Andrew Williams
Associate - Sustainability

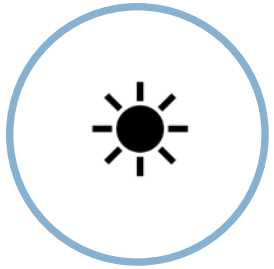
Question today
imagine tomorrow
create for the future

John Smith, Vice President, Canada

Trends in Sustainable Design

Drivers

- *Climate Change*
- *Price of Energy*
- *Stringent compliance*
- *Occupant Demand*
- *Opex*



Minimising Resource Use

- *Energy*
- *Water*
- *Materials*

Indoor Environment Quality

- *Occupant Comfort*
- *Health & Wellbeing*

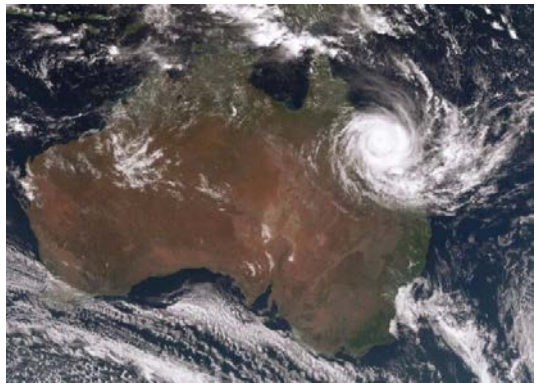
Rating Tools

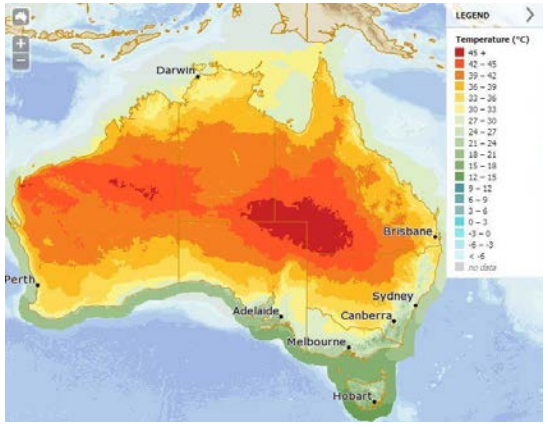
- *Compulsory*
- *Voluntary*

How do these impact Aquatic & Leisure Facilities?

Drivers –Climate Change

	Near Future (2030)	Far Future (2070)
Max Temperature	Increase 0.6 - 1.3℃	Increase 1.2 – 2.9℃
Min Temperature	Increase 0.6 – 1.2℃	Increase 1.2 – 2.5℃
Hot Days	+2 days above 35 ℃	+6 days above 35 ℃
Annual Rainfall	Decrease in spring and winter	Decrease in spring and winter
Rainfall Intensity	Increase	Increase
Sea Level Rise	Increase 0.3m	Increase 0.8m

