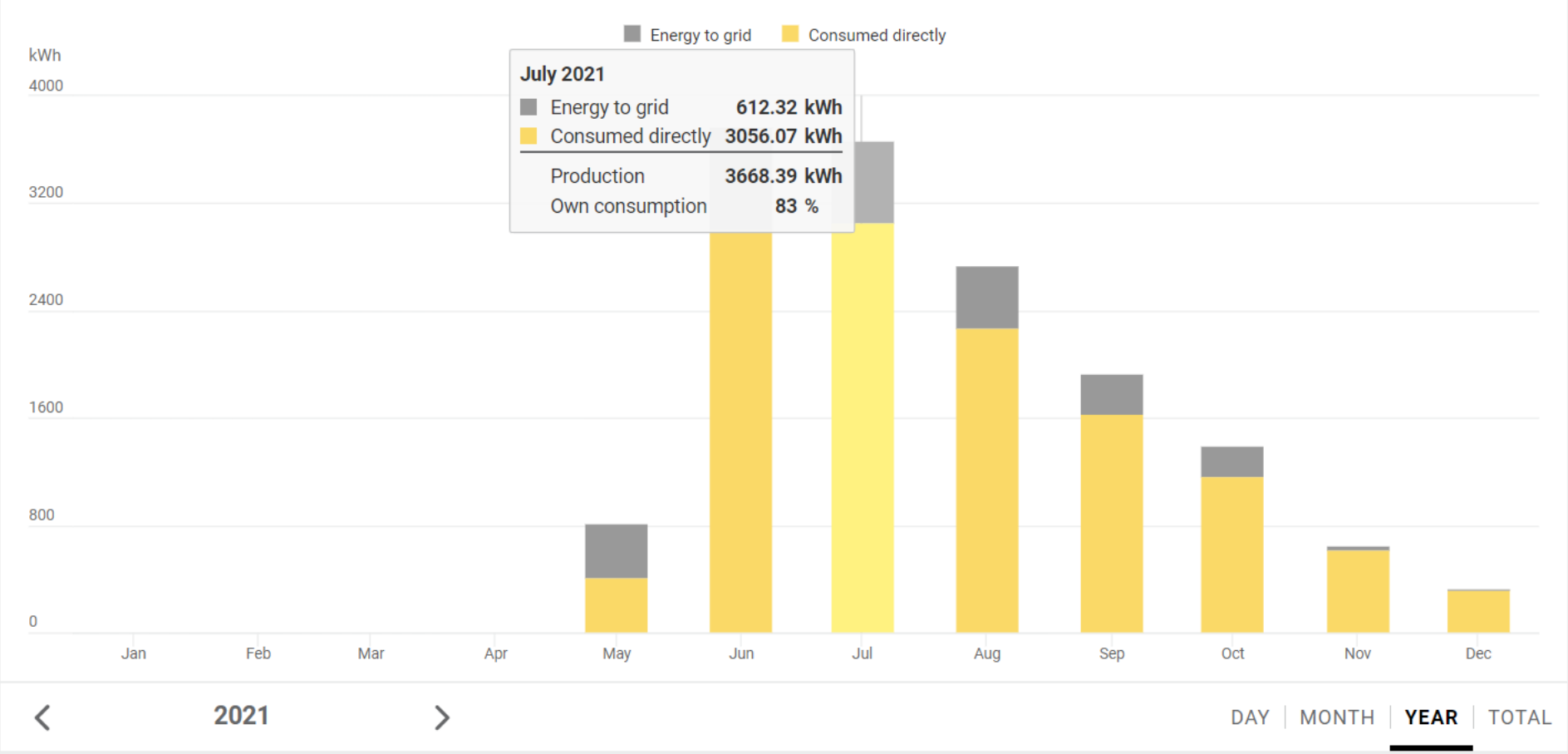
https://www.solarweb.com/Chart/Chart?pvSystemId=bf376e74-46bb-46d6-9380-58e150fd9882

Amazon | Booking.com | Acer | Other favourites

Fronius | Enda Horgan | Product registration | 10+

PRODUCTION | CONSUMPTION | RETURN ON INVESTMENT PREMIUM | EXPENSE PREMIUM

15.31 MWh



9°C Partly sunny

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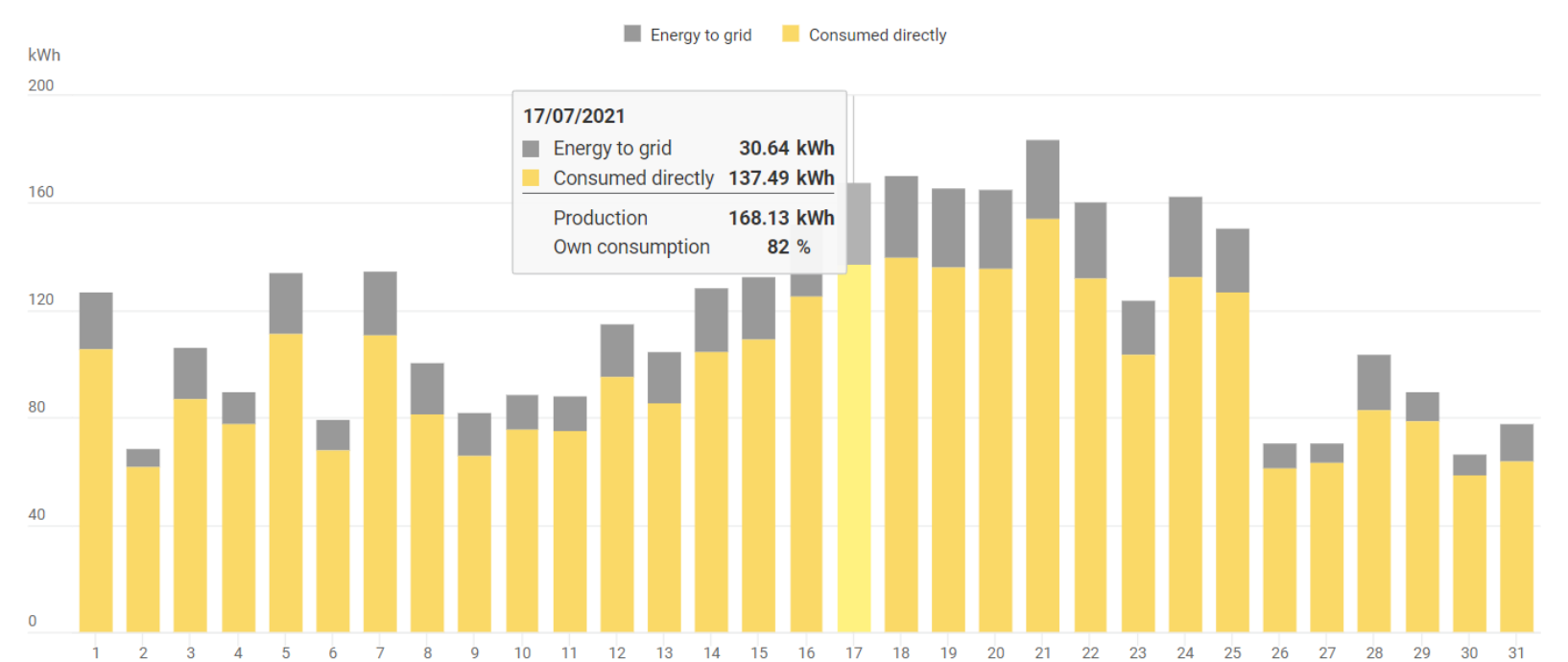
Amazon | Booking.com | Acer | Other favourites

