

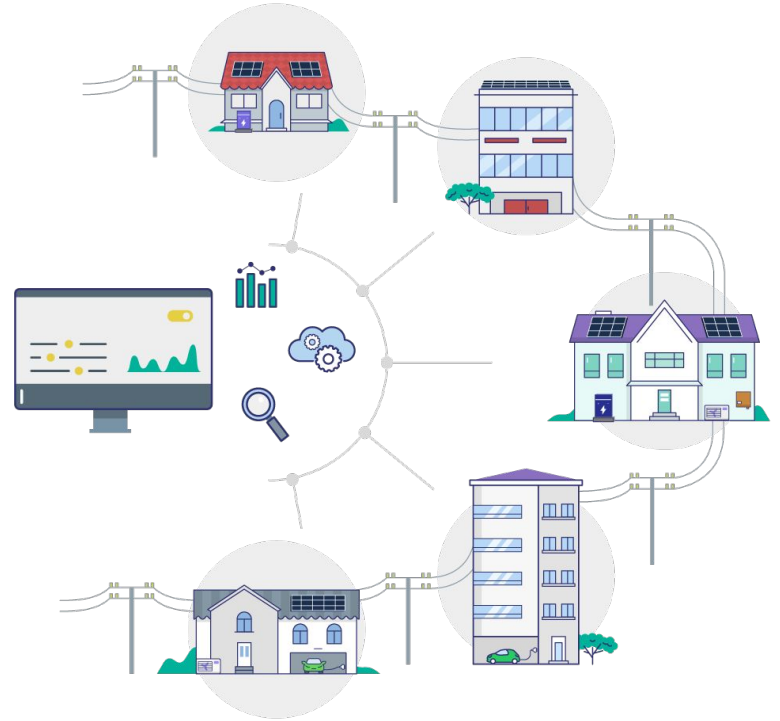


Birchip Cropping Group Microgrid

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About SwitchDin

- Australian energy technology company founded in 2014
- We develop energy management system hardware & software
- We focus on integrating equipment from different manufacturers
- We enable microgrids & virtual power plants
- We work with electricity companies, equipment manufacturers, and project developers



About Walnut Energy



Design / Supply / Construction of

- Commercial & industrial microgrids
100kW-5MW
- Battery storage systems
- UPS systems
- BTS site power systems
- Commercial scale solar PV
- Based in Sydney, with support office in
Bali & Rotterdam



About Birchip Cropping Group

- Not-for-profit agricultural research body founded in 1992 in Birchip, Vic
- Assists local farming community improve their livelihoods through evidence-based best practice
- Rising power prices & unreliable supply have become pressing issues for regional farmers
- BCG to expanded scope of its research beyond cultivation - making it ideal candidate for MDI