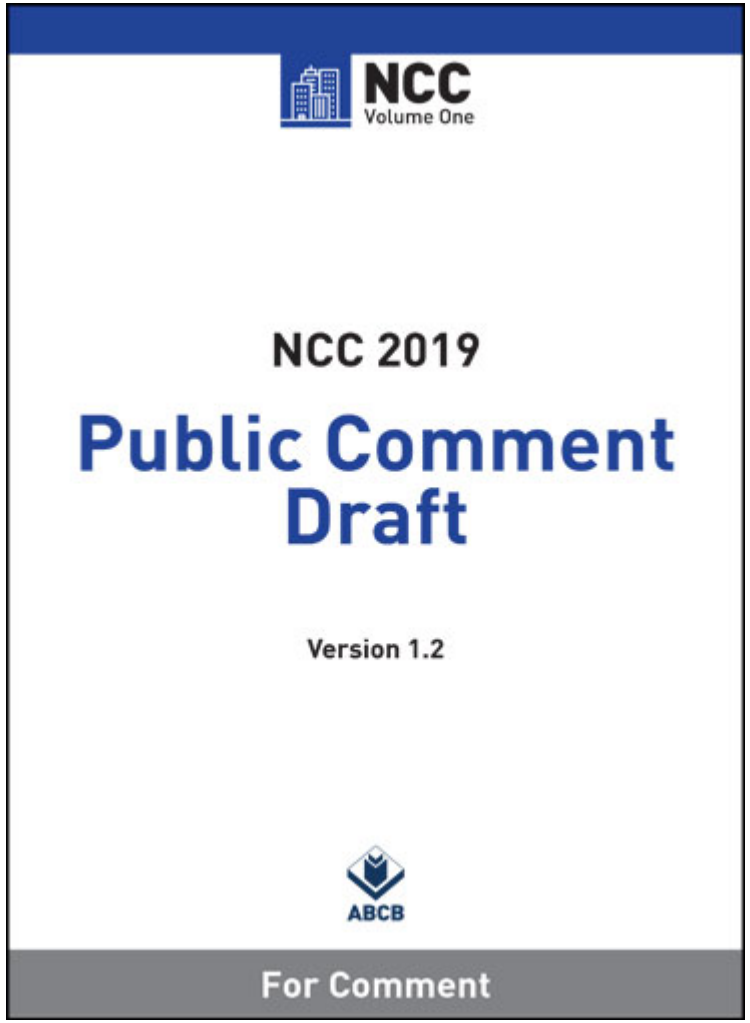




Drivers –Climate Change

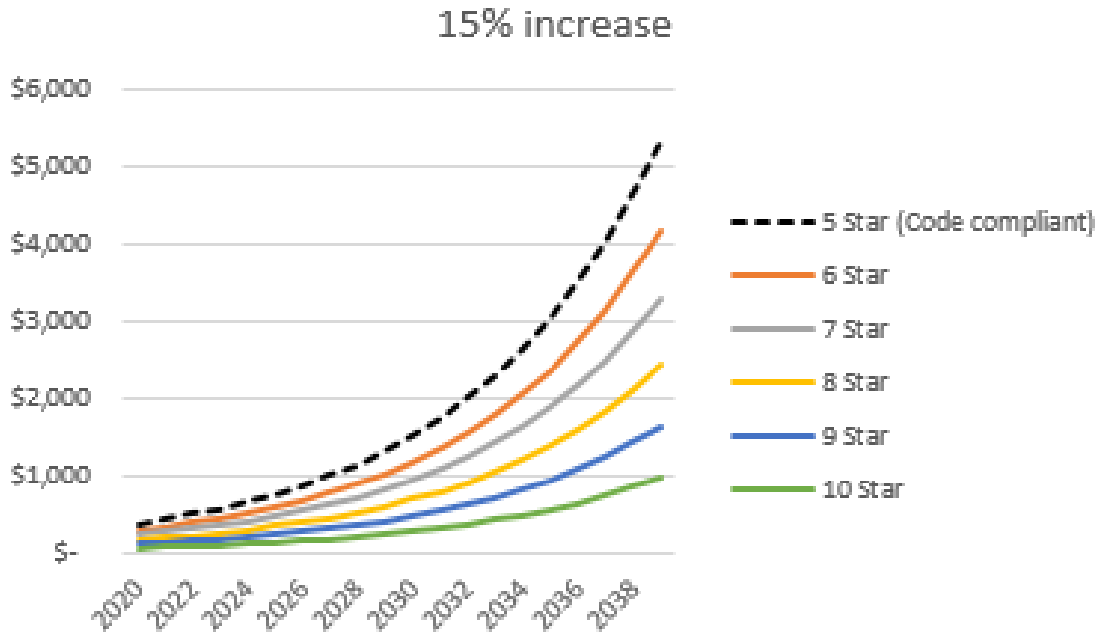
Drivers - Compliance

- The building code mandates minimum levels of performance in respect of energy efficiency
- NCC 2019 will bring a significant step change
- NCC 2019 assesses GHG emissions, rather than kWh.
- Buildings will generally require to be ~40% more efficient as minimum standard



Drivers - Opex

Passive design improvements above minimum code level lead to long -term cumulative savings, and position an asset favourably in a competitive market



Given the high energy intensity of an aquatic facility, even small % changes in performance can translate to big $ savings.