Fronius | Enda Horgan | Product registration | 10+

PRODUCTION | CONSUMPTION | RETURN ON INVESTMENT PREMIUM | EXPENSE PREMIUM | 3,668.39 kWh



July 2021

DAY | MONTH | YEAR | TOTAL

9°C Mostly sunny

10:02 17/03/2022

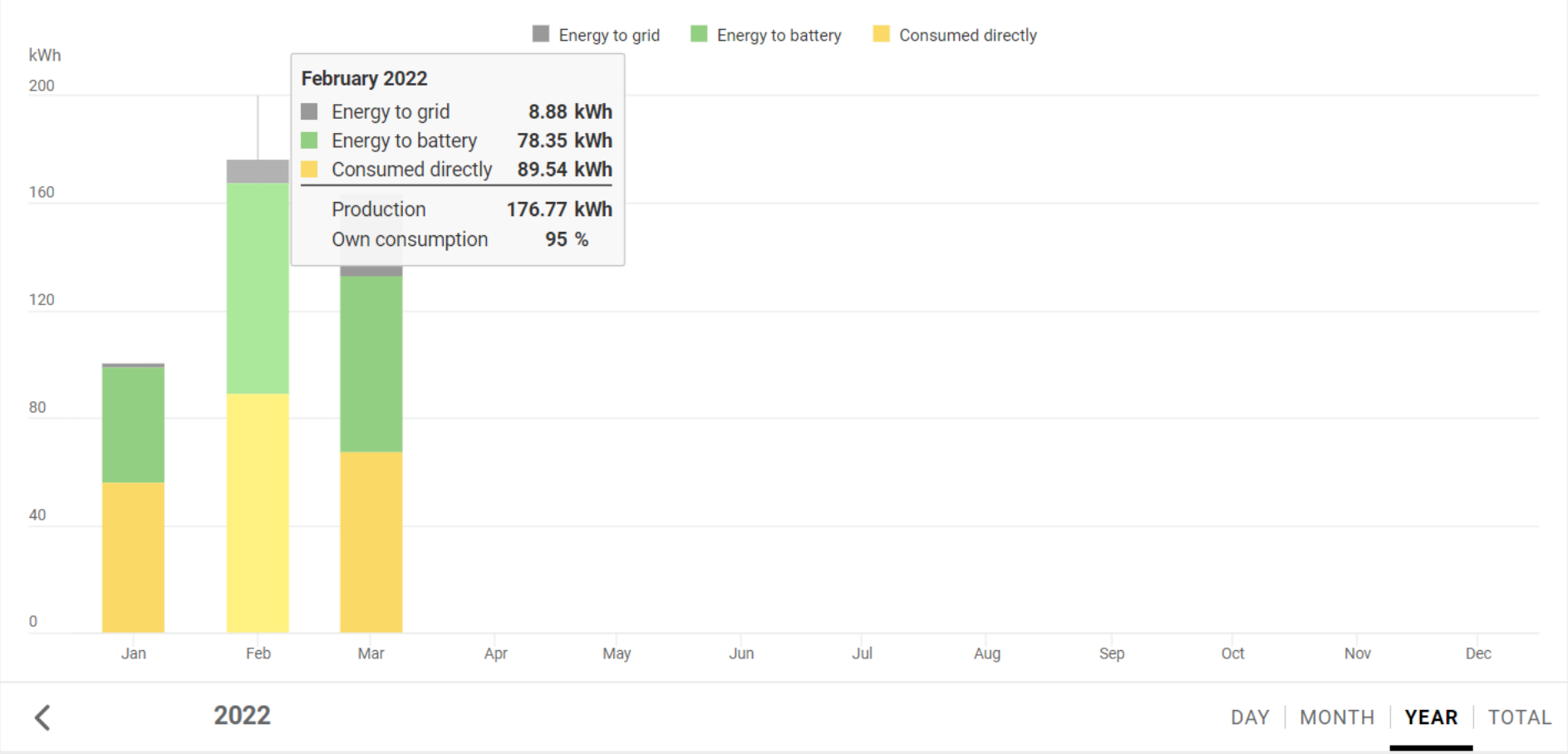
solarweb sign in - Search | Energy balance

https://www.solarweb.com/Chart/Chart?pvSystemId=095ceab0-33e2-4471-9097-a6db3b432054

Amazon | Booking.com | Acer | Other favourites

Fronius | Michael Burke | Product registration | 10+

PRODUCTION | CONSUMPTION | RETURN ON INVESTMENT PREMIUM | EXPENSE PREMIUM | 441.33 kWh



9°C Mostly sunny

10:15 17/03/2022

Battery storage is a very useful technology to buffer between generation and energy usage as an aid to optimising self consumption in homes and farms

Battery storage technology is still expensive relatively speaking but costs are dropping and the technology will pay an increasing role in optimising the use of renewable energy and in helping businesses minimise their energy costs.

