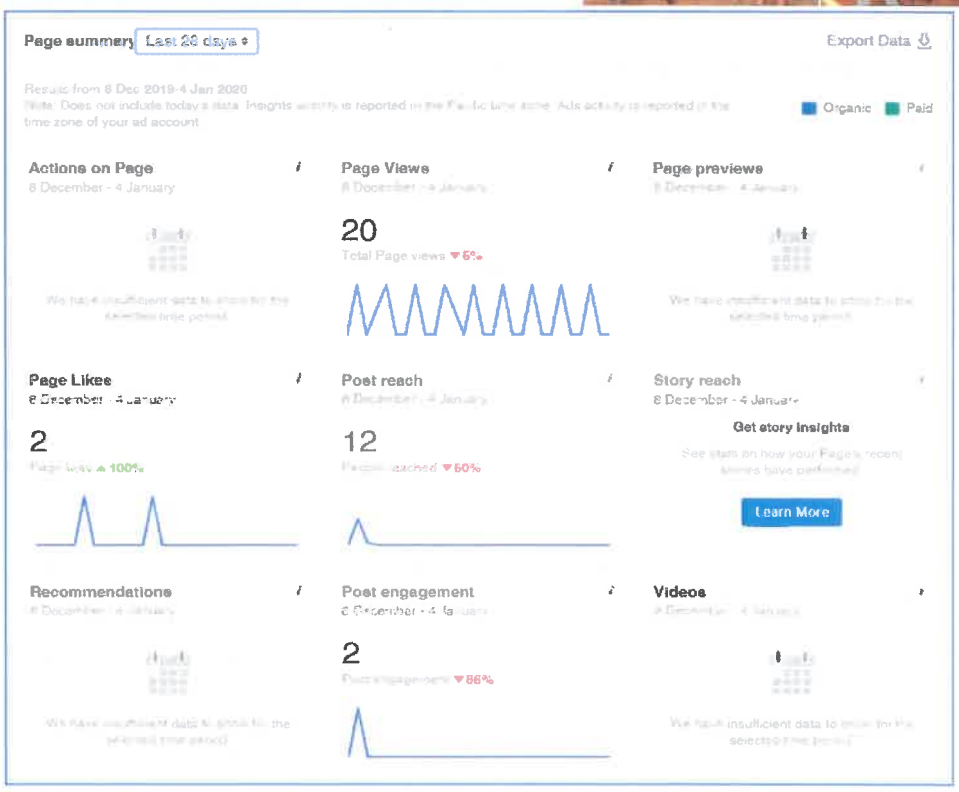
Milestone D 6.1: Attachment H

FACEBOOK

52 followers



TWITTER
47 Followers

Edit profile

Bundaberg Regional Irrigators Group
@BundyIrrigators

Representing Member Irrigators in the Bundaberg Irrigation Area.

Bundaberg Joined November 2017

26 Following **47** Followers

Tweets Tweets & replies Media Likes

You Retweeted

Qld Farmers @QldFarmers · Dec 18 2019

Growers depend on water to nourish their land and are extremely concerned about the health of their hydraulic catchments and the continuation of environmental flows which sustain our environment. Read QFF s @qcinews column here: ow.ly/iLiP30q2y0Z.

3 1

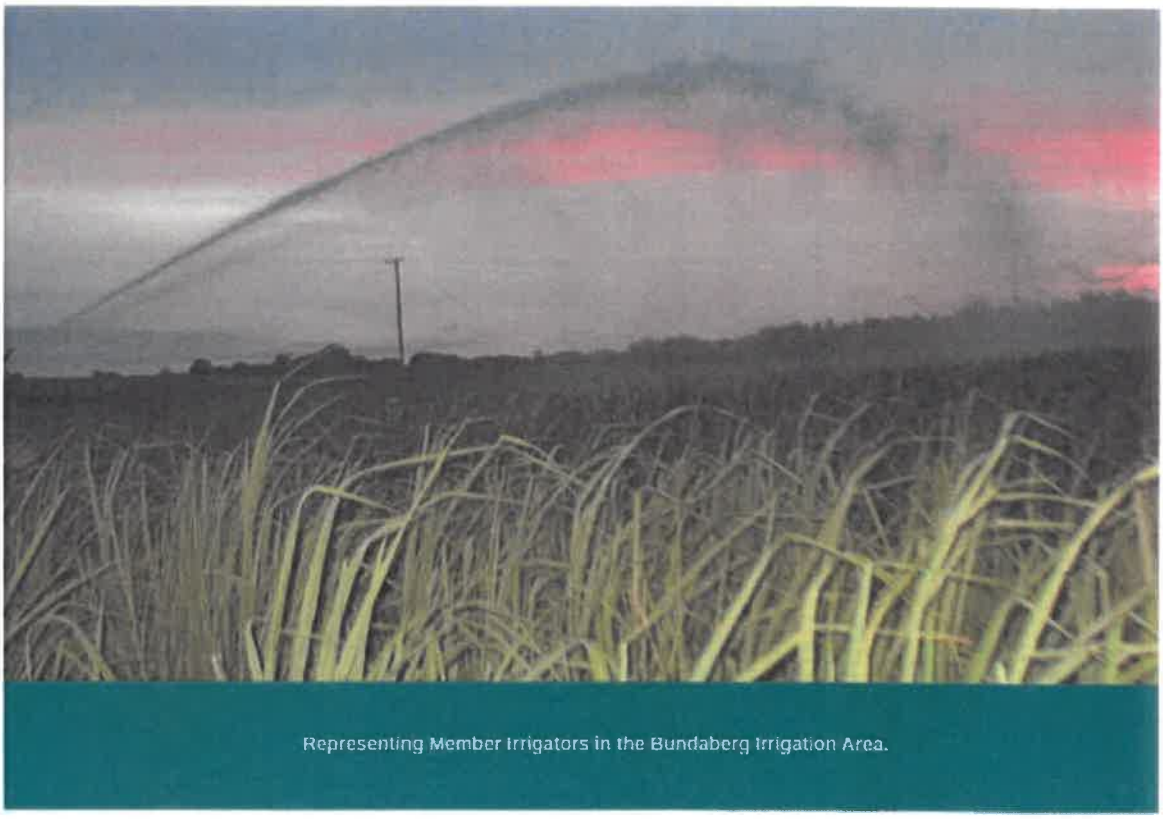
You Retweeted

Jeremy Morton @Jeremy_Morton_ · Nov 26 2019

What would we eat without irrigation? stockandland.com.au/story/6508566/ ... via @@stockandland

WEBSITE
www.brig.org.au

BUNDABERG REGIONAL IRRIGATORS GROUP



Home

Bundaberg Regional Irrigators Group (BRIG) was established to represent irrigators in the Bundaberg district across a range of commodity groups including sugar cane, grain and horticulture.

SOLAR SWEET SPOT GROWS BIGGER CROPS WITH LOWER COSTS

By: ARENA

It takes a lot of water for Australia's second largest crop export – sugarcane – to grow to its potential.

National Renewables in Agriculture™

CONFERENCE AND EXPO

14TH NOVEMBER 2019

9am - 4.30pm / Networking drinks 4.30 - 6pm

The Range Function Centre
308 Copland Street Wagga Wagga

DON'T MISS THIS FIRST TIME EVENT. PLACES LIMITED. REGISTER ASAP.

This unique event invites you to find out everything you need to know about renewables, including;

- **What options are right for me?**
- **What steps should I take?**
- **Who do I work with to make it happen?**

Hear from farmers successfully using renewables, why they did it, and what they've learnt. Industry experts will discuss:

- **Feasibility and working out the business case for renewables.**
- **Understanding grid connections.**
- **What's on the horizon for energy and agriculture.**

On-farm renewables are a valuable opportunity for farmers to cut costs and emissions.

