ATTACHMENTS
MINUTES

Vincent Community Board

Tuesday, 2 March 2021

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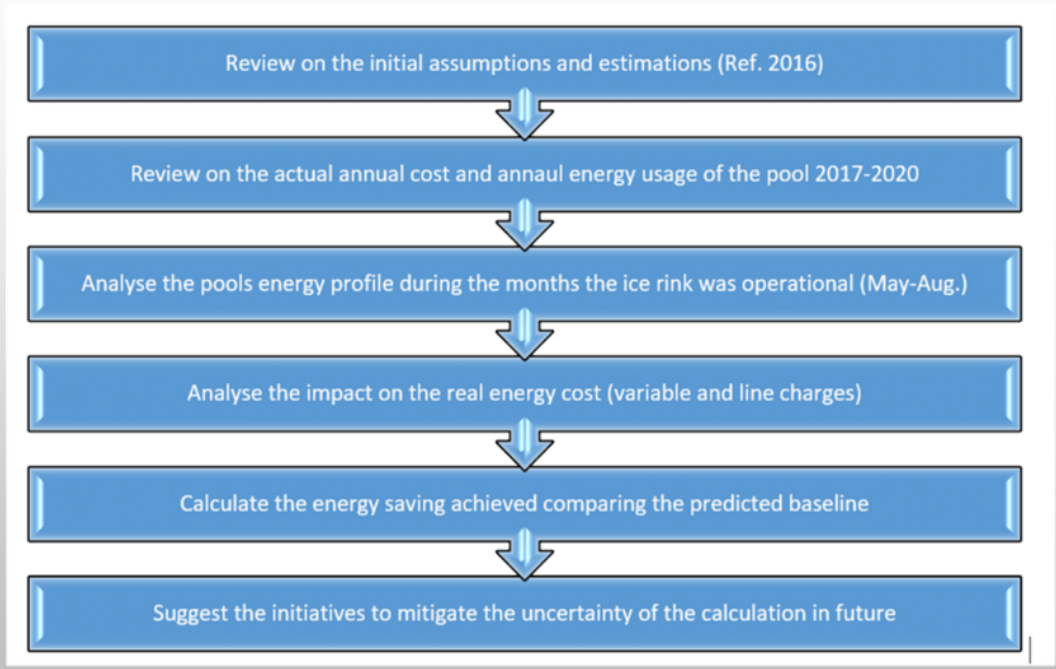
Energy and demand cost savings review for the Molyneux Aquatic Centre.

2nd March 2021

Waste Heat Recovery System

Approach


Review on the initial assumptions and estimations (Ref. 2016)
Review on the actual annual cost and annaul energy usage of the pool 2017-2020
Analyse the pools energy profile during the months the ice rink was operational (May-Aug.)
Analyse the impact on the real energy cost (variable and line charges)
Calculate the energy saving achieved comparing the predicted baseline
Suggest the initiatives to mitigate the uncertainty of the calculation in future

Findings

Savings were estimated at $47,000 at the end of the first year and $71,800 by year 3.

Initial cost savings estimates were based on:

- Energy savings of 180,000kWh/year
- Congestion period demand savings of 40kW.