Anyone buying a battery system needs to check out warranties, charge to discharge ratios, efficiencies, safety etc.


130kwp install Wexford Pig Producer

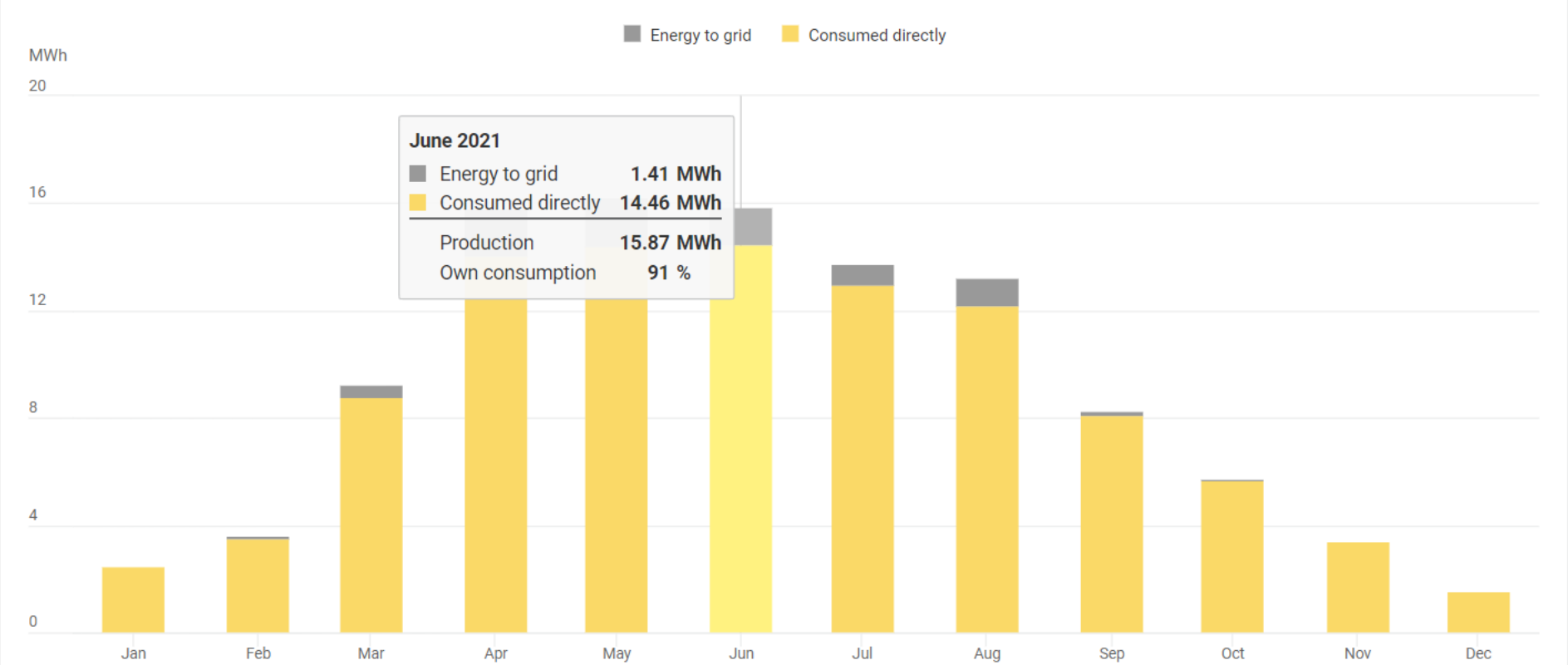
solarweb sign in - Search | Energy balance

https://www.solarweb.com/Chart/Chart?pvSystemId=613bb6c0-ec07-449c-838d-40d740d377a7