The Expo offers farmers the chance to speak to credible renewable energy suppliers about opportunities for their property.

Post Conference, network with a glass of red or white produced by SeeSaw Winery using solar.

SPONSORED BY

REAQUA SOLAR PUMPING

NSW Department of Primary Industries

CEFC CLEAN ENERGY FINANCE CORP

akuoenergy pacific

City of Wagga Wagga

Bentleys THINKING AHEAD

RENEWABLESINAGCONFERENCE.COM.AU

National Renewables in Agriculture™ CONFERENCE AND EXPO

14TH NOVEMBER 2019

PROGRAM SUMMARY

KEYNOTE

Professor Ken Baldwin, Director of the Energy Change Institute at the ANU will present 'The Australian Renewable Energy Revolution' and outline prospects for our future energy systems.

CASE STUDIES

Jon Elder, NSW cotton farmer talking solar irrigation with his 500kW solar diesel pump, the biggest in the country.

Chris Bagot, Victorian dairy farmer using grid connected solar in an innovative closed loop system with his chiller.

Charlie Prell, NSW sheep farmer talking wind turbines, farm income diversification and revenue streams from renewables.

Alisdair Tulloch, a grape grower and winemaker in NSW, reduced emissions, improved his business's bottom line and was the first carbon neutral winery in the Hunter Valley.

Drew Martin, an almond farmer in South Australia commissioned a 216kW solar farm on his property that feeds into the grid. Learn how Drew buys and sells his energy, providing an income for his farm.

SELECTING A SUPPLIER

Clean Energy Council

WORKING OUT THE BUSINESS CASE

John Cutler, from Keemin Energy Solutions has performed over 150 solar inspections in Victoria. He'll cover energy efficiency and the business case for renewables in cold storage chains such as dairy farms.

UNDERSTANDING GRID CONNECTIONS

Michelle Murray, Major Networks Connections Manager at Essential Energy will discuss tips for a smooth renewable energy network connection.

Hamish Dillon from 'The Energy Project', on evaluating your load and the suitability of your usage to solar and how to enter and optimise a retail contract with an electricity provider.

COMMUNITY BASED SOLUTION

Gemma Meier's cropping farm is based in Grong Grong NSW where a community owned solar farm is being built. She'll talk about how farmers with land to spare can participate in community owned solar farms.

SOLAR PUMPING

Ben Lee, owner of ReAqua, will go over 'back of the envelope' calculations for solar livestock pumps and large scale solar irrigation.

Maurie Haines, a respected Queensland consultant, was pivotal in the design of the ARENA funded Bundaberg solar pumping system. Maurie will outline working out the business case for grid connected solar.

BATTERY STORAGE

Peter Cain, a Victorian beef farmer has incorporated battery storage with his livestock pump. He'll crunch the numbers to help others understand when storage works and when it doesn't.

Ged McCarthy from The Solar Experts will cover Solar Solutions & Battery Storage – what works and why?

BIOENERGY

Jarad Smith's family own Kia Ora piggery in Victoria. He's been on a steep learning curve to convert poo to electricity and has many lessons to share from his bioenergy journey.

AGRINERGIE

Akuo Energy will talk through their new model of leasing land from farmers and enabling them access to the area under the solar greenhouses to grow vegetables.

HOSTING RENEWABLES

Andrew Dyer, National Wind Farm Commissioner will cover what you need to know when hosting solar and wind developments on your farm.

...plus many more.

To register and for the full program visit
RENEWABLESINAGCONFERENCE.COM.AU

WHO SHOULD ATTEND: Farmers, ag and energy consultants, Peak body representatives, Government decision makers and agribusiness.

Cost $75 pp (lunch provided)

If you are a business interested in exhibiting, please email **hello@renewablesinagconference.com.au**

CONFERENCE PARTNERS

NSW Department of Primary Industries | NSW Office of Environment & Heritage | REAQUA SOLAR PUMPING | CLEAN ENERGY COUNCIL | NSW FARMERS | National Farmers' Federation | FCA Farmers for Climate Action | National Irrigators' Council


National
Renewables
Agriculture

Sugar Industry Solar Pumping Case Study

Adapting Renewable Energy Concepts to Irrigated Sugarcane Production at Bundaberg