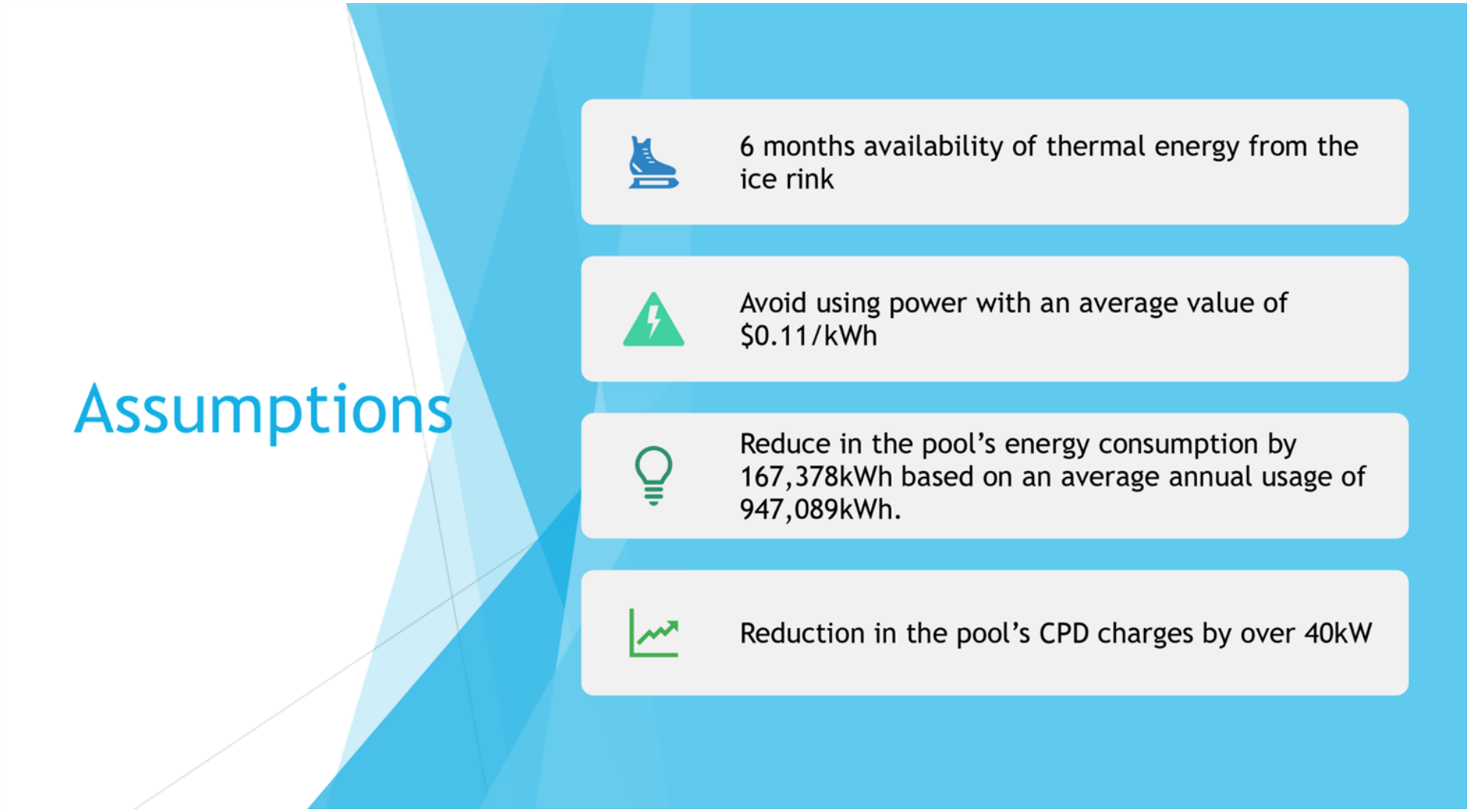
	Model	2018	2019
1	Baseline model used in Vincent Community Board 20th Sep 2016 Report for Decision. (Waste heat available 2017)	$22,000	$36,000
3	Actual 2017 cost and energy usage data	$11,000	$13,000

Background

The project was expected to:

- Start reducing the pool electricity costs in 2017.
- Reduce the pool electricity expenditure by over $40,000 in the first year and over $60,000 in the second year as CPD reductions were realised
- Provide larger cost savings each year based on electricity costs increasing at rate of 4.3% /year.

Financial Year Ending JUNE	Molyneux Annual Invoice Base Case	Molyneux Annual Invoice Post Energy Share with Rink	Annual Savings: 14750.4288	Savings Increase from prior year	Beca savings in first year with annual increase applied as identified by ESS	EES/Beca Average
		BY EES	By EES			
2017	$167,184	$119,453	$47,731		$30,000	$40,000
2018	$171,878	$110,268	$61,610	29%	$38,724	$51,631
2019	$177,231	$105,383	$71,848	17%	$45,158	$60,210
2020	$182,280	$108,961	$73,319	2%	$46,083	$61,444
2021	$187,355	$112,615	$74,740	2%	$46,976	$62,634


Assumptions
6 months availability of thermal energy from the ice rink
Avoid using power with an average value of $0.11/kWh
Reduce in the pool's energy consumption by 167,378kWh based on an average annual usage of 947,089kWh.
Reduction in the pool's CPD charges by over 40kW