Amazon | Booking.com | Acer | Other favourites

Fronius | Joe Healy. Wexford Pig. | Product registration | 10+

PRODUCTION | CONSUMPTION | RETURN ON INVESTMENT PREMIUM | EXPENSE PREMIUM | 109.26 MWh



2021

DAY | MONTH | YEAR | TOTAL

9°C Mostly sunny

10:06 17/03/2022


30 kWp solar install on horticultural Farm in Waterford


15 kwp flat roof system on hort farm Cork


Solar PV system install on large potato operation


60kwp on Horticultural farm in Meath

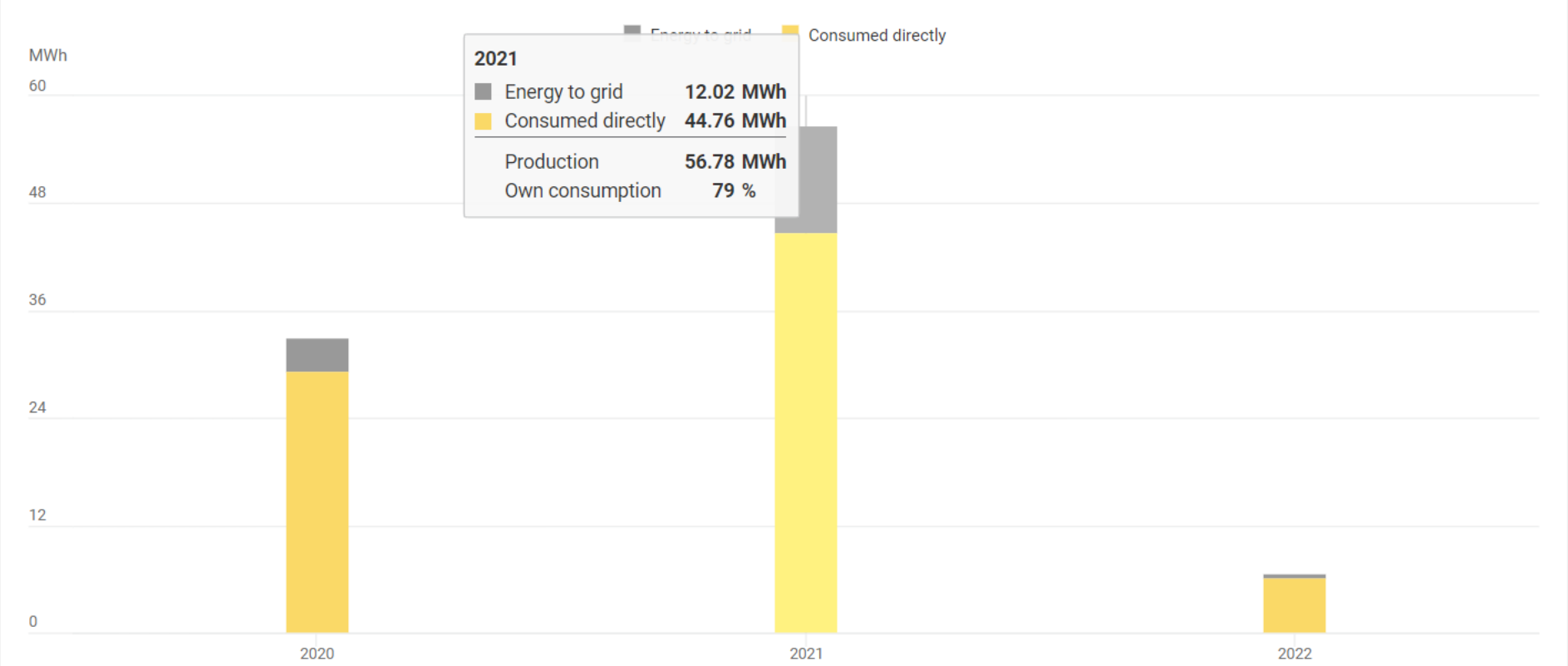
solarweb sign in - Search | Energy balance

https://www.solarweb.com/Chart/Chart?pvSystemId=5a347e21-63f1-43e6-a2b0-19616ef3a3d0

Amazon | Booking.com | Acer | Other favourites

Fronius | Elmgrove Farm | Product registration | 10+

PRODUCTION | CONSUMPTION | RETURN ON INVESTMENT PREMIUM | EXPENSE PREMIUM | 96.55 MWh



DAY | MONTH | YEAR | TOTAL

9°C Mostly sunny

10:08 17/03/2022


Monaghan 50kwp system on poultry farm

Dashboard – EnergyManager Po

https://desktop.energymanager.com/#/dashboard

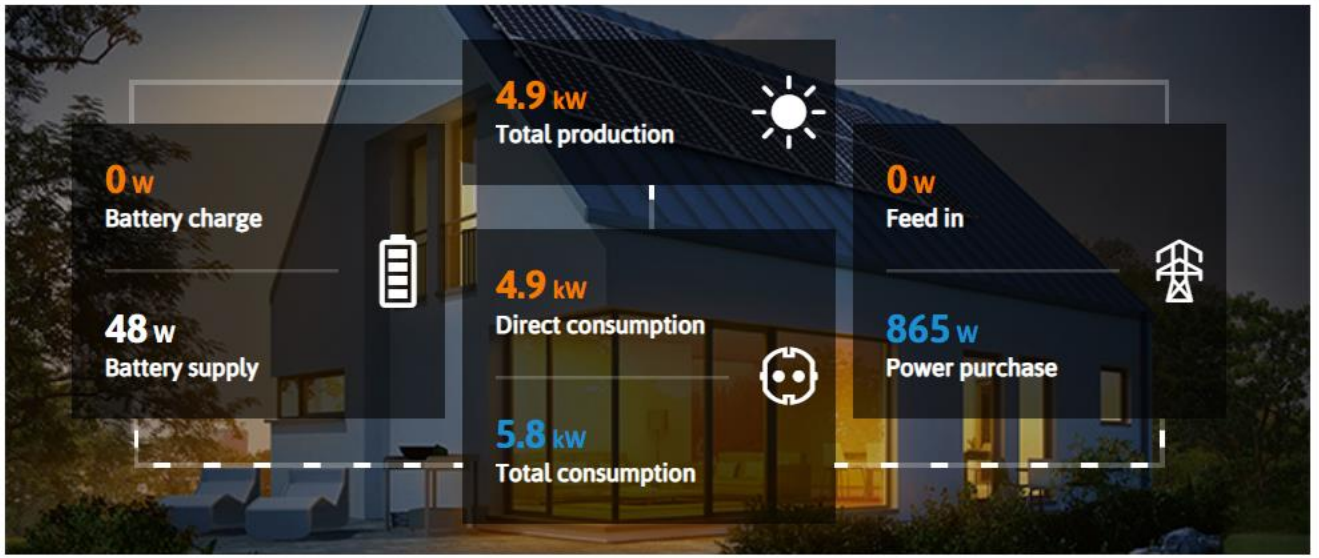
Amazon | Booking.com | Acer | Other favourites