ARENA

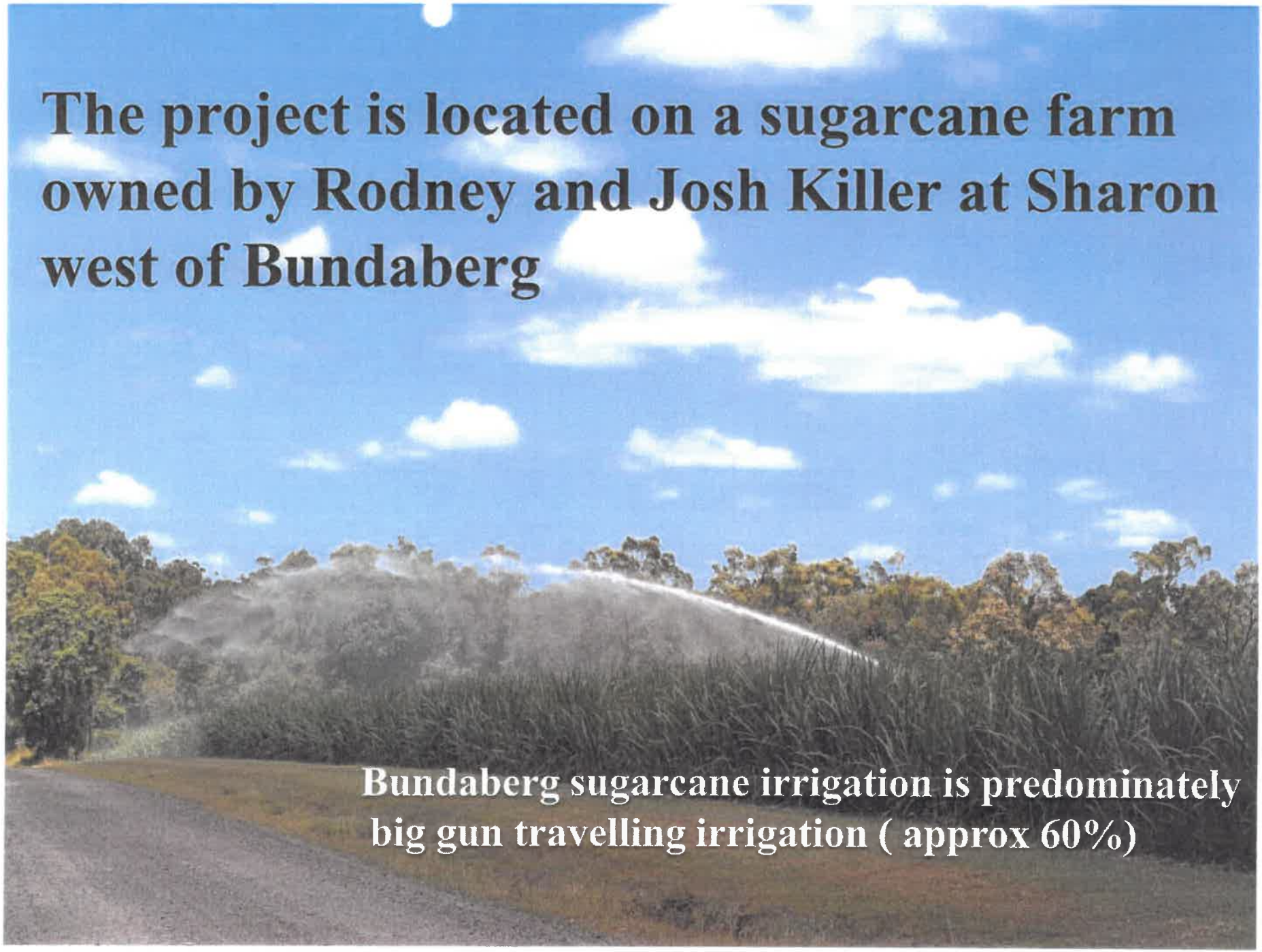
Australian Government

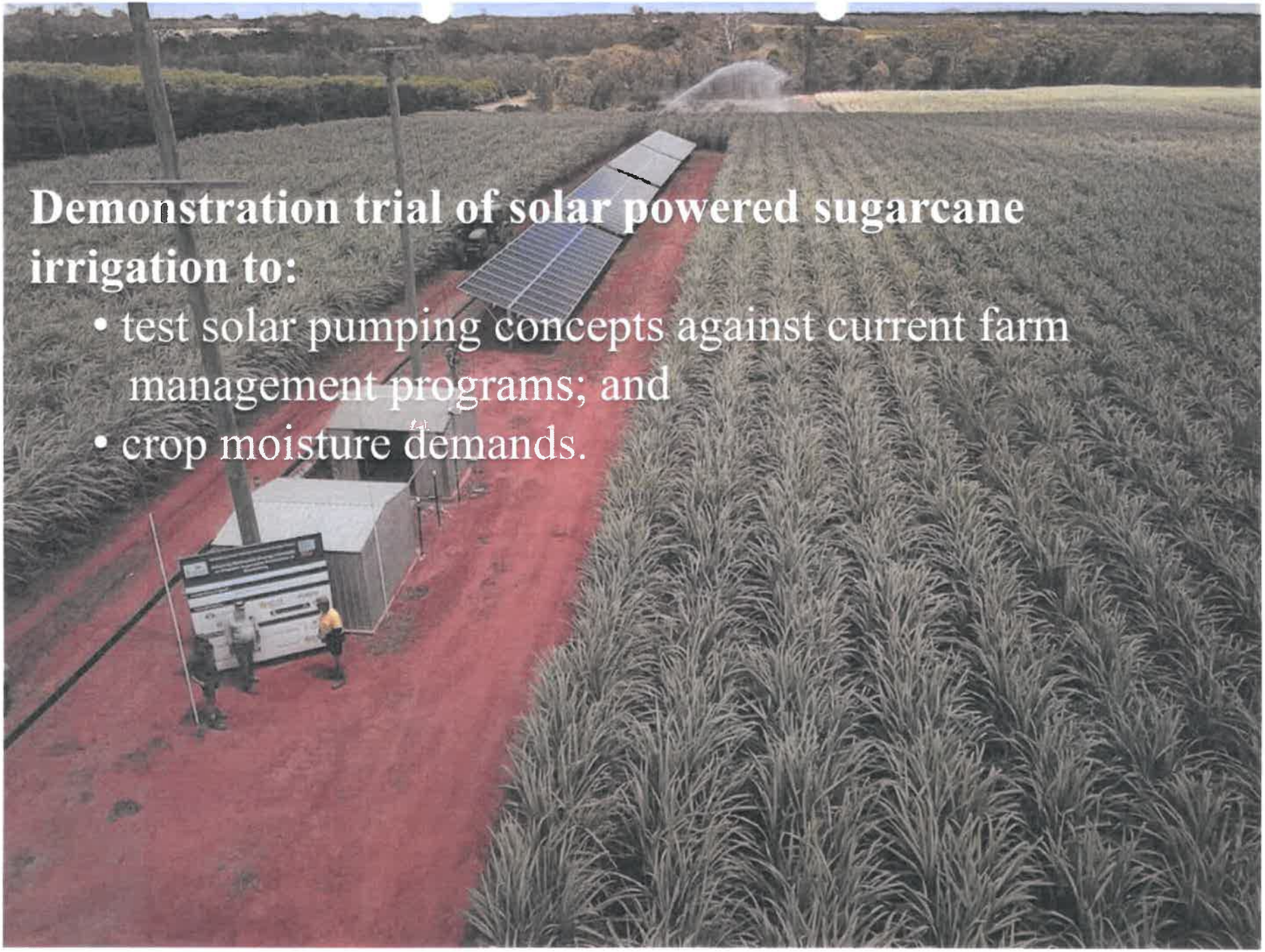
Australian Renewable Energy Agency

BUNDABERG REGIONAL IRRIGATORS GROUP

REPRESENTING MEMBER IRRIGATORS IN THE BUNDABERG IRRIGATION AREA

Aramac
Clermont
Dysart
Middlemount
Clairview
Cape Townshend
Barcaldine
Capella
Tieri
Marlborough
Alpha
Emerald
Blackwater
Yeppoon
Emu Park
ROCKHAMPTON
Duaringa
Dingo
Mount Morgan
Springsure
Woorabinda
Calliope
Gladstone
Tambo
Rolleston
Moura
Biloela
Miriam Vale
QUEENSLAND
Rosedale
BUNDABERG
Theodore
Monto
Gin Gin
Cracow
Eidsvold
Childers
Fraser
Augathella
RANGE
Injune
Taroom
Mundubbera
Hervey Bay
Island
Maryborough
Charleville
Morven
Mitchell
Roma
Wandoan
Goomeri
Murgon
Tin Can Bay
Gympie
Cooroy
Wyandra
Dunkeld
Miles
Chinchilla
Kingaroy
Noosa Heads
Maroochydore
Caloundra
Condamine
Nambour
Yarraman
Kilcoy
Surat
Kogan
Tara
Bell
Dalby
Esk
Caboolture
Redcliffe
Oakey
BRISBANE
Cunnamulla
Bollon
Moonie
Toowoomba
St George
Alton
Millmerran
Ipswich
Beenleigh
Boonah
Nerang
Dirranbandi
Talwood
Goondiwindi
Warwick
Coolangatta
Tweed Heads
Murwillumbah
Thallon
Hebel
Boggabilla
Inglewood
Mungindi
Texas
Stanthorpe
Goodooga
Yetman
Casino
Lismore
Lightning Ridge
Moree
Ballina
Tenterfield
Evans Head
Brewarrina
Collarenebri
Warialda
Maclean
DIVIDING
CAPRICORN CHANNEL


The project is located on a sugarcane farm owned by Rodney and Josh Killer at Sharon west of Bundaberg
Bundaberg sugarcane irrigation is predominately big gun travelling irrigation (approx 60%)


Demonstration trial of solar powered sugarcane irrigation to:
• test solar pumping concepts against current farm management programs; and
• crop moisture demands.

Queensland Grid Connect Rules

- Solar up to 30kW AC (38kW DC Array) may be approved for Feed In Tariff by Ergon
- Depends on location and Ergon infrastructure
- This trial with ECODRIVE which draws DC from solar and AC from grid – no feed in occurs

ECODRIVE is currently operating under a Queensland trial approval for the duration of this project.

