aurecon

Bringing ideas to life

Sustainability Leadership

and why the University of Queensland is building its own power station

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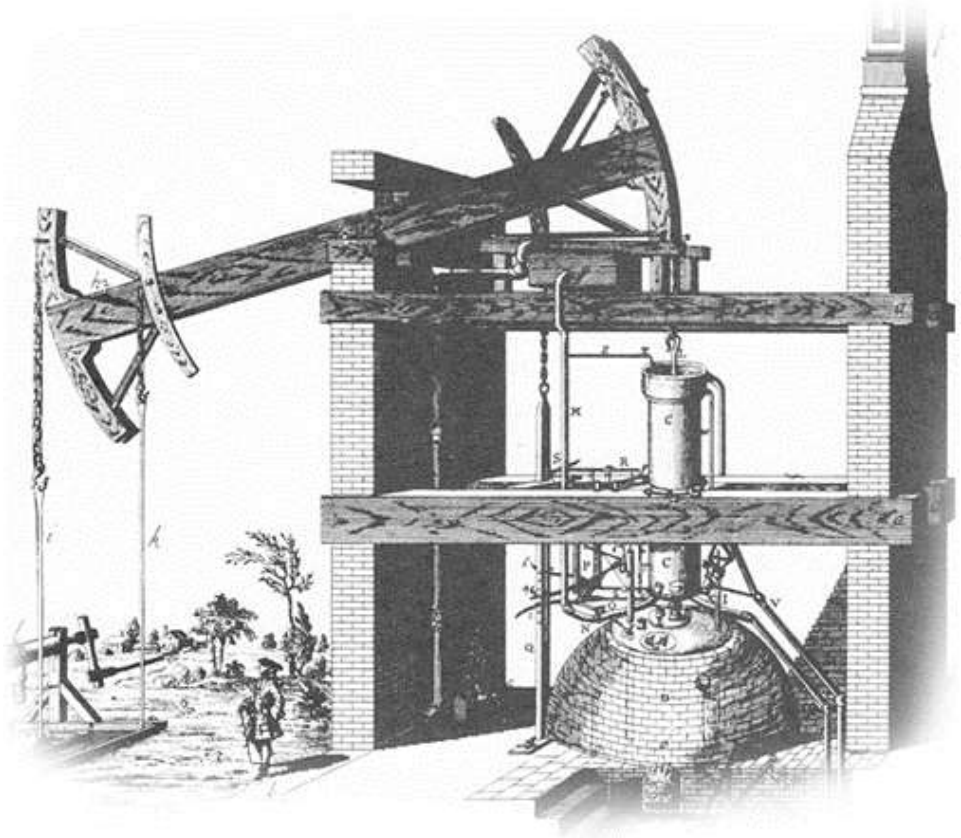
Presented by Mark Griffith, Aurecon

UQ content from Andrew Wilson, University of Queensland

Early advancement in energy technologies



Source - https://www.asme.org/about-asme/engineering-history/landmarks/70-newcomen-engine

The Newcomen atmospheric Engine

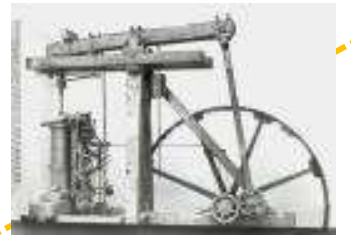
"..one of the strategic innovations in world history and the single greatest act of synthesis in the ensuing history of the steam engine."

American Society of Mechanical Engineers

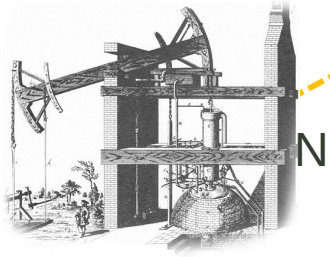
Harnessing chemical energy to do work was a step change in our energy system