ENERGYMANAGER PORTAL

Pat Smith | (1) | EN | Status

Applications

Devices



Independence

51 %

Ø 43 %

of the total consumption covered by solar energy

Self use

99 %

Ø 92 %

self use of the generated solar energy

Feedback

News

14/03/2022

SOLARWATT Manager portal Wartung am 18.03.2021

03/03/2022

300 € für Ihr Elektroauto ++ Jetzt

Energy

Total consumption

17.5 kWh

Today

Fr Sa Su Mo Tu We Th

MyReserve

Battery state

1 %

Current

Standby

Photovoltaic

Forecast

9°C
Mostly sunny

10:16
17/03/2022

PHOTOVOLTAIC

Overview
Specific Yield
Power supply
Settings

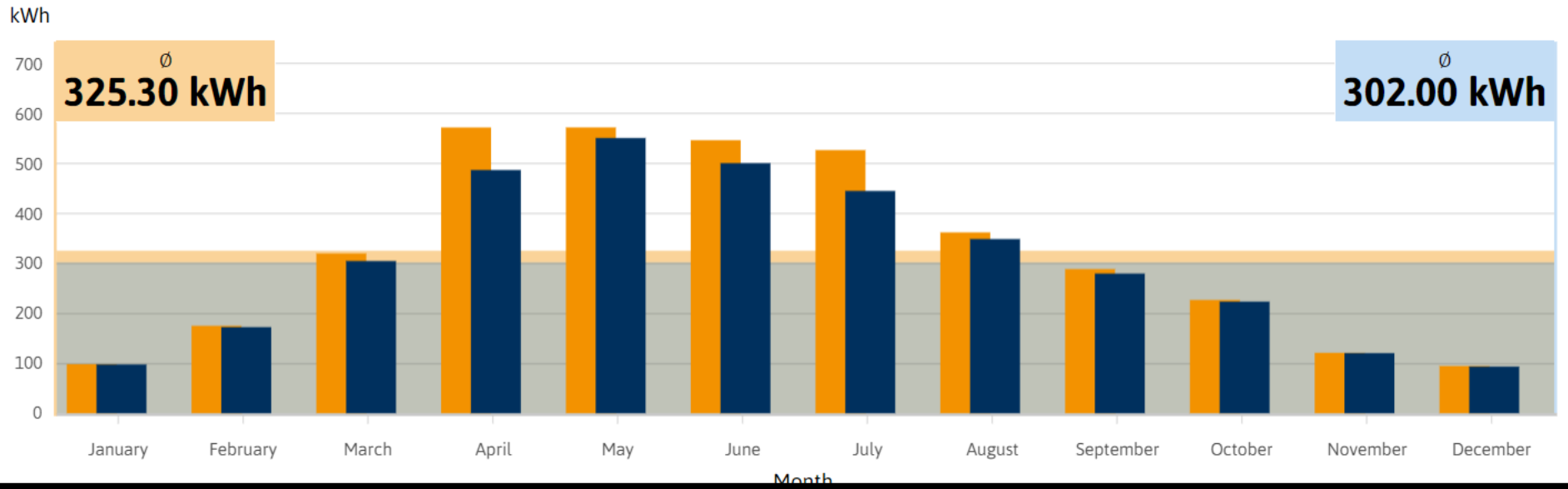
In the year | 2021 | Energy in Wh | lisgowan

3,904 kWh
Generation
lisgowan

3,624 kWh
Self use
lisgowan

316.94 kWh
Power supply
lisgowan

93 %
Self use
lisgowan




9kwp system on dairy farm single phase supply


15kwp on dairy farm Westmeath

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https://www.dropbox.com/s/cqbupz3iesrdfsk/MREF%20video1446528775_1.mp4?dl=0

Amazon | Booking.com | Acer | Other favourites

Download | Open | Workflows | Share | PS JW DH 2

Picture in picture

Rural and Urban Transformers.

15kVA or 33kVA Single Phase Transformer feeding one or more customers

15kVA: 2.2/4% impedance

Three Phase Transformer feeding single farm or group of customers 50kVA, 100kVA, 200kVA.

90% of Rural Single Phase Transformers are 15kVA, 10% are 33kVA

Single Phase Transformers are cylindrical and have two MV wires.

About 220,000 Single Phase Transformers.

Three Phase Pole Mounted Transformers are Rectangular and have three MV wires.

About 20,000 units.

Rating is stencilled on Transformer.

All Urban Transformers are Three Phase Ground Mounted, varying from 200kVA – 1000kVA

esbnetworks.ie

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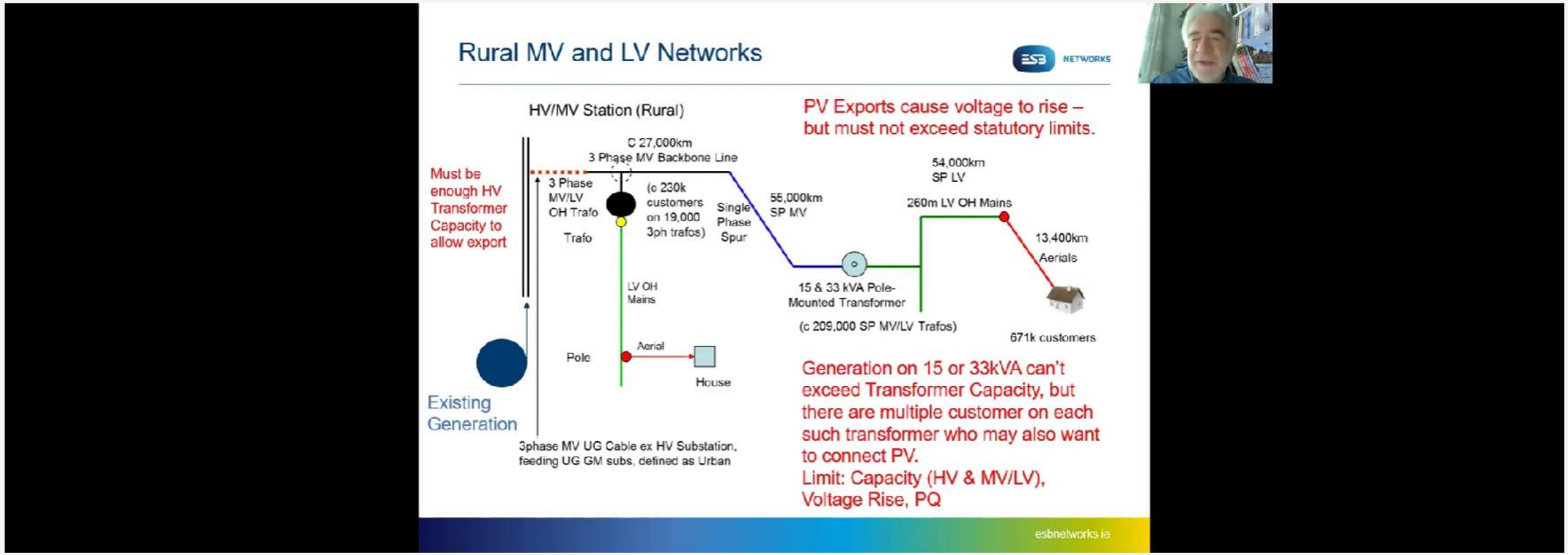
12°C Partly sunny

11:43 17/03/2022



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Minigen - what determines Export:

15kVA or 33kVA Single Phase Transformer feeding one or more customers

15kVA:
2.2/4% impedance

Three Phase Transformer feeding single farm or group of customers
50kVA,
100kVA,
200kVA.

