



Leisure Institute of WA Aquatics (Inc)

Aquatic Facility Sustainability

Energy and Water Efficiency



Leisure Institute of WA Aquatics (Inc)

INDUSTRY STATISTICS

Patronage = 9,924,596 p.a

- On average every Western Australian uses a Public Aquatic Centre 4.8 times per year.

Total Expenditure \$68,284,832

Estimated facilities manage 1,960,699,096 litres of water

Employ 356 full time, 276 part-time and 2,205 casual staff



Leisure Institute of WA Aquatics (Inc)

Fremantle Leisure Centre closes all pools in wake of WA's gas crisis

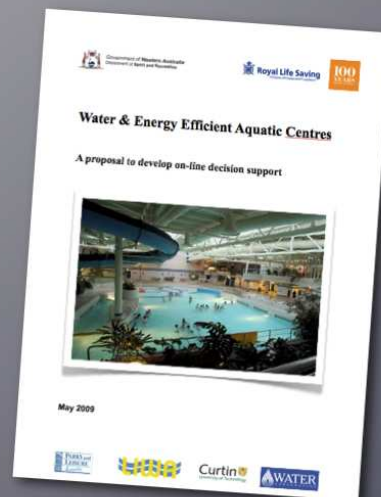
FOLLOWING discussions with AlintaGas, Fremantle Leisure Centre has closed down all swimming pools in response to WA's gas emergency.

"All swimming pools across the metropolitan area are being affected and all of our pools will be shut until further notice from 7pm tonight," Fremantle Leisure Centre

LIWA Water & Energy Efficiency

Web-based decision support for aquatic centres

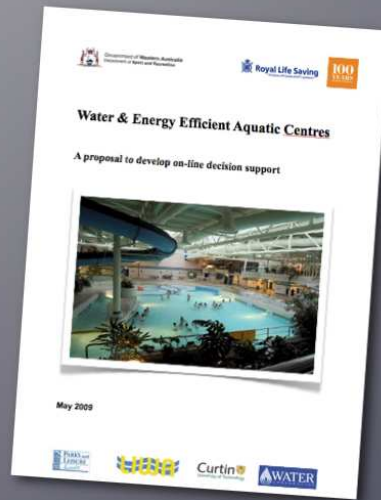
- Industry partnership model
- Benchmark the industry
- Best (worst) practice
- Scenarios of upgrade
- Forward planning.



LIWA Tasks completed

Web-based decision support for aquatic centres

- Review of National issues
- Collating, cleaning, importing LIWA data
- Initial scoping of LIWOC system
- Initial scoping of water conservation scenarios
- Initial system interface design



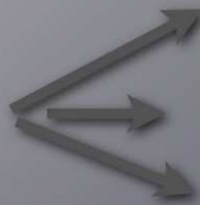
Summary of National Findings

Sub-optimal institutional capacity



- Poor knowledge of technical solutions
- Little sharing of upgrade knowledge

Slow uptake of best practice



- Poor understanding of water use partitioning
- Poor inspections and preventative maintenance
- Common, cheaper BMPs being implemented

Information provided by:



Workflow

Monitoring & evaluation



Sources of water loss

- Water filter backwash
- Leaking/faulty float valves
- Evaporation
- Pool shell or hydraulic system leaks
- Splash and bather carry out
- Showers, toilets

Workflow

Water & Energy Efficiency

LIWA

Leisure Institute of WA - Water Options Calculator

LIWOC Main Menu

<input type="button" value="Aims"/> Aims of LIWOC	Overview of LIWOC <input type="button" value="Overview"/>
<input type="button" value="Buildings"/> Buildings	Pools <input type="button" value="Pools"/>
<input type="button" value="Change rooms"/> Change rooms	Plant room <input type="button" value="Plant room"/>
<input type="button" value="Grounds"/> Grounds	Strategies <input type="button" value="Strategies"/>
<input type="button" value="Report"/> Printing LIWOC report	<i>Minimising tap water usage</i>
<input type="button" value="Export"/> Export final data	<i>Minimising ground water usage</i>
	<i>Water reuse and recycling</i>
	<i>Minimising power usage</i>
	<i>Minimising gas usage</i>
	<i>Improving management</i>
	<i>Communicating results</i>

Workflow

Main
Go to
Main Menu

Water calculations

LIWA

This Water Options Calculator is designed to:

1. provide a single integrated interface for LIWA aquatic centre data;
2. use data for all WA public pools to establish regional benchmarks;
3. to establish normal ranges of water usage for various parts of aquatic centres;
4. facilitate scenario planning of various water conservation measures (ie. best practice methods); and,
5. promote a culture of continuous improvement.