The BCG Microgrid project



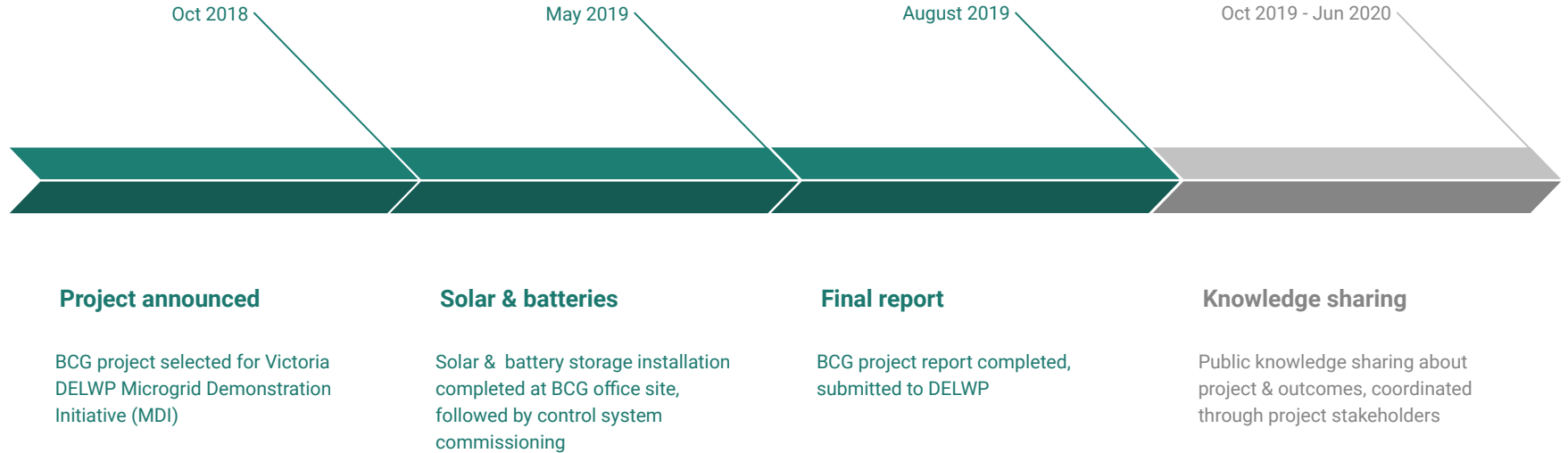
Microgrid components

- 51kW solar PV
- 137kWh battery storage (Sungrow/Samsung SDI)
- 4x SMA Tripower Grid Inverters
- ABB grid protection relay
- Sungrow local controller
- Acuvim power meter



Standard 30KVA grid connection agreement w/Powercor

BCG Micogrid: Project timeline



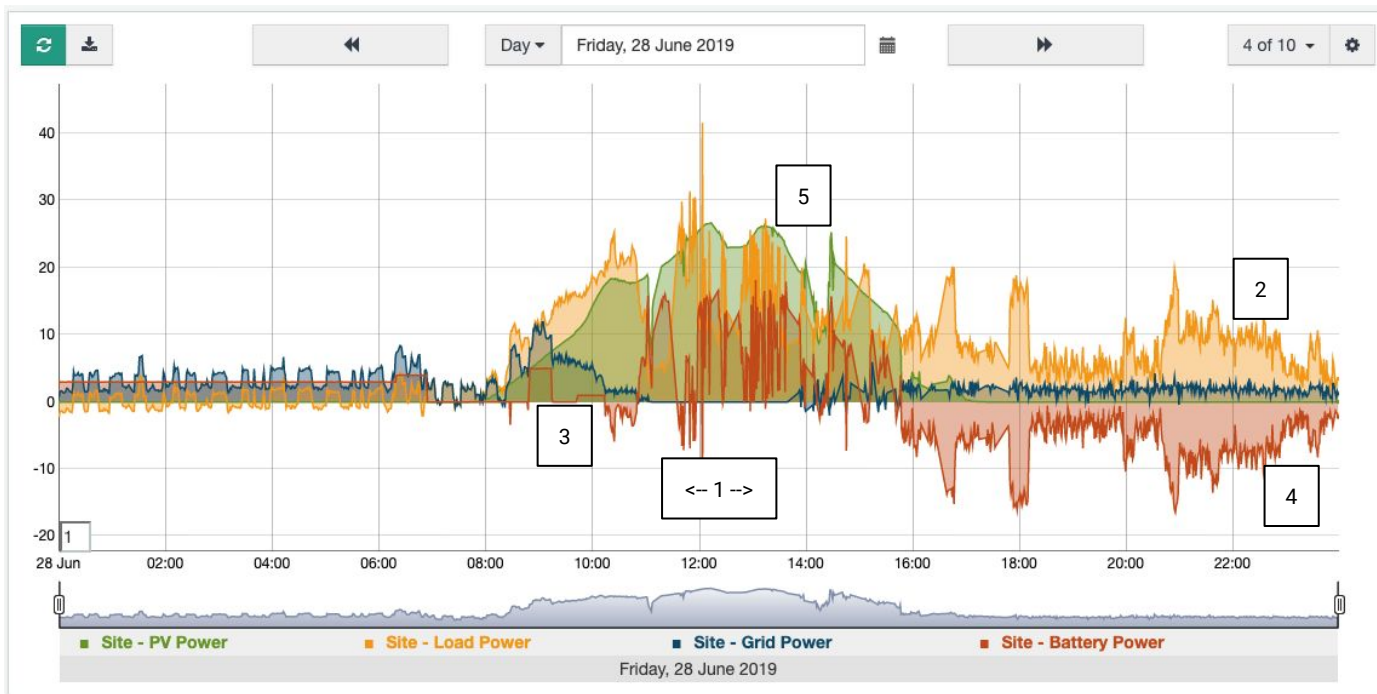
BCG microgrid: Benefits & outcomes to date