Minimising Resource Use - Energy

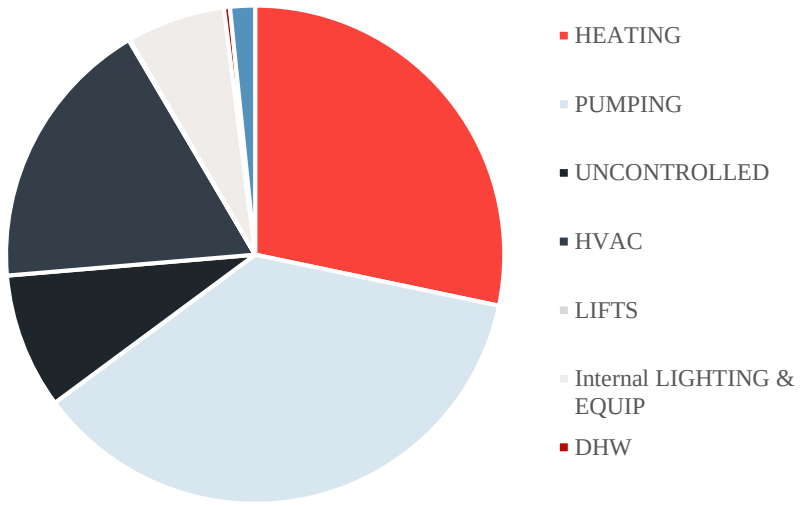
- Aquatic and Leisure Centre's are high energy intensity facilities.

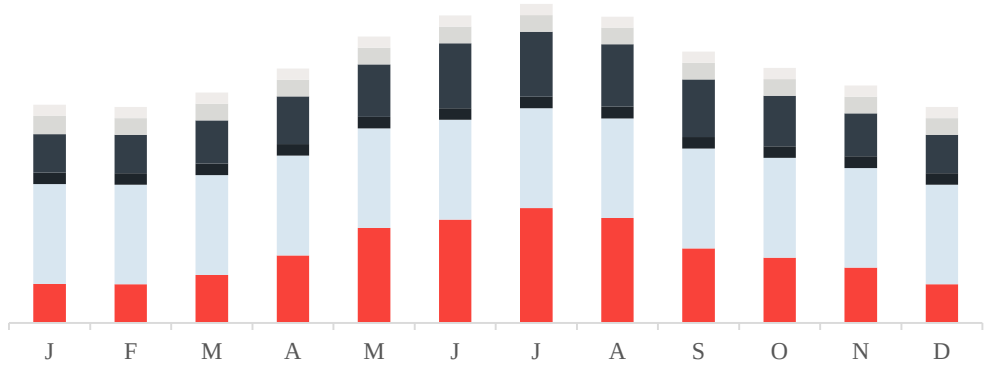
- Offices range ~ **100 - 200** kWh/m²/ yr
- Apartments typically ~ **10 - 20** kWh/m²/ yr
- Aquatic Centres can be > **600** kWh/m²/ yr

- Aquatic Centre energy use can vary considerably based on a range of factors

- High incentive to reduce energy use moving forward due to increased energy and carbon reporting

Where is this Energy Use?