Considerations

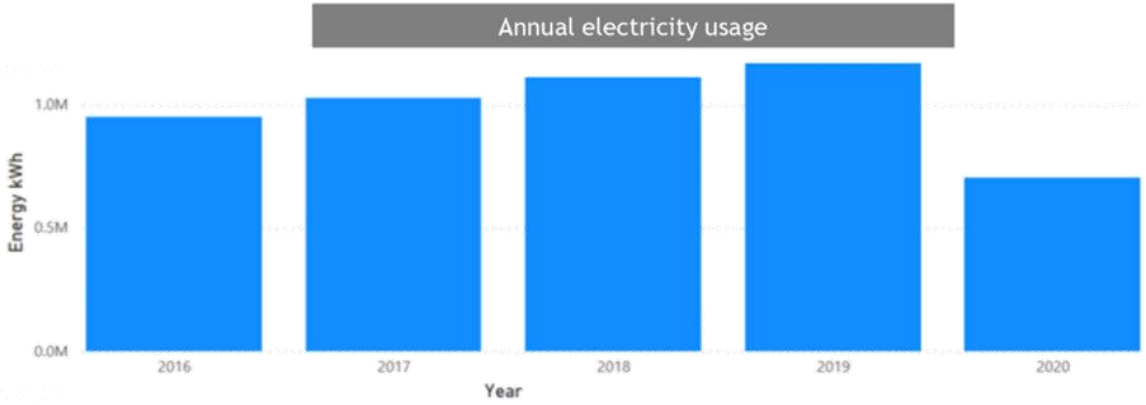
The Aquatics Centre annual electricity usage is dependent on several other factors:

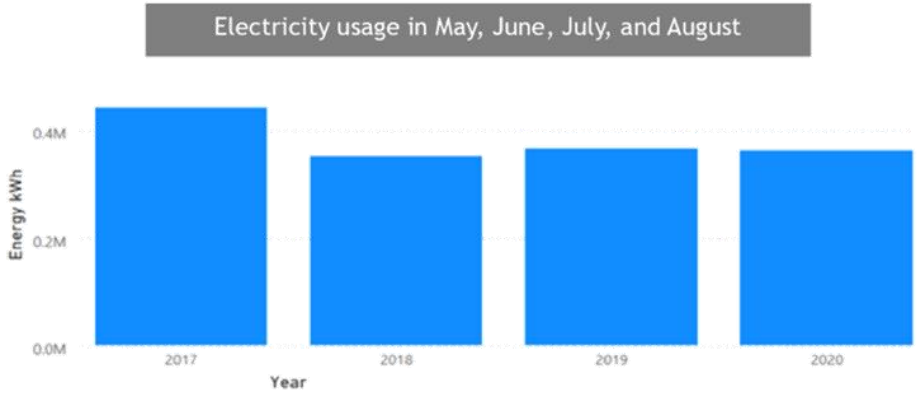
- Use of heated outdoor pool.
- Pool hall conditions (ventilation rates, operational hours, pool hall and pool water temperatures)
- The building envelope
- The operation of the pool heating plant (heat pump or direct electric heating elements).

The ice rink was only operational and transferring heat to the pool between the following dates:

- 2020 – open 5 June to 23 August.
- 2019 – open 15 May to 18 August.
- 2018 – open 17 May to 15 August.

