Bundaberg Sugar Industry Renewable Energy Project

Adapting Renewable Energy Concepts to Irrigated Sugarcane Production at Bundaberg

Cooperating Irrigator:

Killer Family Holdings Pty Ltd

Subcontractors:

Bundaberg CANEGROWERS Ltd

SUGAR SERVICES

REAQUA SOLAR PUMPING

GEMENERGY

SUNFAM CRT

Activity Steering Committee:

Dr Georgina Davis — QFF Queensland Farmers' Federation

Eddy Vickery — ARENA Australian Government Australian Renewable Energy Agency

Axel Braunsberger — Ergon Energy

Maurie Haines — Sugar Services

Bundaberg Sugar Industry Renewable Energy Project Objectives

Develop and deploy a field trial of renewable (solar) energy pumping systems to test compatibility with the existing BUNDABERG sugarcane irrigation infrastructure and farming methods.

Test existing managerial practices and amendments to confirm viability of conversion to renewable system.

Assess the potential for productivity gain/increased profitability attributable to renewable energy adoption.

Extend knowledge gained to industry stakeholders, financiers, government agencies and community.

The new irrigation pumping system with solar irrigation trial was installed at Killers Farm near Sharon in January 2018 and has completed 263 hrs of trials during January and February of 2018.

The irrigation method is a soft hose big gun system (water winch).

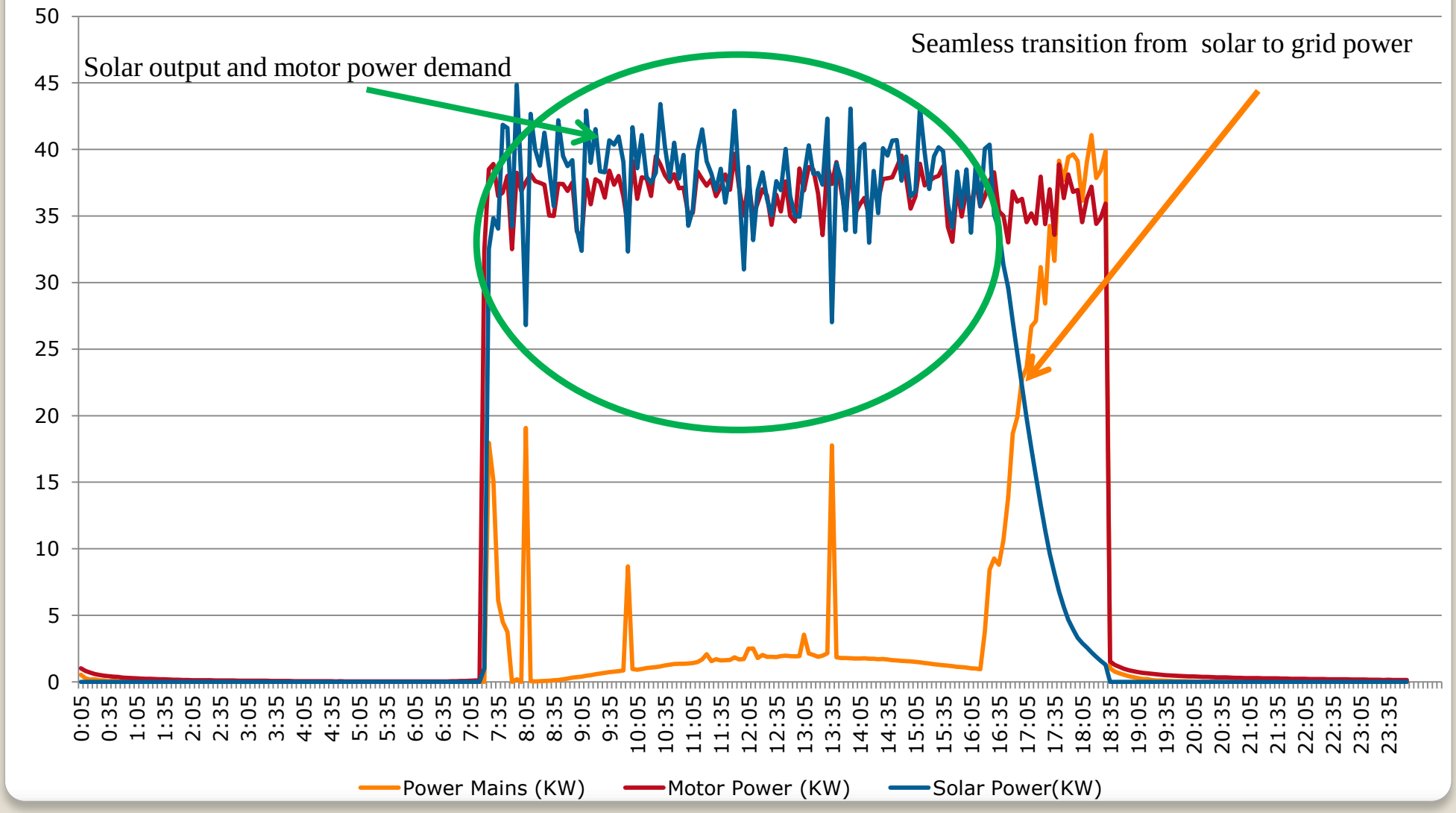
• The **original pumping system** with 45 kW motor used a constant 39kW/hr which all came from the Ergon grid and pressure differentials were managed by a gate valve on the pressure side of the pump.