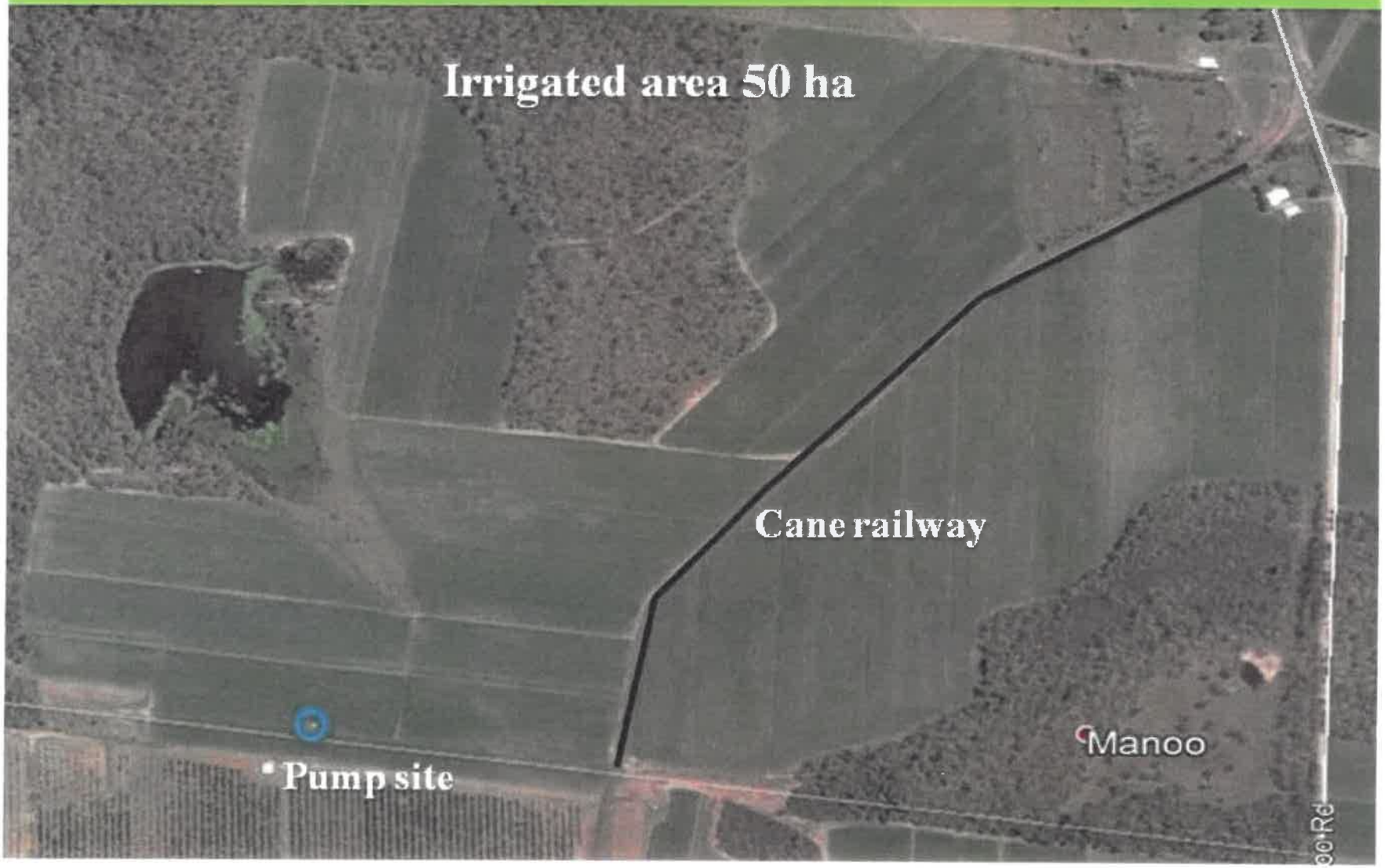
Irrigation water supply

Water Allocation 4.6 ML/ha

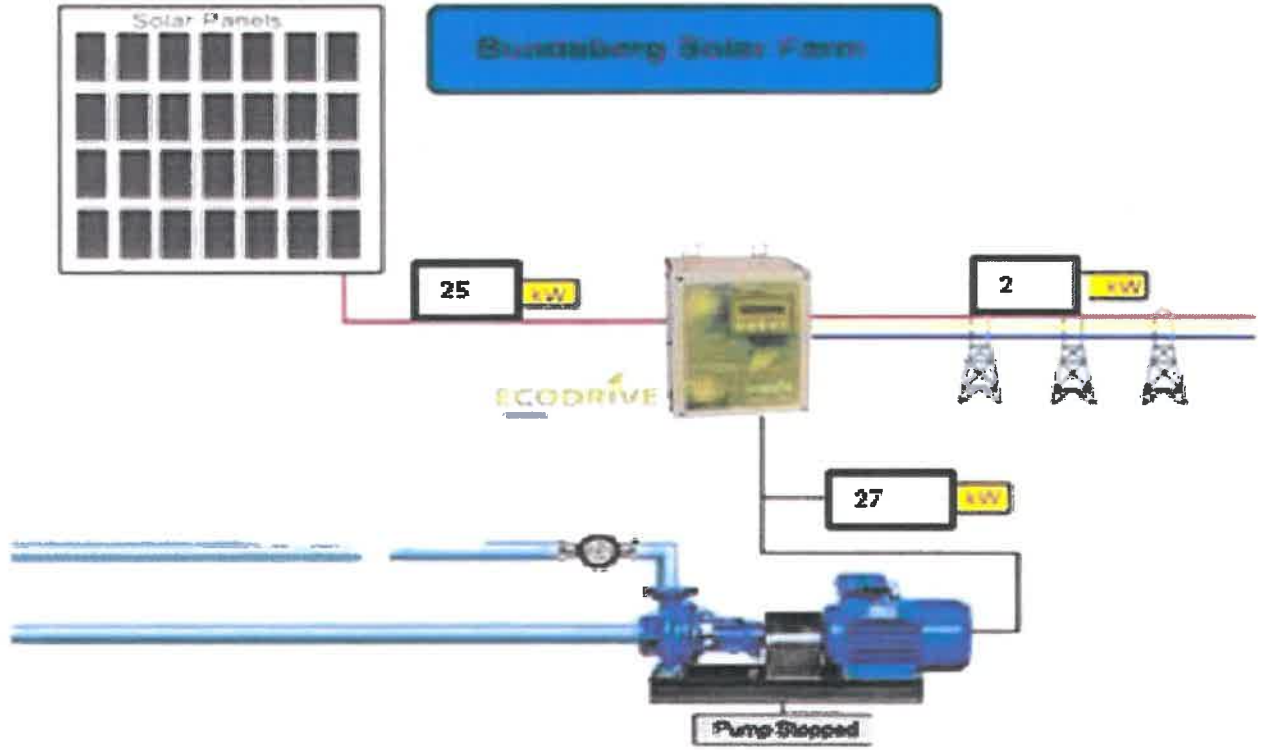
Farm area 50 ha

Total 230 ML

Trial farm layout



Trial irrigation pump system

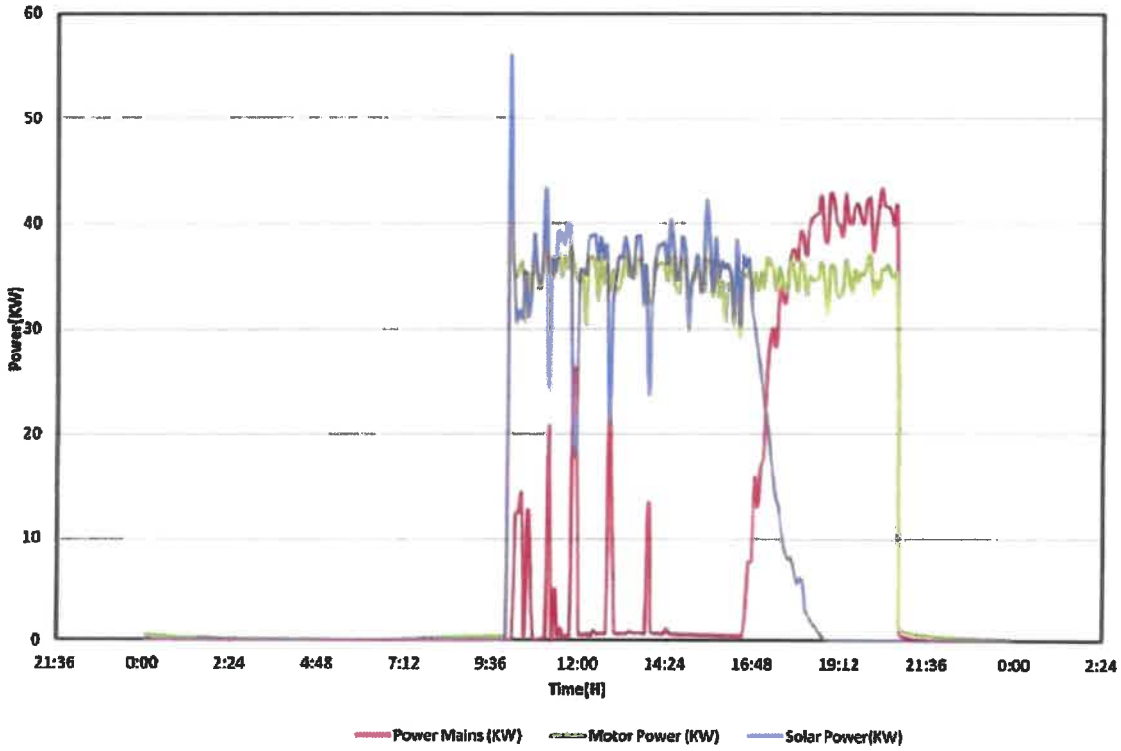


A 82 KW solar array and new pump and motor combined with a Variable Speed ECODRIVE was installed at the trial site at Bundaberg in January 2018.

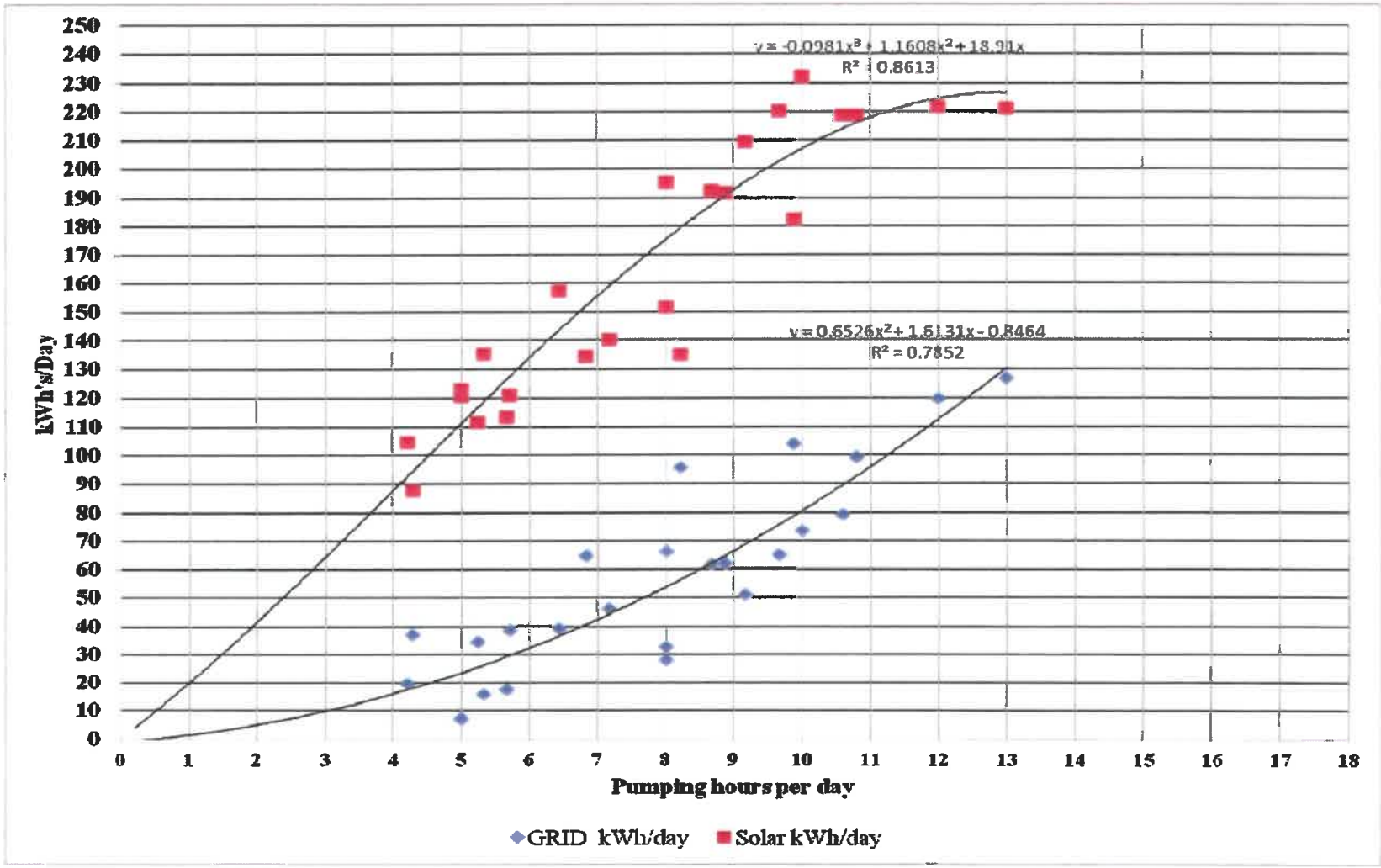
Benefits of ECODRIVE Technology

The Variable Speed ECODRIVE eliminated the need to apply the gate valve to manage pressure thus removing the 500 kpa of pressure load.

Energy blending capacity maintains constant operating load during changing irradiation conditions and during the transition to night hours



Solar – Mains utilisation trend



Cost benefit identified by project so far

Business as usual pumping system comparison

Run Hours	ML pumped	Mains kWh	kWh/ML	Cost/ML @ 26 c/kWh
1850	167	72,072	431	$105.00

Trial pumping system

Run Hours	ML pumped	Mains kWh	kWh/ML	Cost/ML @ 26 c/kWh
1850	167	16,520	99	$24.00

Distribution of kWh – Trial pumping system

VSD saving kWh	Solar saving kWh	Total kWh saved	Mains kWh
21,125	34,427	55,552	16,520

Sugar Industry Solar Pumping Business case

Adapting Renewable Energy Concepts to Irrigated Sugarcane Production at Bundaberg