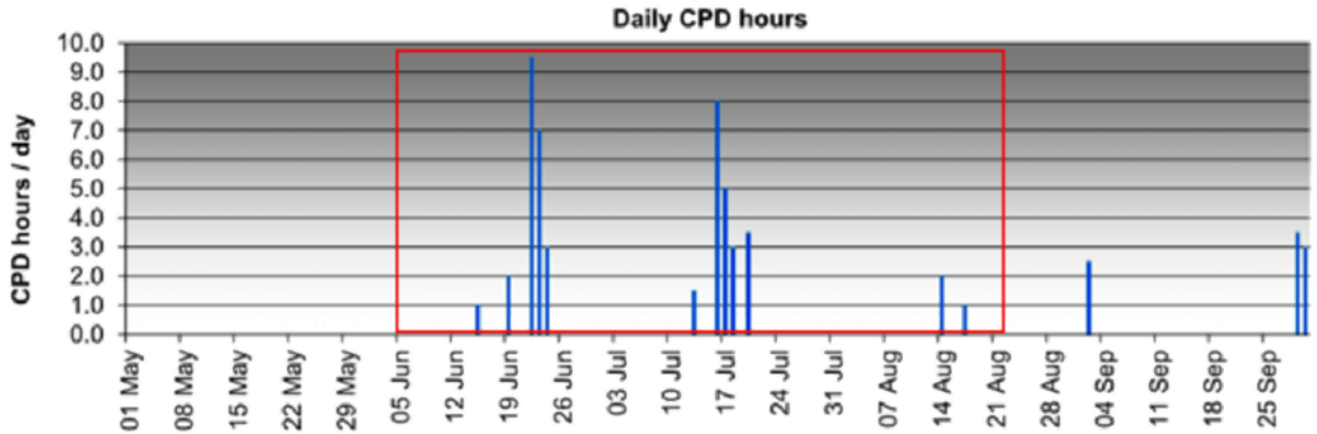
Actual Energy Savings Achieved





Actual CPD savings Achieved

		Billed	Actual for last year	Actual Monthly	YTD
2017	may	157	156	125	125
2017	Jun	157	156	156	155
2017	Jul	157	156	186	180
2017	Aug	157	156	188	183
2017	sep	157	156	159	183
2018	may	**170**	183	125	125
2018	Jun	**170**	183	120	125
2018	Jul	**170**	183	0	125
2018	Aug	**170**	183	119	125
2018	sep	**170**	183	0	125
2019	may	148	125	91	91
2019	Jun	148	125	148	132
2019	Jul	148	125	127	131
2019	Aug	148	125	128	129
2019	Sep	148	125	148	129
2020	may	139	129	0	0
2020	jun	139	129	135	135
2020	Jul	139	129	145	140
2020	Aug	139	129	127	139
2020	Sep	139	129	202	149

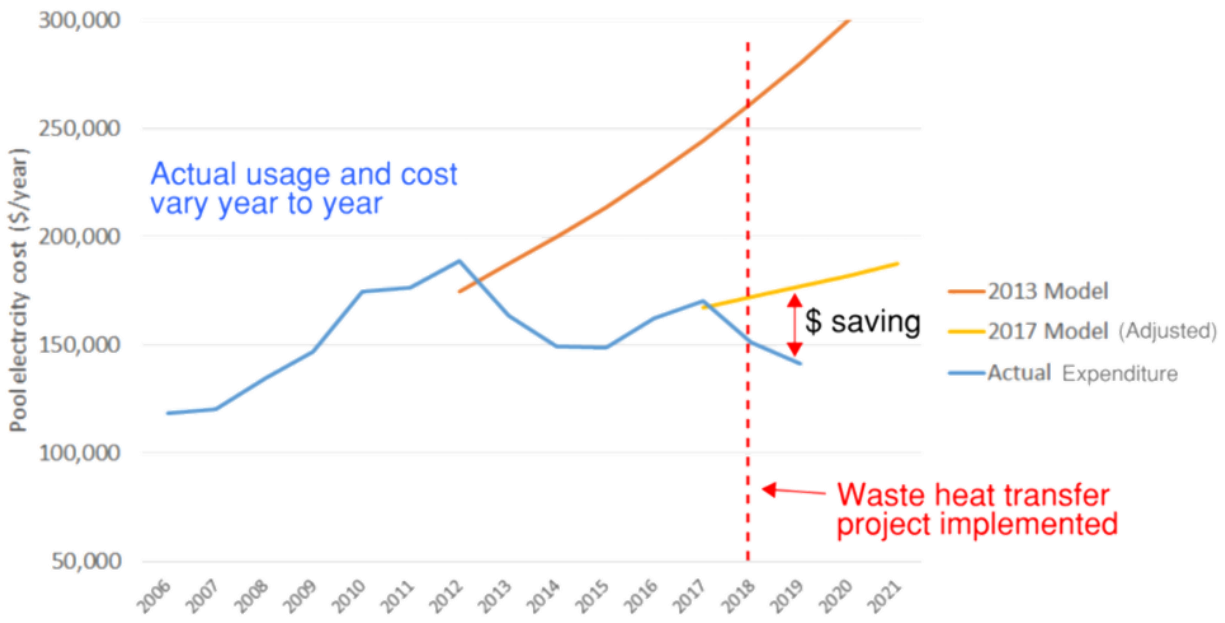


Review of CPD charges

Cost Savings Achieved

- Operate the ice rink for 6 months of the year to reduce electricity usage at the pool and CPD charges at the pool.

Year	Actual Electricity usage (kWh)	Savings (kWh)	Energy cost savings	Billed CPD (kVA)	CPD cost ($/kVA)	CPD savings Actual	Total Savings achieved
2017	442,907			157	154		
2018	352,548	90,359	$ 7,500	170	157		
2019	366,042	76,865	$ 6,380	148	203	$ 4,458	$ 10,838
2020	362,360	80,547	$ 6,685	139	210	$ 6,503	$ 13,188



Predicated and actual electricity expenditure

Further Suggestion

1. Investigate why the Aquatics Centres annual energy usage increased year on year since 2016?
2. Investigate why has the peak demand moved from winter to February and November
3. Investigate why power factor is poor
4. Develop a separate baseline model for the energy usage of the Aquatic Centre and pool heating plant
5. Investigate why performance is worse in July and August