Increasing efficiency, scale and complexity

Callide C supercritical coal power station - 1999



Watt Boulton steam engine - 1767



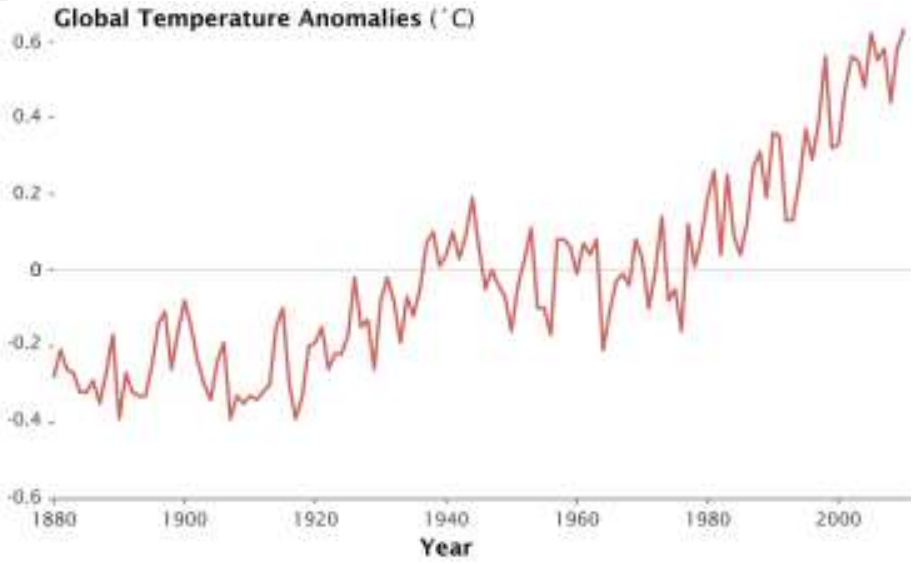
Newcomen atmospheric or steam engine - 1712

Complexity

Time

Newcomen's atmospheric engine, originally used to dewater coal mines, was a precursor to fossil fuel usage

The consequences of fossil fuel use



Carbon dioxide emissions are contributing to global climate change

Technology continued to advance

Collgar Wind Farm (WA)

Oakey 2 Solar Farm (QLD)

Hornsdale Power reserve
Source: Tesla

Generating electrical energy from abundant, renewable resources is another step change in energy systems

The Warwick solar project

By the numbers:

- 78MW DC
- 64MW AC
- 154 hectares
- ~204,000 modules
- 160GWh / annum
- 120t of CO_2e / annum

The Warwick solar project (CGI)

The Warwick solar project annual energy generation is equivalent to 27,000 average homes (or a little more than one large university!)

Aurecon and the Warwick solar project

Technical advisor before construction

- Feasibility study and project shortlist
- Acquisition of the project from Terrain Solar (project developer)
- Negotiation of the construction and operations contracts with Lendlease
- Advice on the development approval
- Grid connection support

Owner's engineer during construction

- Project management support
- Design review
- Quality checks (ongoing)
- Commissioning and completion checks (to come)

Aurecon has had a unique opportunity to be involved from the start

Why would a university build a 64MW solar farm?