ARENA

Australian Government

Australian Renewable Energy Agency

BUNDABERG REGIONAL IRRIGATORS GROUP

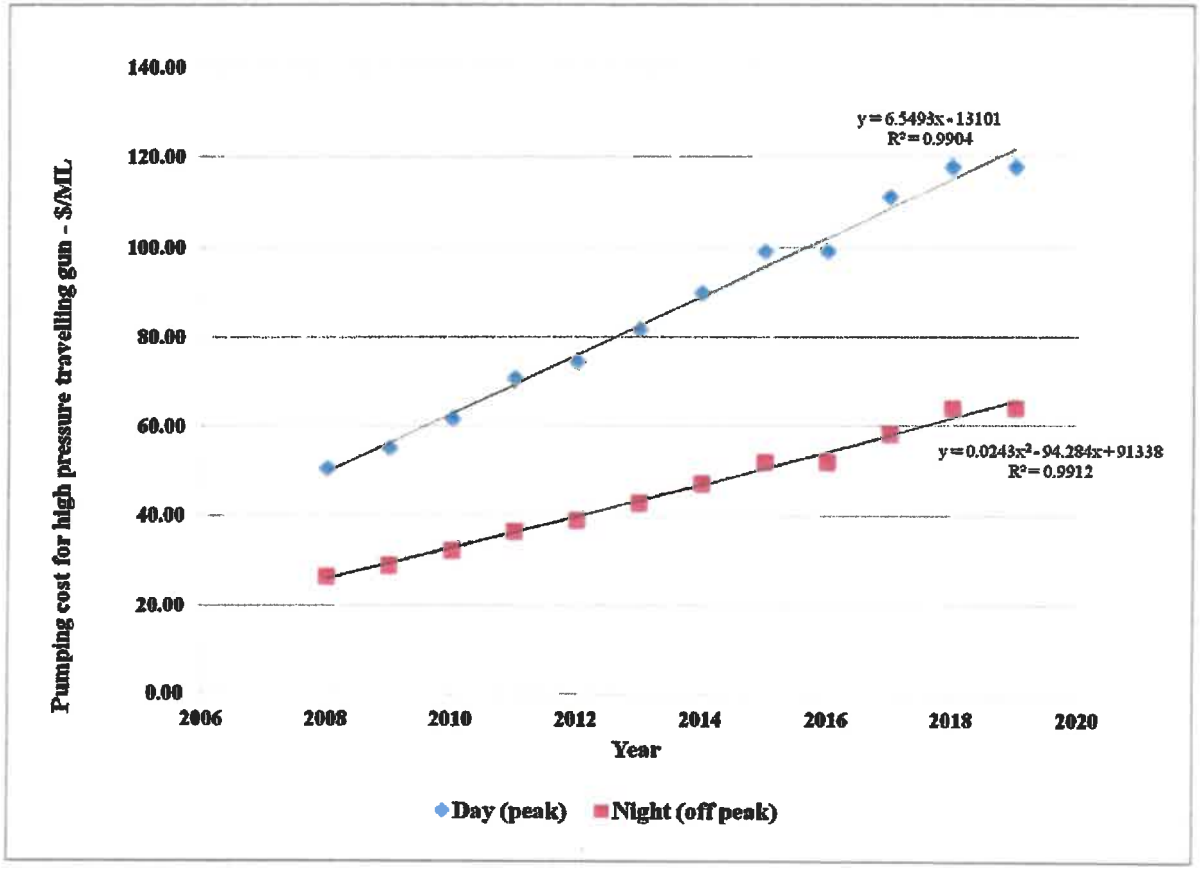
REPRESENTING MEMBER IRRIGATORS IN THE BUNDABERG IRRIGATION AREA

Ergon irrigation tariffs increased by 230% from 2008 -2018

Tariff 65 :– 12 hrs day (peak) / 12 hrs night (peak)

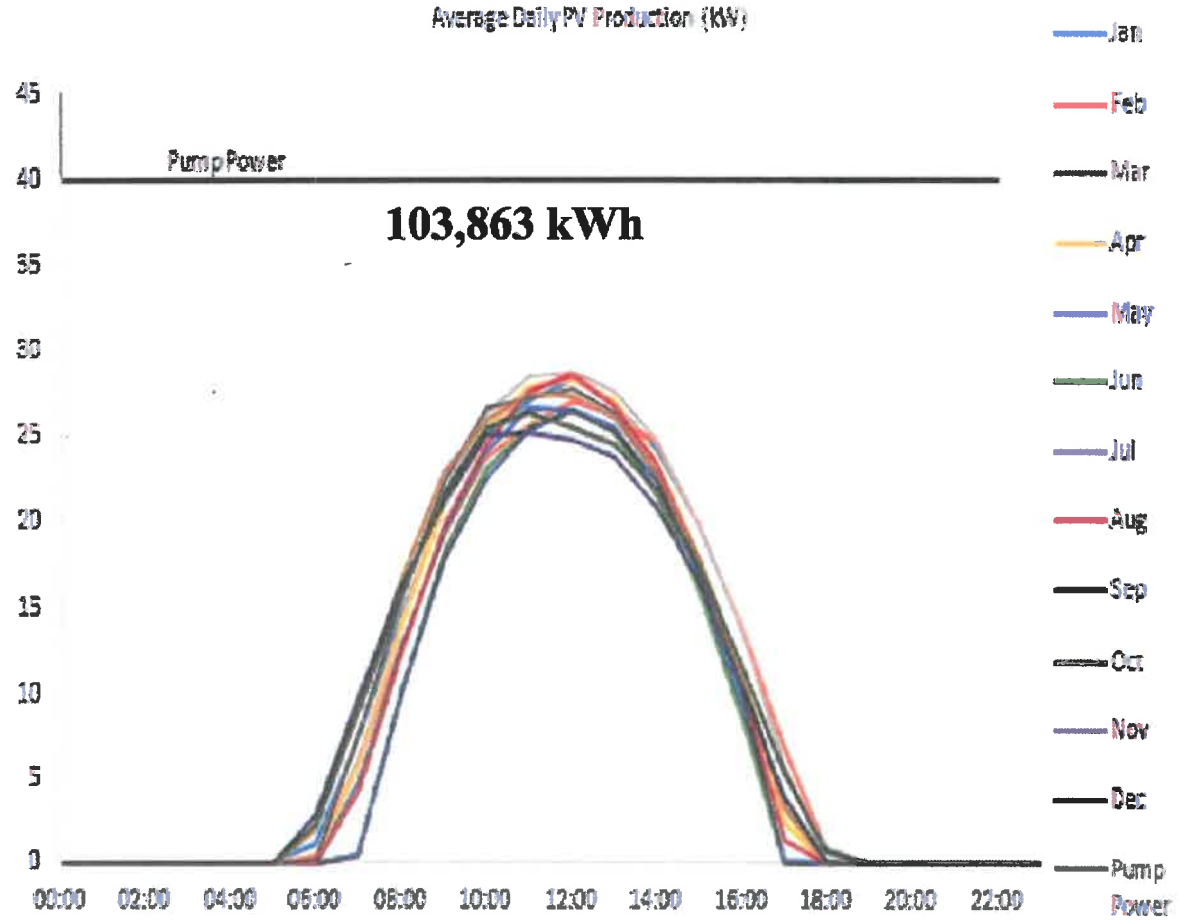
Options

1. **Only water at night and reduce the amount of water applied annually and accept the production loss**
2. **Look to an alternative for daytime irrigation**