Export limits set by:

- Transformer capacity not exceeded by total generation connected.
- Voltage rise produced within limits
- Power Quality within limits
- Transformer Capacity upstream at HV/MV Station available
- ECP2 requirements

Limits on PV installed generally arise from Generation Export exceeding Network Capacity.

Limiting Export using Export Limiting Scheme allows more customers install PV, or existing customer installing larger PV for own load

Size of Installed PV set by Connection Size and Power Quality impact.

esbnetworks.ie

0:37:00

MR 75_1.mp4

0:36:56 / 1:26:40

12°C
Partly sunny

11:45
17/03/2022

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Amazon | Booking.com | Acer | Other favourites

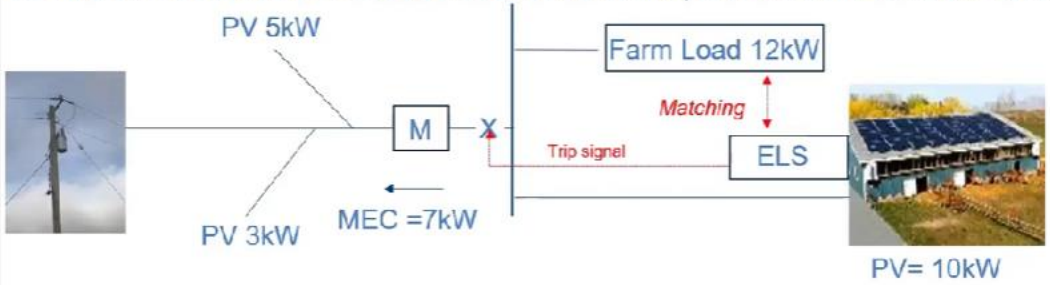
Download | Open | Workflows | ••• | Share | PS JW DH 2

Export Limiting Schemes (ELS)

ESB NETWORKS

The amount a customer can export is called the Maximum Export Capacity (MEC) and is agreed with ESBN.

ELS increases allowed Generation that can be installed, but Generation Inverter< MIC

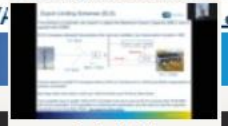


Farmer wants to install PV but export limit is 7kW as Transformer is 15kVA and 8kVA of generation is already connected.

But large dairy load which could use 12kVA at times and 7kVA at other times.

Only possible way to install 10VA of PV (Inverter) may be to use an ELS to ensure that 7kVA MEC will not be exceeded. ELS operates by matching the generation and the load so that the exported electricity is no more than 7kVA criteria)

esbnetworks.ie



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12°C Partly sunny

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Mini-Generation – application for capacity

ESB NETWORKS

6. MINI-GENERATOR DETAILS Note: Unless stated otherwise in Type Test, RSce =33 will be used as the basis for Harmonic assessment calculations.

	Unit 1	Unit 2	Unit 3
Single Phase / Three Phase	1PH☐ 3PH☐	1PH☐ 3PH☐	1PH☐ 3PH☐
Energy Source: (Wind (W) / PV (P) / Hydro (H) / CHP (C) / Battery (B) / Other (O)			
Manufacturer			
Manufacturer's Model / Reference No.			
Inverter Capacity (kVA) Note that Cumulative Inverter Capacity cannot exceed the lesser of MIC or 50kVA, and that the peak output must not exceed the MEC or ELS limits			
Generator (kVA) installed behind each Inverter			
Storage (kVA) installed behind each Inverter			
Confirm that interface will have Irish settings installed as per Conditions Governing the Connection and Operation of Mini-generation DOC-030221-GAP	Yes☐ No☐	Yes☐ No☐	Yes☐ No☐
Does Interface have type test certification as per Conditions Governing the Connection and Operation of Mini-generation DOC-030221-GAP?	Yes☐ No☐	Yes☐ No☐	Yes☐ No☐

- This section provides information on the Mini-Generation that it is intended to ***install.***
- Installed generation may not all be able to be exported i.e. the ***MEC available may be less*** than the amount of generation intended to be installed.
- Also possible that the ***Installed Generation may simply be too great*** for the network connection to accommodate even with no export (e.g. Harmonics).

esbnetworks.ie

NEW GRID CONNECTION CALCULATION MODEL

			SINGLE PHASE					THREE PHASE		
	selfconsumption kwh value		€ 0.22	generation kwh/kwp installed	850			€ 0.22		
	grid access kwh value c/kwh		€ 0.135	premium price				€ 0.135	premium price	
			grif access kwh						Grid access kwh	
% Grid export	% self consumption		9	13	17	Grid access secured		30	40	50
20.00%	80.00%		€ 1,553	€ 2,243	€ 2,933			€ 5,177	€ 6,902	€ 8,628
40.00%	60.00%		€ 1,423	€ 2,055	€ 2,688			€ 4,743	€ 6,324	€ 7,905
60.00%	40.00%		€ 1,293	€ 1,867	€ 2,442			€ 4,310	€ 5,746	€ 7,183
80.00%	20.00%		€ 1,163	€ 1,680	€ 2,196			€ 3,876	€ 5,168	€ 6,460
System cost no grant			€ 13,000	€ 17,000	€ 21,000			€ 34,000	€ 44,000	€ 54,000
System cost with grant			€ 9,750	€ 12,750	€ 15,750	€ 0	€ 0	€ 25,500	€ 33,000	€ 40,500
Payback years 80%	NO grant		8.4	7.6	7.2			6.6	6.4	6.3
consumption years	Grant received		6.3	5.7	5.4			4.9	4.8	4.7
Payback years 80%	NO Grant		11.2	10.1	9.6			8.8	8.5	8.4
grid export	Grant received		8.4	7.6	7.2			6.6	6.4	6.3