Equations

Ev Evaporation volume kl = Potential local evaporation mm * Evaporation factor * surface area m2

Evaporation factor is a function of whether the pool is indoors, shaded or in the open

Cr Change room usage kl = Toilets + Urinals + Showers + Hand basins + Washdown

Pr Plant room usage kl = Backwash profile * Backwash maintenance schedule

Eu External usage kl = Irrigated turf area m2 * T irrigation rate mm + Irrigated gardens area m2 * G irrigation rate mm

Tu Total usage kl = Ev + Cr + Pr + Eu + Splash loss + Leakage

or...

Leakage = Tu - (Ev + Cr + Pr + E + Splash loss)

Workflow

Main Pools

LIWOC - Buildings and staff

LIWA

Aquatic Centre information

Name

Region

Web site:

Street address:

Postal address:

Google map link:

Annual patronage:

No of full time staff:

No of part time staff:

No of casual staff:

Total no of staff:

Buildings

Areas (m2)

Total roof area



Heating electric:

Heating gas:

Heating geothermal:

Heating solar:

Heating other:

Heating other description:

Total power usage kW:

Total gas usage Units:

Total tap water usage kl:

Total ground water usage kl:

Total expenditure on power:

Total expenditure on gas:

Total expenditure on tap water:

Total expenditure on ground water:

Centre annual expenditure:

Workflow

Main Buildings

LIWOC - Pools

Aquatic Centre information

Name:

Region:

Total water in all pools (kl):

Total water usage (kl):

Total expenditure on water:

Pool water turnover (hrs):

	Length	Breadth	Shallow depth	Deep depth	
Pool 1	<input type="text" value="25.00"/>	<input type="text" value="22.00"/>	<input type="text" value="0.80"/>	<input type="text" value="1.56"/>	Calculated surface area total m2: <input type="text" value="1194"/>
Pool 2	<input type="text" value="25.00"/>	<input type="text" value="20.00"/>	<input type="text" value="1.00"/>	<input type="text" value="1.60"/>	
Pool 3	<input type="text" value="12.00"/>	<input type="text" value="10.00"/>	<input type="text" value="0.80"/>	<input type="text" value="0.80"/>	Calculated volume_total m3: <input type="text" value="1415"/>
Pool 4	<input type="text" value="6.00"/>	<input type="text" value="4.00"/>	<input type="text" value="0.40"/>	<input type="text" value="1.30"/>	LIWA volume_total m3: <input type="text" value="1235"/>
Pool 5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

LIWOC_Pool pic1

LIWOC_Pool pic2

LIWOC_Pool pic3

LIWOC_Pool pic4

LIWOC_Pool pic5

LIWOC_Pool pic6

Workflow

Main Pools

LIWOC - Grounds

Aquatic Centre information

Name:

Region:

Web site:

Street address:

Postal address:

Google map link:

Grounds

Areas (m2)

Car park area m2:

Irrigated turf m2:

Irrigated gardens m2:

Non-irrigated landscape m2:

Regional information

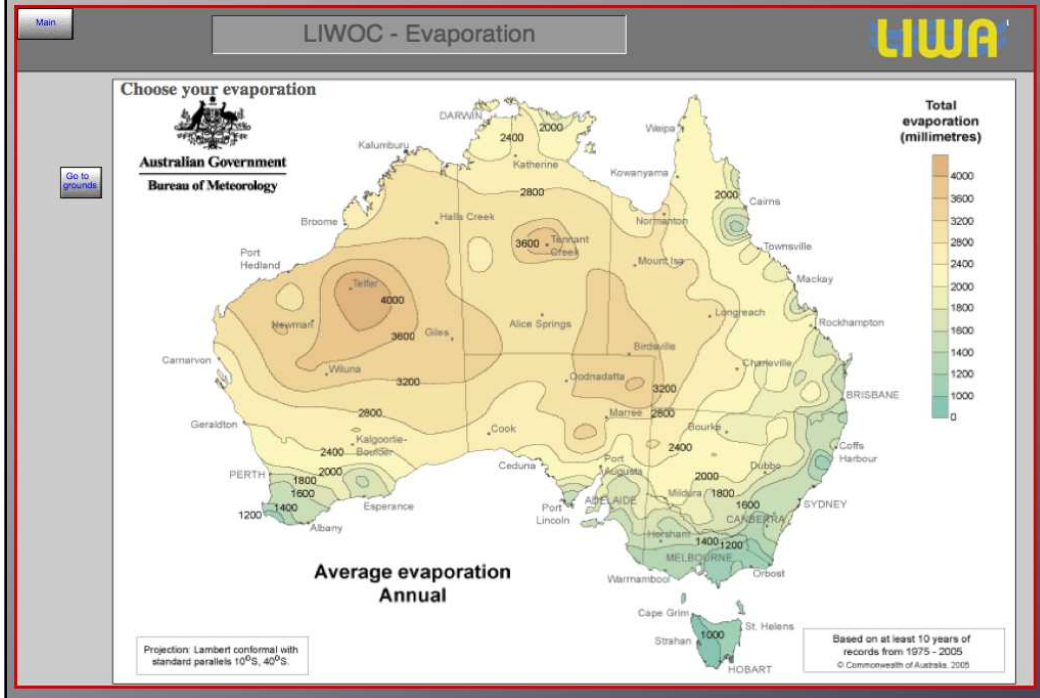
Annual rainfall mm

- <300
- 300-899
- 900-1499
- 1500-2099
- 2100-2700
- >2700

Annual evaporation mm

- 1000-1599
- 1600-2399
- 2400-3199
- >3200

Workflow



Workflow

LIWOC - Grounds

LIWA

Main Pools

Aquatic Centre information

Name:

Street address:

Postal address:

Region:

Web site:

Google map link:

Grounds

Areas (m²)

Car park area m²

Irrigated turf m²

Irrigated gardens m²

Non-irrigated landscape m²

Regional information

Annual rainfall mm

Select rainfall

<300

300-899

900-1499

1500-2099

2100-2700

>2700

Annual evaporation mm

1000-1599

1600-2399

2400-3199

>3200

Workflow

Main Pools

LIWOC - Buildings and staff



Aquatic Centre information

Name:
 Region:

Street address:
 Albany Leisure and Aquatic Centre,
 Barker Road, Albany, Western
 Australia, 6330

Postal address:
 Albany Leisure and Aquatic Centre, PO
 Box 484, Albany, 6331

Web site:

Google map link:

Annual patronage:
 No of full time staff:
 No of part time staff:
 No of casual staff:
 Total no of staff:



Buildings

Areas (m2)
 Total roof area:

Heating electric:	<input type="text" value="No"/>	Total power usage kW:	<input type="text"/>	Total expenditure on power:	<input type="text"/>
Heating gas:	<input type="text" value="Yes"/>	Total gas usage Units:	<input type="text"/>	Total expenditure on gas:	<input type="text"/>
Heating geothermal:	<input type="text" value="No"/>	Total tap water usage kl:	<input type="text"/>	Total expenditure on tap water:	<input type="text"/>
Heating solar:	<input type="text" value="No"/>	Total ground water usage kl:	<input type="text"/>	Total expenditure on ground water:	<input type="text"/>
Heating other:	<input type="text" value="No"/>			Centre annual expenditure:	<input type="text" value="\$2,600,000"/>
Heating other description:	<input type="text" value="No"/>				

Workflow

Main Pools

LIWOC - Buildings and staff



Aquatic Centre information

Name:
 Region:

Street address:
 Altona Park Leisure Centre, 332 Benara
 Road, Beechboro, Western Australia,
 6063

Postal address:
 Altona Park Leisure Centre, 332 Benara
 Road, Beechboro, Western Australia,
 6063

Web site:

Google map link:

Annual patronage:
 No of full time staff:
 No of part time staff:
 No of casual staff:
 Total no of staff:



Buildings

Areas (m2)
 Total roof area:

Heating electric:	<input type="text" value="No"/>	Total power usage kW:	<input type="text"/>	Total expenditure on power:	<input type="text" value="\$100,600"/>
Heating gas:	<input type="text" value="Yes"/>	Total gas usage Units:	<input type="text"/>	Total expenditure on gas:	<input type="text"/>
Heating geothermal:	<input type="text" value="No"/>	Total tap water usage kl:	<input type="text"/>	Total expenditure on tap water:	<input type="text"/>
Heating solar:	<input type="text" value="No"/>	Total ground water usage kl:	<input type="text"/>	Total expenditure on ground water:	<input type="text"/>
Heating other:	<input type="text" value="No"/>			Centre annual expenditure:	<input type="text" value="\$534,000"/>
Heating other description:	<input type="text" value="No"/>				