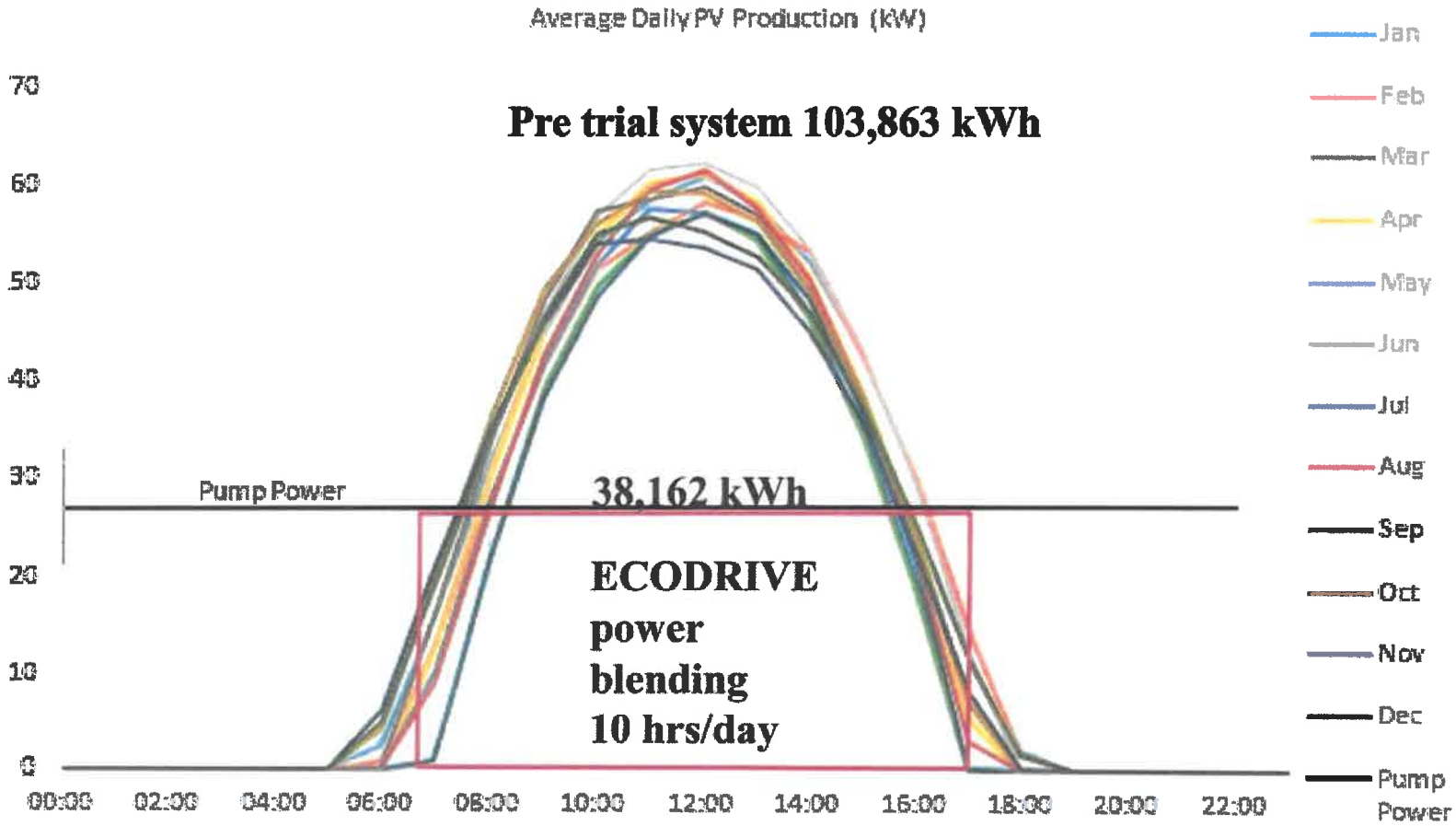
30 Kw solar was considered

30 kW with FIT is allowed but will only supplement about 4% of current 40 kW load



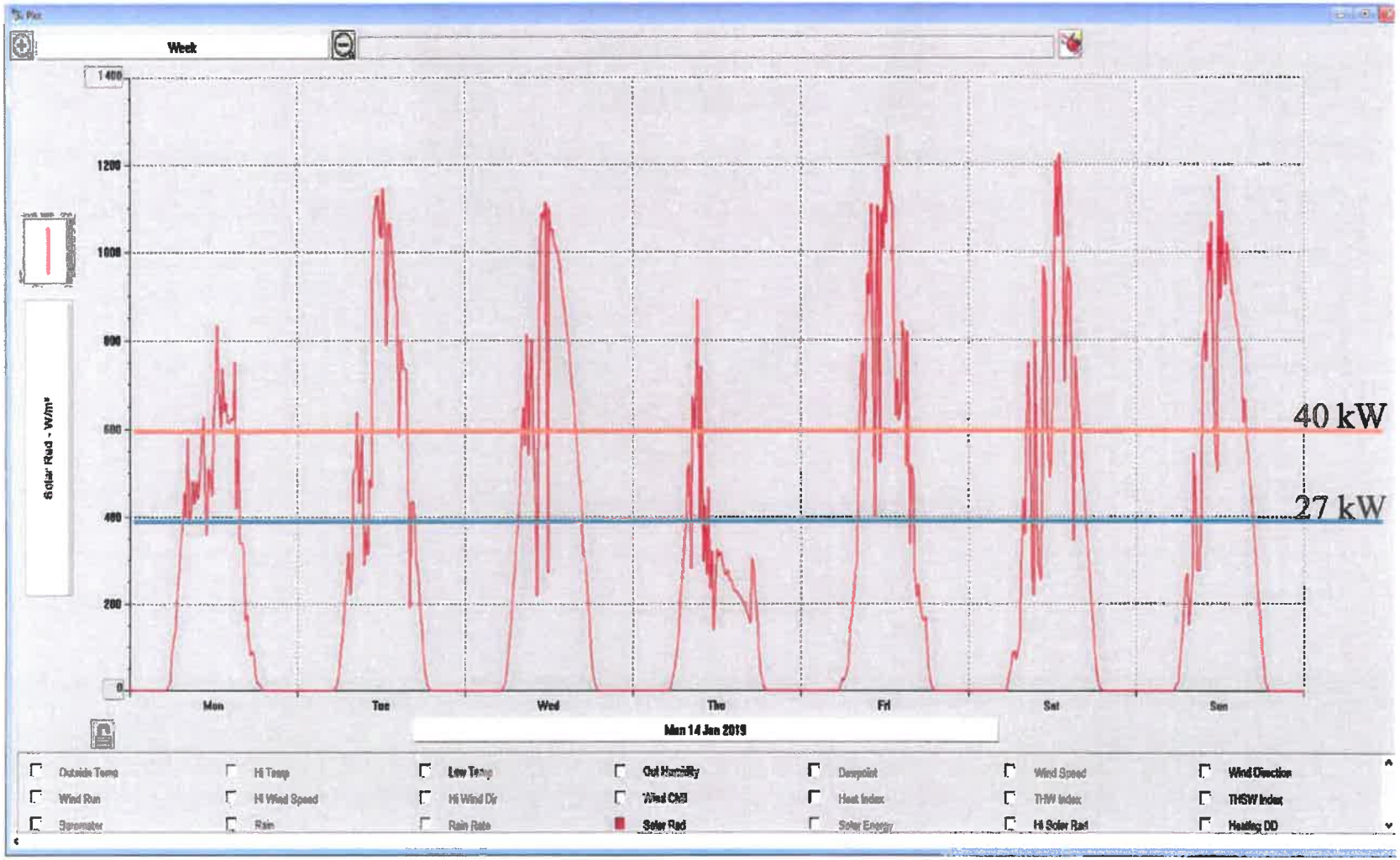
Annual pumping energy saved 4,240 kWh + FIT ($25,369 - $8,311 = $ 17058)

Load shed and power blend with ECODRIVE



Annual pumping energy saved 65,674 kWh ($25,369 - $16,045 = $ 9,208)

Cloudy conditions in coastal areas affect reliability



Potential crop moisture demand

Based on estimates of farm scale crop factors and historical rainfall data

Daily crop moisture demand (mm/day = E_T x crop factor)	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May
15% Autumn plant	4.2	6	7.4	6.9	7.1	6.8	4.5	2.9	2
15% spring plant	0	2	4	5.3	5.6	6.6	5.2	3.6	2.7
25% early season ratoon	1.5	2	4.5	6	7.1	6.5	5	3.5	2.6
25% mid season ratoon	0	2	3	4	5.6	6.4	4.9	3.4	2.5
20% late harvest ratoon	0	0	1.5	3.6	5.6	6.2	4.5	3.3	2.4
Average mm day	**1.1**	**2.4**	**4.1**	**5.2**	**6.2**	**6.5**	**4.8**	**3.3**	**2.4**

Farm monthly irrigation demand	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May
Farm monthly demand (mm/mth)	34	74	122	160	192	182	149	100	76
Average monthly effective rainfall (mm/mth)	21	41	58	90	123	127	91	52	62
Effective moisture deficit (mm/mth)	13	34	64	70	70	55	58	48	14
Gross irrigation required (mm/mth) 20% efficiency factor	**16**	**40**	**77**	**84**	**84**	**66**	**70**	**58**	**16**