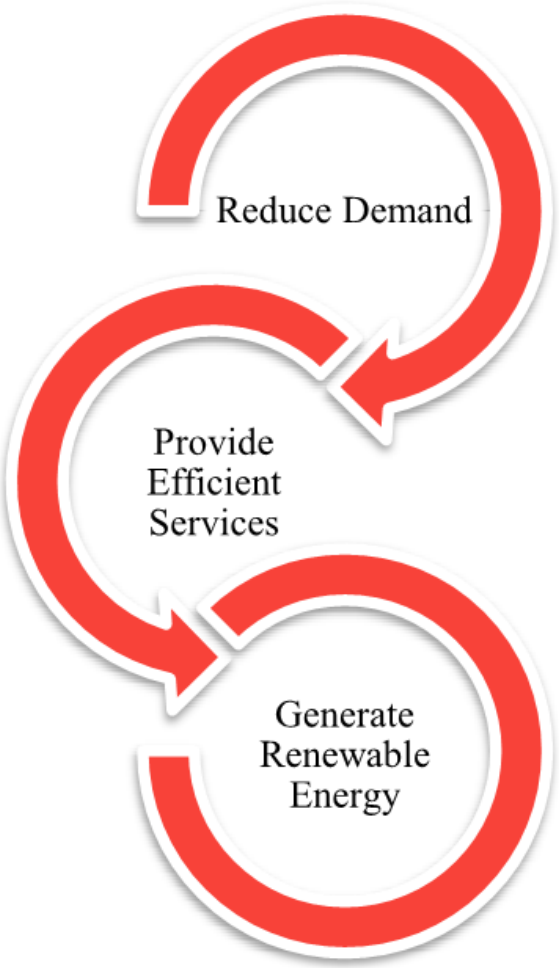




- Pool Heating & Filtration
- HVAC
- Lighting

- Need to understand baseline performance first and foremost – critical need for monitoring
- Need alerts
- Performance in operation is very different from design

How Can We Reduce It?