Three reasons why

1

Simplified operation

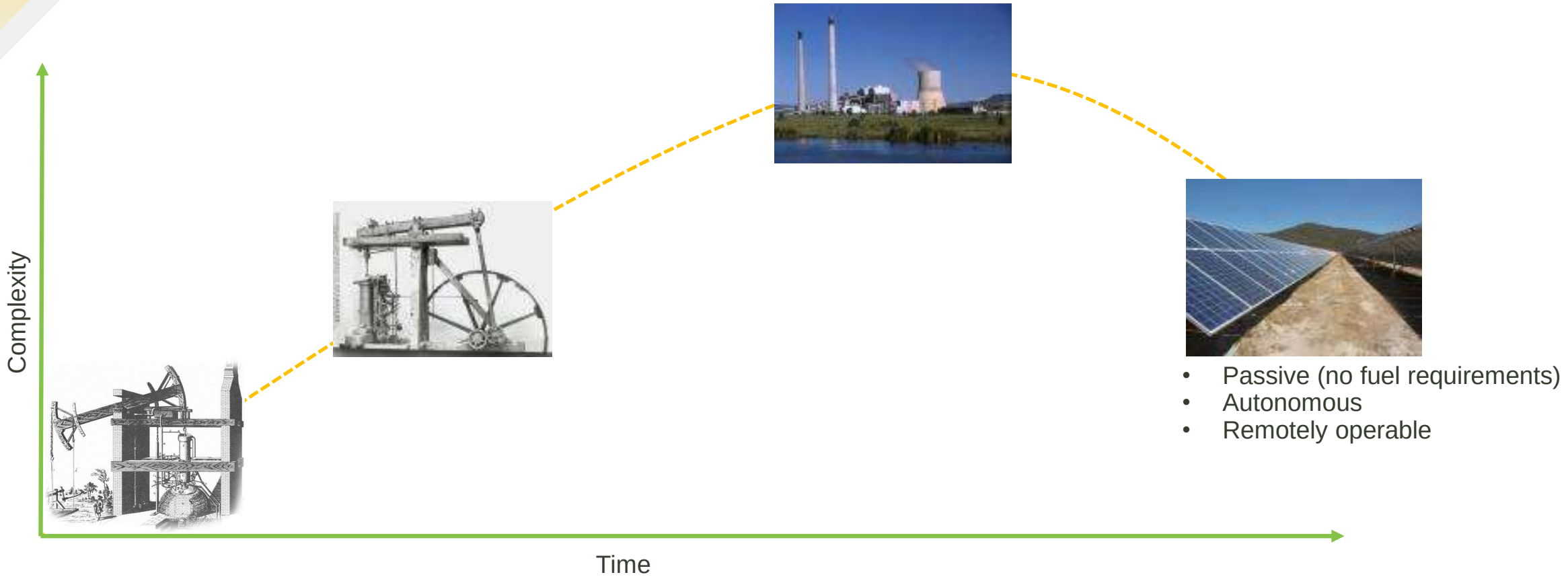
2

Value

3

Sustainability

1. Simplified operation



Organisations for whom energy is a non-core business are now are able to own large scale energy generation plants

2. Value

Motivated by:

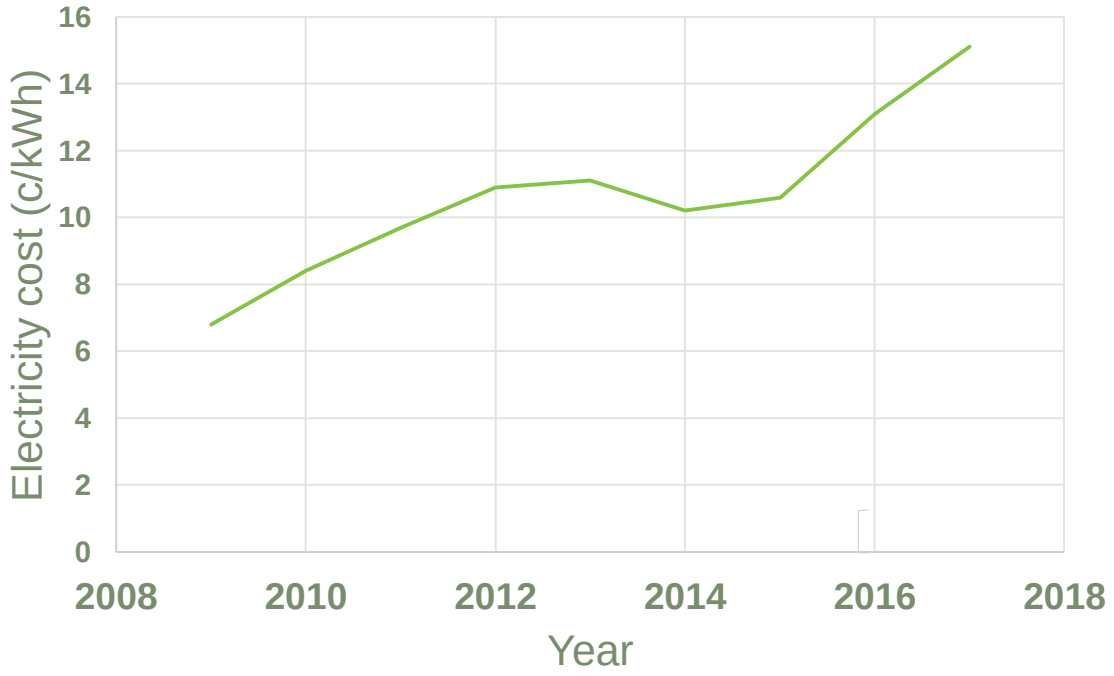
- Large annual electricity bills and
- Pricing uncertainty

The Warwick solar project provides:

- Cost savings
- A hedge against future increases

and

- Teaching and research opportunities



Wind and solar are the cheapest new build energy generation options in Australia

3. Sustainability

UQ's energy strategy

- Energy efficiency
- Renewable energy generation
- Demand response
- Energy storage

UQ will be the first university in the world to generate 100% of its net electricity
from its own renewable energy asset