• The **new pumping system** with 45 kW motor has a demand load averaging 26 kWh.

This is achieved through new motor and pump technology and the VSD Ecodrive which varies the load on the motor according inflow pressure and outflow pressure required to run the winch irrigator.

VSD
Ecodrive

This example illustrates how the solar system can provide almost all power required from 7.00 am to 4.00 pm during days of full sunshine
The VSD Ecodrive provides a seamless transition from solar to grid supply



Original pumping system – estimates of performance based on audits prior to replacement with solar irrigation trial system				
Date	Pumping time	Est Grid demand	Water pumped	Grid kWh
Period ending	Hrs / period	kWh's	ML	Per ML
25-01-18	0	0	0	0
29-01-18	40	1560	3.47	449.6
01-02-18	49	1911	4.26	448.6
06-02-18	16	624	1.39	448.9
15-02-18	116	4524	10.08	448.8
21-02-18	42	1638	3.65	448.8
	263	10257	22.85	**448.9**

Performance of new pumping system with solar trial - based on data from the Bundaberg solar irrigation trial system							
Date	Meter readings	Pumped time	Grid demand	Solar input	Total pump energy demand	Water pumped	Mains use per ML
Period ending	Mains kWh	Hrs	kWh	kWh	kWh	ML	kWh
25-01-18	43908	0	0	0	0	0	
29-01-18	44336	40	428	606	1034.2	3.47	123.3
01-02-18	44795	49	459	808	1266.9	4.26	107.7
06-02-18	45118	16	323	91	413.7	1.39	232.4
15-02-18	45263	116	145	2854	2999.2	10.08	14.4
21-02-18	45570	42	307	779	1085.9	3.65	84.1
		263	1662	5138	6800	22.85	**72.4**

Potential savings in energy demand required from the grid (mains) supply.

Inputs and savings	New pumping system kWh	Original pumping system kWh	Total kWh saved
Mains demand	1662	10257	
Reduction due to motor/ pump efficiency + VSD	3457	0	3457
Reduction due to Solar	5138	0	5138
Combined pump efficiency and solar impact	8595	0	8595

Impact of reduced kWh per ML Pumped

The original system was using 448.9 grid kWh's for each ML of water pumped.

The new system with its combination of efficiency improvement and the introduction of solar has used only 72.7 kWh's per ML

Original pumping system	New pumping system	Reduction in grid demand	Saving
kWh/ML	KWh/ML	kWh/ML	%
448.9	72.4	376.5	**83.87**

Potential payback periods and savings over lifetime of the solar equipment (25 years)

Operating hours (Year)	Water Pumped each year (ML)	Pay Back Period (Years)	Total saving after Payback
1000	90	19.8	$45,000
1500	130	13.2	$163,000
2000	175	9.9	$254,000
2500	220	7.9	$385,000
3000	260	6.6	$499,000

Caution –This extrapolation of long term outcomes is an estimate based on a 28 day sample of management practices and pump performance data from the Bundaberg solar irrigation trial site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ARENA
Australian Government
Australian Renewable Energy Agency
Bundaberg Regional Irrigators Group
Representing member irrigators in the Bundaberg Irrigation Area
Cooperating Irrigator:
Subcontractors:
SUGAR SERVICES
SUNFAM
Activity Steering
Dr Georgina Da
Gemma Ansell
Axel Braunsberge
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mate


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I’ve Seen The Future and It’s Solar Powered Pumping

Published on February 23, 2018 by Dr Georgina Davis,
Founder and Thought Leader, the Waste to Opportunity Enterprise

This week saw the official launch of an innovative agricultural project ‘*Adapting Renewable Energy Concepts to Irrigated Sugar Cane Production at Bundaberg’*

The project aims to reduce irrigators’ dependence on grid-supplied electricity, which powers the majority of irrigation systems in Bundaberg.

In an effort to combat rising electricity prices, the project aims show the cost efficiencies that can be achieved by using solar PV to power high pressure irrigation systems.

The Bundaberg Regional Irrigators Group (BRIG) led the delivery of the project, which is supported by an investment from the Australian Government, through the Australian Renewable Energy Agency (ARENA).