Increase solar self-consumption / reduce grid draw & energy costs

- Nearly 11,000kWh solar produced so far (>8,400kWh import reduction)
- Direct savings of ~\$2,800
- Insulation against rising prices (coincidentally, sizeable rate increase since system installed)
- EMS dynamic export limiting 51kW -> 30kW (no infrastructure upgrade necessary)

Bolster reliability of supply with 'off grid' emergency blackout protection

- Battery & solar supplied backup power during local grid outage in afternoon of 28 June
- Downtime in periods >30min result in productivity losses of ~\$480/hr, a/t BCG figures
- June 28 outage: ~\$1,200 saved
- In past 12 months, outages = approx \$3,800 in losses



Stormcloud portal: Historic insights

1 - Grid outage 11am-1:40pm | 2 - Site load power (yellow, total sum of all energy use) | 3 - Grid power (blue, negative = export) | 4 - Battery power (red, negative = discharge) | 5 - Solar PV output (green)

Stormcloud portal live insights

Birchip Cropping Group

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ABB Grid Protection Relay

Voltage L1/N		241.2 V	Voltage L2/N		237.2 V
Voltage L3/N		240.6 V	Frequency		50.0 Hz
Last Trip Reason		35 U	Trip Counter		32 U
Status Register 20		0 U	Command Register Value		0 U

Data time range from 18 minutes ago till a few seconds ago by Droplet 0060e06f6dfb.

Acuvim II Power Meter

Frequency		50.00 Hz	Phase 1 Voltage		240.51 V
Phase 2 Voltage		236.67 V	Phase 3 Voltage		241.65 V
Phase 1 Current		15.71 A	Phase 2 Current		16.94 A
Phase 3 Current		15.76 A	Phase 1 Active Power		-1.29 kW
Phase 2 Active Power		-1.76 kW	Phase 3 Active Power		1.35 kW
Phase 1 Apparent Power		3.78 kVA	Phase 2 Apparent Power		4.01 kVA
Phase 3 Apparent Power		3.81 kVA	Phase 1 Reactive Power		0.58 kVAr
Phase 2 Reactive Power		-1.70 kVAr	Phase 3 Reactive Power		-1.05 kVAr
Phase 1 Power Factor		-0.34 U	Phase 2 Power Factor		-0.44 U
Phase 3 Power Factor		0.35 U			

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Site Aggregates

PV Power		13.75 kW	Load Power		12.84 kW
Grid Power		-1.71 kW	Battery Power		-0.80 kW
Battery SoC		95.10 %			

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BCG Microgrid: Broader implications & learnings

Partner feedback indicates community interest is high

- Regional businesses more susceptible to power supply unreliability
- Want security against future energy price increases
- Regional DSOs face challenges as DER rates grow - how to make it win-win?

Microgrid cost-effectiveness needs to improve

- But how can industry & utilities deploy microgrids to deliver better energy outcomes - affordably?
- Optimistic payback periods 3.5 - 9 years (after MDI grant) → need improvement for broader uptake

Other income streams crucial to financial case

- Microgrids as energy market players (strategic export, FCAS)?
- Payments for reducing grid congestion & peak loads?
- Provision of other grid services (e.g. voltage regulation, etc)



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