If monies need to be borrowed add between 0.5 and 1.5 years to paybacks for intrest accruing

			SINGLE PHASE				THREE PHASE	
	selfconsumption kwh value		€ 0.22	generation kwh/kwp i	850		€ 0.20	
	grid access kwh value c/kwh		€ 0.100	market price			€ 0.100	premium price
			grif access kwh					Grid access kwh
% Grid export	% self consumption		9	9	MICRO		15	15
20.00%		80.00%	€ 1,499	€ 1,499			€ 2,499	€ 2,499
40.00%		60.00%	€ 1,316	€ 1,316			€ 2,193	€ 2,193
60.00%		40.00%	€ 1,132	€ 1,132			€ 1,887	€ 1,887
80.00%		20.00%	€ 949	€ 949			€ 1,581	€ 1,581
System cost no grant			€ 13,250	€ 13,250			€ 18,750	€ 18,750
System cost with grant		BEC	€ 9,938	Domestic € 11,100		BEC	€ 14,063	Domestic € 16,600
Payback years 80% consumption years	Grant received		7	7	NO GRANT DELAYS worth €500 -€1,000		6	7
Payback years 80% grid export	Grant received		10	12			9	10
Payback years 80% consumption years	After 100% TAX benefit				After 100% TAX benefit			
	Grant received sole trader		3.3	3.7	Grant received sole trader		2.8	3.3
	Grant received company		5.8	6.5	Grant received company		4.9	5.8
ROI				14%				15%
SUMMARY	sole trader			3-4 year payback			3-3.5year payback	
	company			6-6.5 year payback			5-6 year payback	