Workflow

Main Pools

LIWOC - Buildings and staff

LIWA

Aquatic Centre information

Name: Carnarvon Aquatic Centre
Region: Mid West


Street address: Carnarvon Aquatic Centre, Lot 103, Carnarvon, Western Australia, 6701
Postal address: Carnarvon Aquatic Centre, C/- Shire of Carnarvon, Carnarvon, 6701

Web site: <http://www.carnarvon.wa.gov.au>
Google map link: <http://maps.google.com/maps?>

Annual patronage: 25,662
No of full time staff: 1
No of part time staff: 0
No of casual staff: 1
Total no of staff: 2

Buildings

Areas (m2)
Total roof area:



Heating electric: No
Heating gas: No
Heating geothermal: No
Heating solar: No
Heating other: No
Heating other description:

Total power usage kW:
Total gas usage Units:
Total tap water usage kl:
Total ground water usage kl:

Total expenditure on power:
Total expenditure on gas:
Total expenditure on tap water:
Total expenditure on ground water:

Centre annual expenditure: \$192,260

Workflow

Home Water Energy

LIWOC - Strategies

LIWA

Minimising water usage | Water reuse and recycling | Minimising power usage | Minimising gas usage | Improving management | Communicating results

Pool deck | Change rooms | Plant room | Grounds potable/ground water

Aquatic Centre information

Name: Carnarvon Aquatic Centre
Region: Mid West

Total tap water usage kl:
Total ground water usage kl:

	No of:	No with low flow:	No with timers:
Showers:	<input type="text" value="6"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Hand basins:	<input type="text" value="8"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

	No of:	No with dual flush:
Toilets:	<input type="text" value="12"/>	<input type="text" value="12"/>

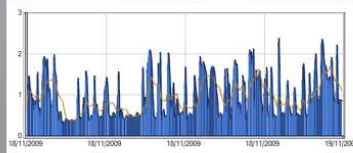
	No of:	No waterless:
Urinals:	<input type="text" value="4"/>	<input type="text" value="0"/>

Total expenditure on tap water:
Total expenditure on ground water:

Monitoring & evaluation - eg Hydroshare

Soft systems
eg governance, water bills

Hard systems
eg Water, energy consumption partitioning



What is the gauge showing?

The gauge below is comparing usage for the current month against usage for the previous month.
Place the mouse cursor over that face of the gauge for more information. Placing your cursor over the gauge needles provides usage detail.



What else can you do with the gauges?

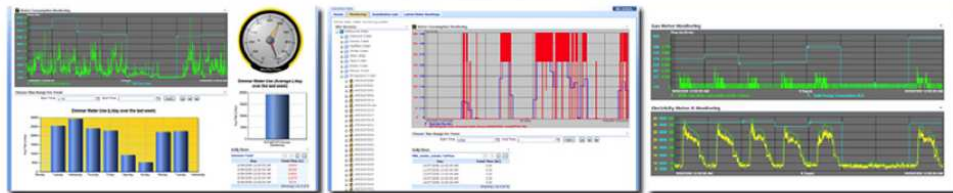
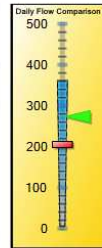
The gauge below shows other types of things that can be done. It is providing estimated leakage data based on usage between midnight and 3 am.
Place the mouse cursor over the different areas of the gauge for more information such as Average flow rate and Maximum leakage over the last 7 days.



Carbon Emission and Energy Rating Data

19/11/2009

Meter Number	Meter Type	Average Daily			Green Star Rating
		Energy	Kg CO2 /day	balloons of CO2	
SFDS34232	Electricity	12.44	1234.1	24682	★★★★
FF342342/1	Gas	45.33	4534.3	90686	★★★★
GGETT3334	Gas	23.33	2022.7	40454	★★★
12FFF45345	Electricity	0.332	45.2	904	★★
ELECT_main01	Electricity	0.23	36.2	724	★★½
UIP600082	Gas	100.99	10234.2	204684	★



LIWOC - Continuing Tasks

Web-based decision support for aquatic centres

- Importing GHD audit data
- Filling gaps in LIWA and GHD data
- Further developing water conservation scenarios
- Development of electricity and gas conservation measures
- Development of water recycling and reuse scenarios
- Finalisation and testing of interface
- Communications, documentation.