Pumping system capacity

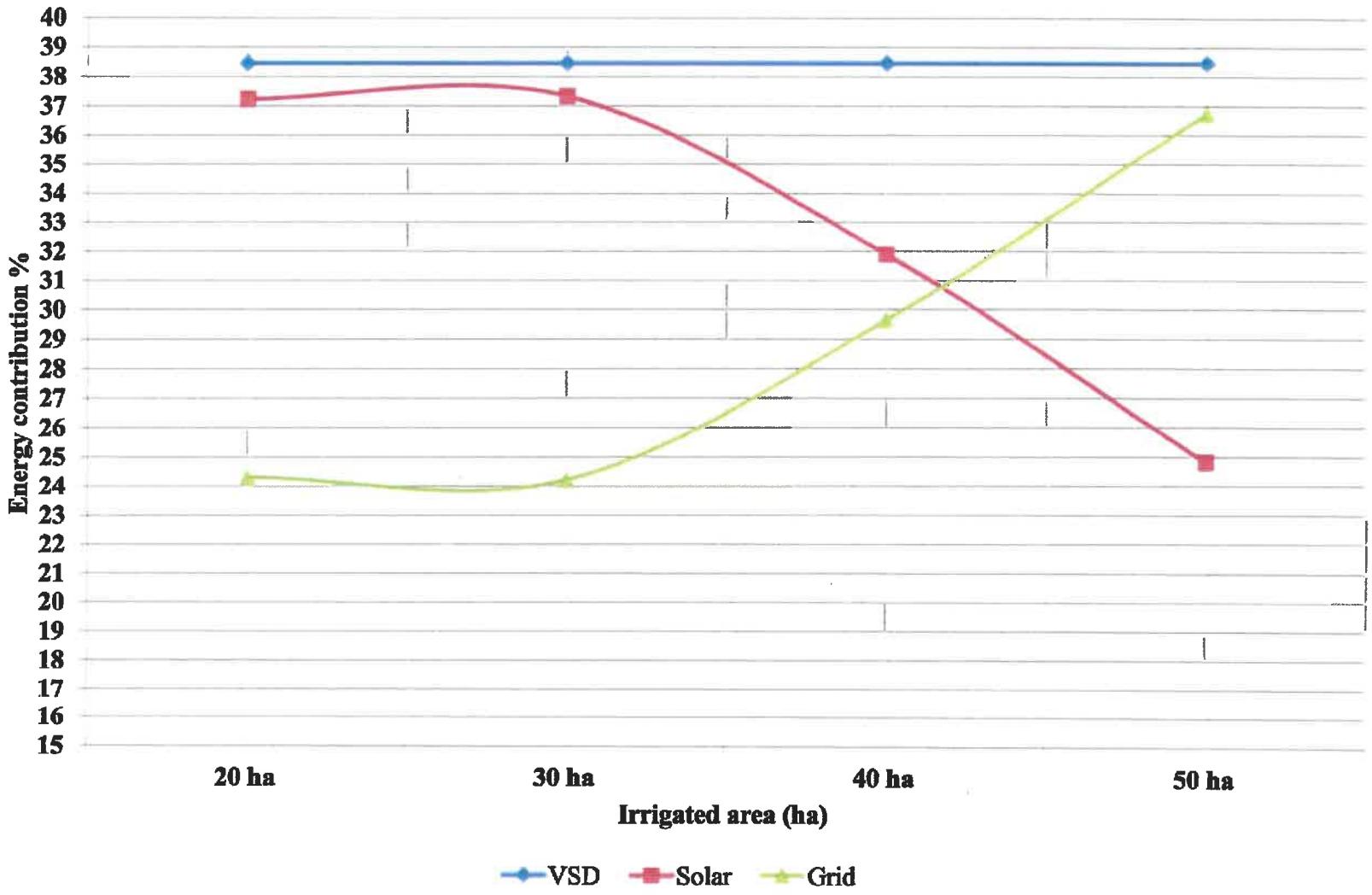
Modelled outcomes

Farm area ha	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	Total ML
50	50	50	50	50	50	50	50	50	50	
Irrigated area fraction of farm	0.25	0.5	0.75	1	1	1	1	1	1	
Irrigation ha	12.5	25	37.5	50	50	50	50	50	50	
Irrigation volume required (ML)	2	10	29	42	42	33	35	29	8	230

Pumping rate l/sec	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	Total
27	27	27	27	27	27	27	27	27	27	
Pumping hrs/month	20	104	298	434	430	338	359	299	84	2367
Pumping hrs per day	7	8	17	20	20	17	17	14	7	
Days per month	3	12	18	22	22	20	22	21	12	152

Energy mix per irrigated area

Modelled outcomes



Energy / cost saving and income potential (modelled outcomes)

Income is based on a sugarcane price of $37.00 t cane less $ 7.00 harvesting

	Irrigation	Crop	Irrigation	Yield	Yield	Probable	Historic
Area	Probable	stress	Historic	Probable	Historic	Income	Income
ha	ML	days	ML	tc/ha	tc/ha	gross tc	gross tc
50	4.38	22	2.5	103	82	$154,500	$123,000
40	4.43	17	2.5	104	82	$124,800	$98,400
30	4.47	13	2.5	104	82	$93,600	$73,800
20	4.52	9	2.5	105	82	$63,000	$49,200

Reflects potential energy and cost savings for the system when fully utilised

	Grid	Tariff 20	Solar /Grid	Tariff 20	Solar	Sav $
Area	Pre Trial	24.43	New	24.43	VSD - Eco	T20 -24.43
ha	kWh	c/kWh	kWh	c/kWh	kWh	c/kWh
50	103836	$25,369	38162	$9,323	65674	$16,045
40	83068	$20,295	24609	$6012	58459	$14,283
30	62301	$15,221	15674	$3,829	46627	$11,392
20	41534	$10,147	10091	$2,465	31443	$7,682

Conclusion

Business as usual (BAU) v's Hybrid energy system (HES)

50 ha

- Pre trial Irrigation energy cost : 20% of net income
- HES Irrigation energy cost : 6% of net income

20 ha

- Pre trial Irrigation energy cost : 20% of net income
- HES Irrigation energy cost : 4% of net income

HES provides a potential to install the pump drive system then incrementally add panels to suit the specific demand for each farm scenario.

Selection of Media from Renewables in Ag Conference held on 14th November in Wagga

Riverina ABC 15th November with Sally Bryant from 7.34min in. Interviews with participants
https://www.abc.net.au/radio/riverina/programs/breakfast/breakfast/11689094

Channel 9 news 14th November
https://www.facebook.com/9NewsRiverina/videos/611476736056264/UzpfSTY2MDk5MDU0NToxMDE1NzMxNzgxNDkzNTU0Ng/?fref=nf&__tn__=m-R&eid=ARAoSt-yk9Y6IIHgnFRqNJAursDx5YkTBGMhucrwbXcKFSP7B1t4WZkogfkM2aq29N1FRj_MbMr3WjUa&__xts__[0]=68.ARCXXqmPAZD9R8D-YpBVuHOf5O-W7YMTlH5qVGFdkAWRge7o5bRE5FiM4y_ey-li2QK78a5iW2R2OvBFAKTiVqRNo9MdZF_dfrEtS1wO9jjj1D5LOZ1cRhE5wTJmQmu1XYb1t3nZLV1WP9lH4MeeqEWgfxy3-trBSOsaLfGOsy3Rcil1hJo7-oHNd0ftBp7bLuSJvELkjSxbJOkd6jIc9msWVjeevTlqvsuGA-Glf75-Jdzyp4KXQ4rI8kQFYsLEHi2k6fOyUlY2amU6E4V3GuhfceDgcZe-wzSSWZTtNOf641zOVkmM5lRPka-448mi7xNvrBWvLeEU3Y0BYc4

Prime 7 News, 13.30mins in. 14th November
https://www.youtube.com/watch?v=YXz2QPAHqGU

NSW Country Hour 14th November
https://www.abc.net.au/radio/programs/nsw-country-hour/nsw-country-hour/11684422

The Land 15th November
https://www.theland.com.au/story/6493476/focus-on-renewable-energy-in-wagga-wagga-video-photos/?cs=4941#slide=1