Pig Farm Longford 100kwp system install


50kwp east west install on pig farm in Kildare

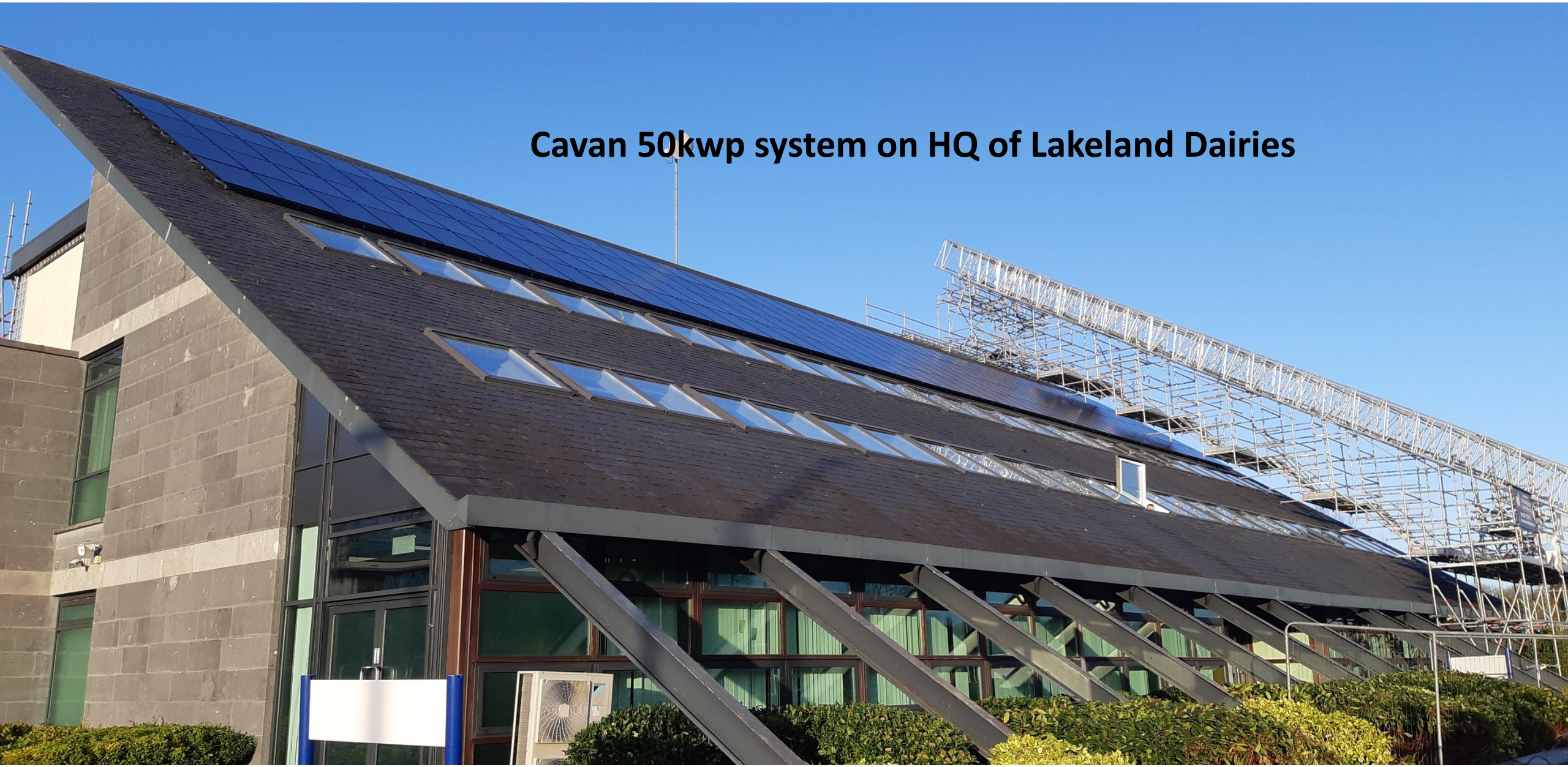

70kwp Leahy Open Farm Cork

25kwp system install on robotic dairy farm single phase

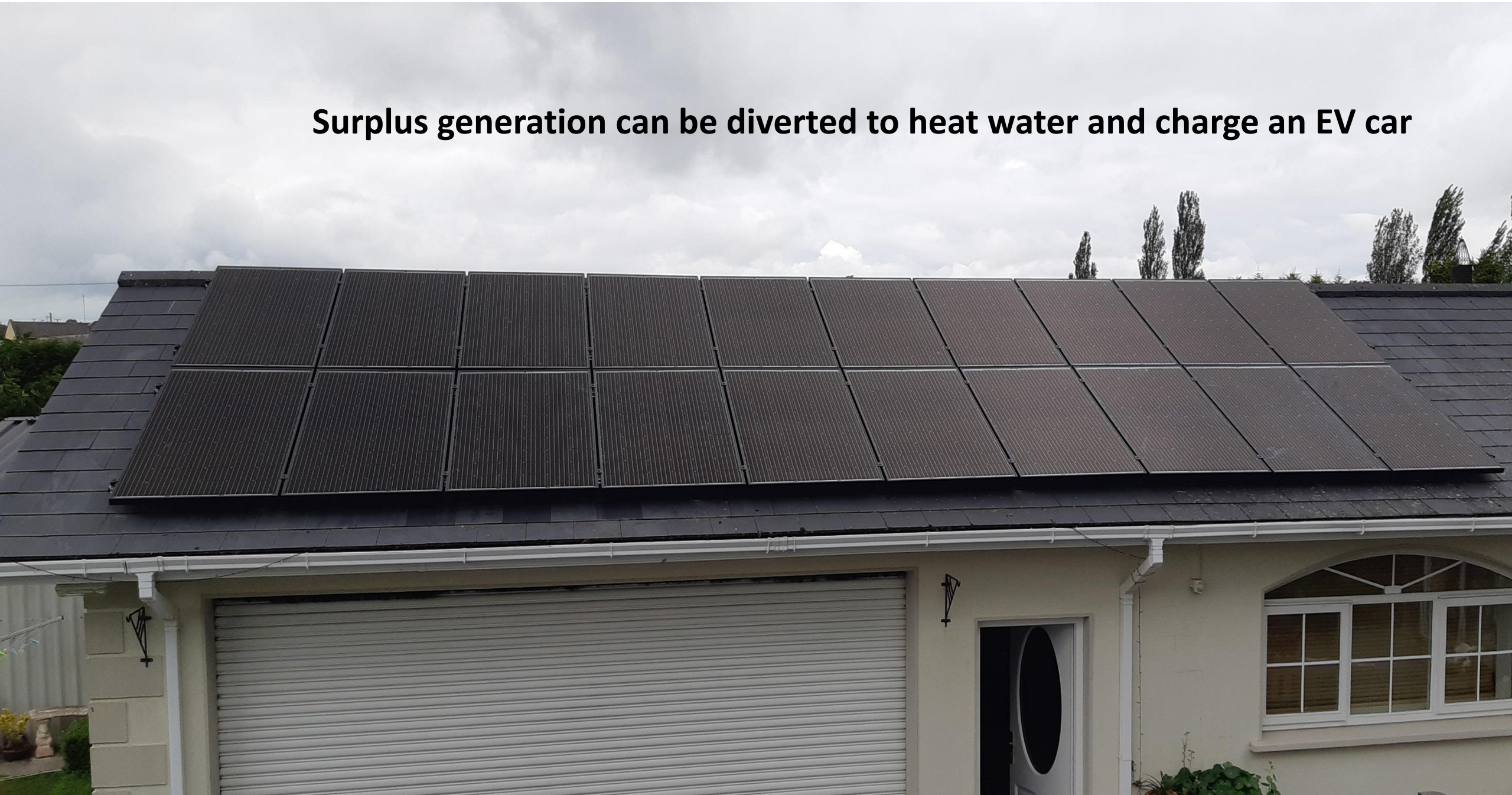

100kwp east west facing Wexford farm


Fronius
Fronius
Fronius
Fronius
Fronius

150kwp cereal feeds mill and farm


Cavan 50kwp system on HQ of Lakeland Dairies

Surplus generation can be diverted to heat water and charge an EV car



Comparison of Local Power solar PV options

	PREMIUM	MARKET STANDARD PLUS	MARKET STANDARD/TIER 1
PV panels	**Local Power**	Local Power	Local Power
Manufacturer	**Solarwatt (BMW family)**	Solarwatt (BMW family)	Most Tier 1/glass foil panels
Where manufactured	**Germany Dresden**	Germany & Asia	Asia mainly
Model	**Solarwatt glass- glass**	CLASSIC **glass foil**	**Glass foil**
Performance manufacturer warranty	**30 yrs.**	25 yrs.	25/30 yrs.
Product & material warranty	**30 yrs.**	15 yrs.	10/12yrs. generally
Warranty cover	**Materials and labour**	Materials and labour	Materials only
Warranty exclusions (**buyer beware**)	**Limited exclusions**	Limited exclusions	Check- often several exclusions
Max. linear degradation warranty/yr.	**0.345%/ yr.**	0.5%/yr.	0.5/0.7%/yr.
Panel wattage	**310-365w**	300-440w	280-400w
Output guarantee after 25 years	**92%**	85%	See data sheets
Output guarantee after 30 years	**87%**	None	None
5 year all-risks insurance cover	**Yes**	Yes optional	No
Self-clean glass	**Yes**	Yes	Generally but varies
Resistant to ammonia/salt erosion	**Yes**	limitations- warranties clear	Check- Warranties may be void
Resistant to protracted harsh environment	**Yes**	limitations -warranties clear	Check- Warranties may be void
Fire safety rating IEC 61730-2	**Class A**	Class C	Class C
Robustness	**Strong and robust**	Panels easily damaged	Panels easily damaged
Video comparison	**www.smartsolar.ie**	Transparent warranties	Read warranties carefully
Inverter	**Fronius**	Fronius	Asian manufactured generally
Manufactured	**Austria**	Austria	Asia
Warranty	**7 years (can be extended)**	7 years (can be extended)	Check- 5 years generally
Battery Storage	**Solarwatt**	Solarwatt/ BYD	BYD
Warranty	**10yr unlimited cycle**	10yr unlimited cycle	10yr limited cycle generally
Charge to discharge	**100%**	100%	<90%
Efficiency	**93% +**		Check - varies significantly

Warranties Matter

Damage to glass foil panels after 9 years in UK.

THANK YOU

Pat Smith

info@localpower.ie -086- 2613374