Key success factors

1

Experience

2

Contingency

3

Grid connection

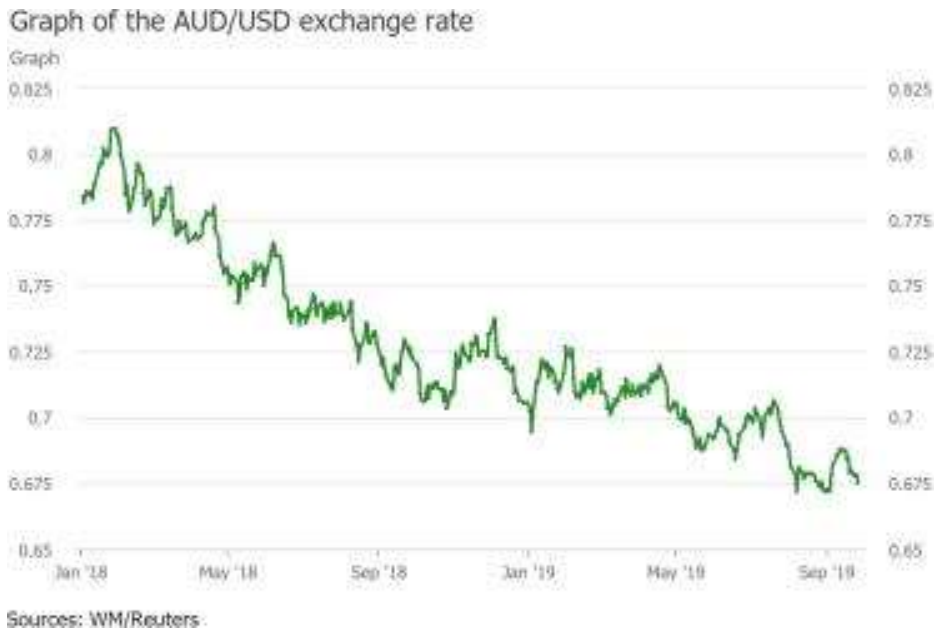
Advice for future project owners

Key success factors

Experience

UQ rooftop systems

Contingency



AUD Depreciation

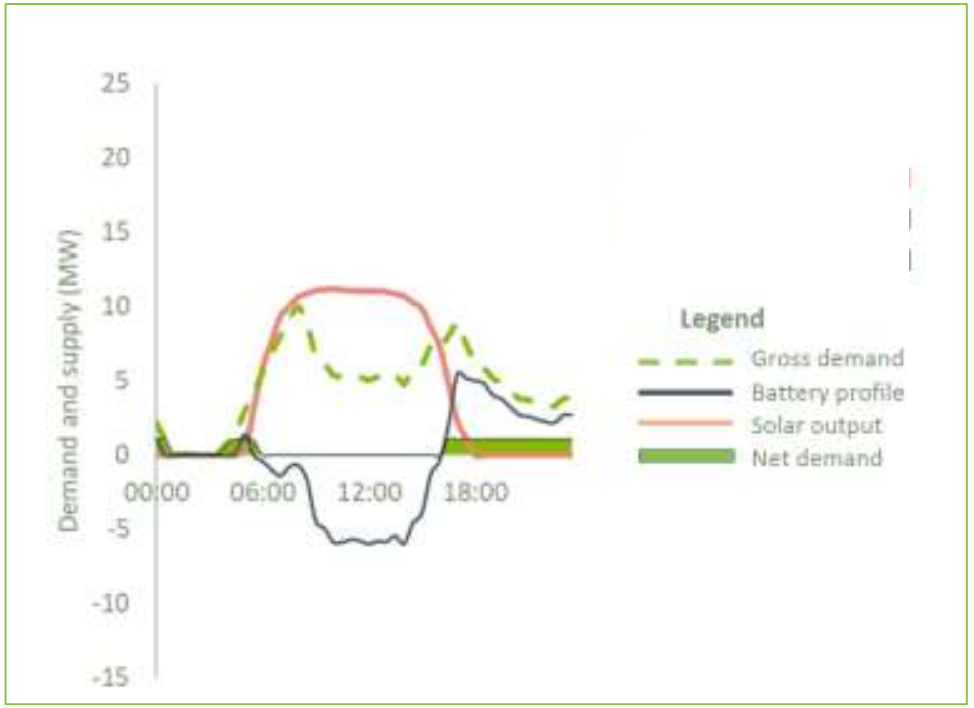
Grid connection

System strength variability
Source: AEMO

Lessons from the Warwick project and others like it

What's next?

Demand Response demonstration at UQ



Balancing loads with generation and storage

The combination of load management and behind the meter battery energy storage can unlock value through pricing arbitrage, demand change reduction and the ancillary services market

Thank you

Mitch Hardwick, OE at Warwick celebrates the project’s progress

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