Energy Efficiency Gains for Australian Irrigators

Irrigation Australia Conference 2014
Gold Coast, Queensland

Michael Scobie
Research Engineer (Irrigation and Water Resources)
Discussion topics

- The EEGAI project
- Energy Auditing
  - Benchmarking and detailed investigations
- Preliminary data and trends
- Difficulties
- Continuation
EEGAI Project

- Funding from the Australian Government 2013 - 2015
  - Energy Efficiency Information Grants
  - Target Area are the Burdekin and Bowen basins

- A holistic approach
  - Scrutiny of infrastructure
  - A review of water use and application efficiencies
  - A review of tariff options

A Research Centre of the University of Southern Queensland
EEGAI Project

Aims to build the capacity of Australian Irrigators to adopt energy efficiency practices and technologies

- Information research
- Develop new information materials
- Conduct training
- Conduct workshops, seminars, etc
- Auditing
- Benchmarking

The EEGAI project
Energy Auditing
Preliminary data and trends
Difficulties
Continuation
EEGAI Project

Aims to build the capacity of Australian Irrigators to adopt energy efficiency practices and technologies

- Information research
- Develop new information materials
- Conduct training
- Conduct workshops, seminars, etc
- Auditing
- Benchmarking
Energy Auditing

- **Level 1**
  - Basic look at gross energy usage
  - Overview – Accuracy of savings and costs +/-40%

- **Level 2**
  - More detailed look at individual areas of energy use
  - Energy Use Survey – Accuracy +/-20%

- **Level 3**
  - Detailed investigation into how much energy is being used over time
  - High Level Audit - +/- 10%
Level 1 Energy Auditing

The EEGAI project

Energy Auditing
Preliminary data and trends
Difficulties
Continuation
Preliminary Data and Trends

The EEGAI project
Energy Auditing
Preliminary data and trends
Difficulties
Continuation

A Research Centre of the University of Southern Queensland
Difficulties

- Grower engagement
- Industry engagement
- Getting data – electricity data from the supply company
- Effort involved in a L1 underestimated
  - Initial plan was a kitchen table interview
  - Has evolved into a bulk data collection from the electricity supplier and mill
Continuation

- Training program
  - Very successful
  - To continue in the Burdekin and satellites
Continuation

- Complete 220 Level 1
- Complete 30 Level 3

**Calculated Performance Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Rate</td>
<td>26.78 ML/Day (310 l/sec)</td>
</tr>
<tr>
<td>Flow Rate (target)</td>
<td>25.06 ML/Day (290 l/sec)</td>
</tr>
<tr>
<td>Total Dynamic Head</td>
<td>33.66 (m)</td>
</tr>
<tr>
<td>Total Dynamic Head (target)</td>
<td>27.90 (m)</td>
</tr>
<tr>
<td>Energy/Volume</td>
<td>104.44 (kWh/ML)</td>
</tr>
<tr>
<td>Engine Derating Factor</td>
<td>98%</td>
</tr>
</tbody>
</table>

**Performance**

- Combined / Overall Performance: 28.04%

**Specific Speed**

- Target Specific Speed: Insufficient input to calculate Target Specific Speed
- Nominal Specific Speed: Insufficient input to calculate Nominal Specific Speed
- Measured Specific Speed: 71.92

**Pumping Cost**

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grower Cost</td>
<td>$32.93/ML</td>
</tr>
<tr>
<td>Comparison Cost at $1.20/l</td>
<td>$37.63/ML</td>
</tr>
<tr>
<td>Grower Cost ($/ML/m)</td>
<td>$0.98/ML/m</td>
</tr>
<tr>
<td>Comparison Cost at $1.20/l</td>
<td>$1.12/ML/m</td>
</tr>
</tbody>
</table>

![Graph showing electricity usage per unit and cost per unit]

The EEGAI project
Energy Auditing
Preliminary data and trends
Difficulties
Continuation
Continuation

- Tool is web based
  - growers can use it year after year
- Case studies to publish some findings
Energy Efficiency Gains for Australian Irrigators

DWS Irrigation
Daley's Water Service Pty Ltd
Specialising in Water & Energy Efficiency

AgriTech Solutions

Sugar Research Australia™
A Research Centre of the University of Southern Queensland

BBIFMAC
University of Southern Queensland
fulfilling lives