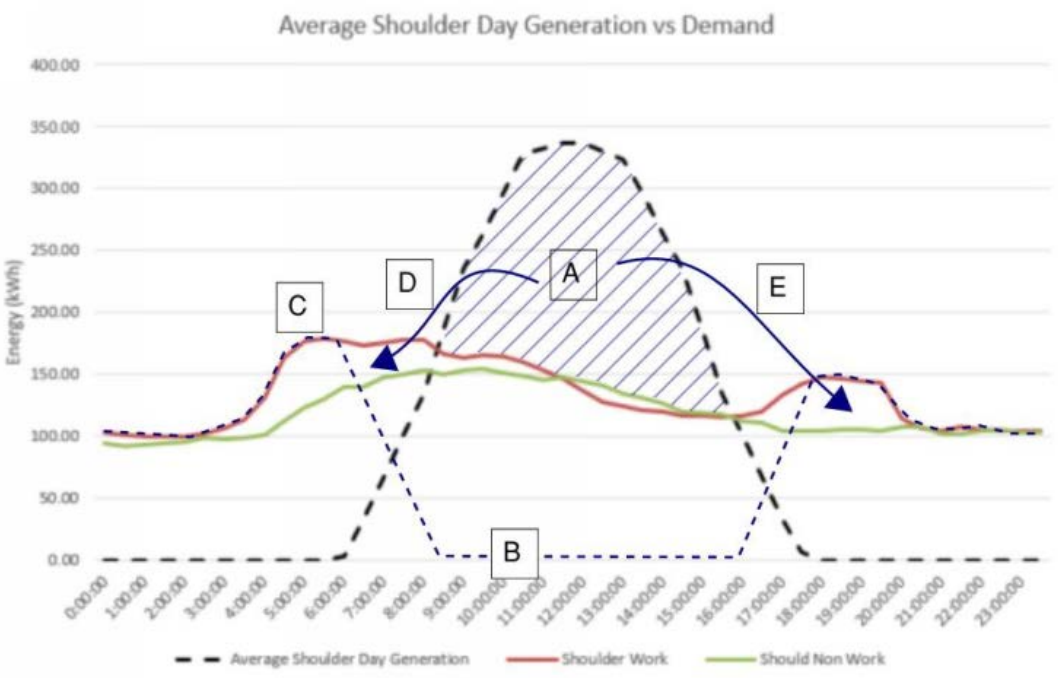


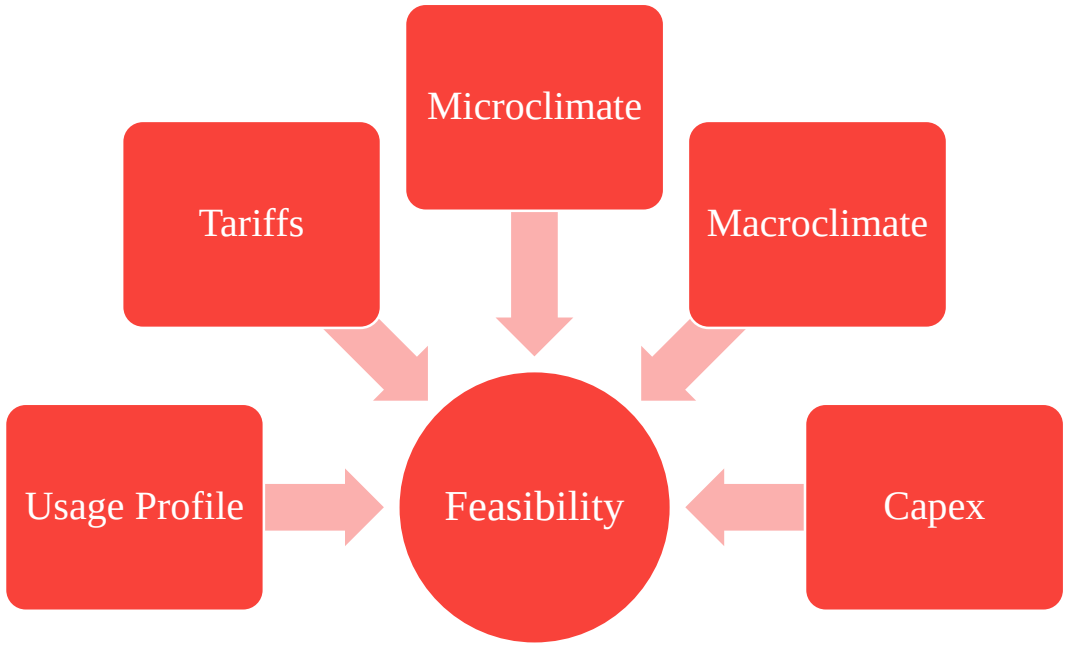
- Optimise passive design
- Optimise system parameters to minimise demand
- Mixed mode ventilation
- Energy recovery systems

- Efficient services
- Optimise control strategies especially at nexus of pool heating, pool pumping and space conditioning

- On-site energy generation to meet demand on an annualised basis
- Seasonal variation between supply and demand

Minimising Resource Use - Renewables





- Excess energy generated at peak times [A] used to offset the peaks at [D] and [E], to produce a steady demand profile
- Peak demand typically in early morning due to pool heating demand prior to use
- What is the best energy strategy? Varies per facility

Indoor Environment Quality

- Materials
  - PVC
  - Low Formaldehyde
  - Sustainably sourced timber

- Occupant Comfort:
  - Visual Comfort
  - Thermal Comfort
  - Lighting Comfort
  - Acoustic Comfort

- Health & Well -being

Rating Tools

greenstar

An Australian Government Initiative

National Construction Code

NABERS

INTERNATIONAL WELL BUILDING INSTITUTE™

Moving forward...

- Insurance and financial institutions are indirectly driving a change in the wider property sector, this will likely trickle down.
- Carbon reporting is becoming standard practice, and will trickle down.
- Aquatic and leisure facilities are generally bespoke facilities with a range of amenities, so it is difficult to benchmark resource use.
- ALFAQ State of Industry Report is a good start in benchmarking performance.
- Health and well -being is buzz -word in property sector. Mutual benefits possible.
- Sub-metering is critical – you don't know what you don't know.
- Aquatic and Leisure facility design guidelines? Best practice guidelines?

Thank You!