

Milestone D3.1 - Attachment E: Crop and energy efficiency relationship

Arena solar/VSD trial project at Killer farm Bundaberg - Economic evaluation of the new solar/VSD irrigation pumping system and the previous 45 kw all grid supplied irrigation pumping system

Impact of summer and autumn solar radiation and day/night utilisation is shown in by new system kWh/Hr column which illustrates variable kWh for individual periods of time.

NEW PUMPING SYSTEM								
	Run time	Ergon	Mains	ML				Mains cost
Date	hrs	Meter	kwh	water use	kwh/ hr	kWh/ML	/ period	
15-01-18	Start	42644	/ period	/ period				27.718 c/kwh
25-01-18	91	43908	1264	7.96	13.89	158.76		\$350.36
29-01-18	40	44336	428	3.50	10.70	122.30		\$118.63
Summer	01-02-18	49	44795	459	4.29	9.37	107.07	\$127.23
	06-02-18	16	45118	323	1.40	20.19	230.74	\$89.53
	15-02-18	25	45263	145	2.19	5.80	66.29	\$40.19
	21-02-18	42	45570	307	3.67	7.31	83.55	\$85.09
Autumn	19-03-18	16	45981	411	1.40	25.69	293.61	\$113.92
	29-03-18	1	46000	19	0.09	19.00	217.17	\$5.27
	16-04-18	2	46036	36	0.17	18.00	205.74	\$9.98
	30-04-18	26	46375	339	2.27	13.04	149.03	\$93.96
	03-05-18	20	46583	208	1.75	10.40	118.87	\$57.65
	08-05-18	15	46782	199	1.31	13.27	151.64	\$55.16
	05-06-18	55	476	476	4.81	8.65	98.92	\$131.94
	Totals	398		4614	34.82			\$1,278.91

OLD PUMPING SYSTEM							NEW SYSTEM ENERGY SAVINGS	
	Run time	Est Mains	ML			Mains cost		Solar with VSD
Date	hrs	kWh /	water use	kwh/hr	kWh/ML	/ period		/ period
		period	/ period		/period	27.718 c/kwh		
25-01-18	91	3549	7.96	39	446	\$983.71		\$633.36
29-01-18	40	1560	3.50	39	446	\$432.40		\$313.77
Summer	01-02-18	49	1911	4.29	39	\$529.69		\$402.47
	06-02-18	16	624	1.40	39	\$172.96		\$83.43
	15-02-18	25	975	2.19	39	\$270.25		\$230.06
	21-02-18	42	1638	3.67	39	\$454.02		\$368.93
Autumn	19-03-18	16	624	1.40	39	\$172.96		\$59.04
	29-03-18	1	39	0.09	39	\$10.81		\$5.54
	16-04-18	2	78	0.17	39	\$21.62		\$11.64
	30-04-18	26	1014	2.27	39	\$281.06		\$187.10
	03-05-18	20	780	1.75	39	\$216.20		\$158.55
	08-05-18	15	585	1.31	39	\$162.15		\$106.99
	05-06-18	55	2145	4.81	39	\$594.55		\$462.61
	Totals	398	15522	34.82		\$4,302.39		\$3,023.48

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

Inputs and savings	New pumping system kWh	Original pumping system kWh	Total kWh saved
Mains demand	4614	15522	
Reduction due to motor/ pump efficiency + VSD	5519	0	5519
Reduction due to Solar	5389	0	5389
Combined pump efficiency and solar impact	10908	0	10908