NSW GOVERNMENT | Office of Environment & Heritage

Special Presentation - Sourcing Renewable Energy

Contracting options to purchase renewable energy for NSW Councils

Tuesday 9 October 2018

NSW GOVERNMENT Office of Environment & Heritage

Sustainability Advantage helps organisations and industry sectors

1. Embed sustainable practices
2. Adapt to a changing climate
3. Transition to net zero emissions by 2050

Please welcome

Mark Shorter

Sustainability Coordinator

Eurobodalla Shire Council

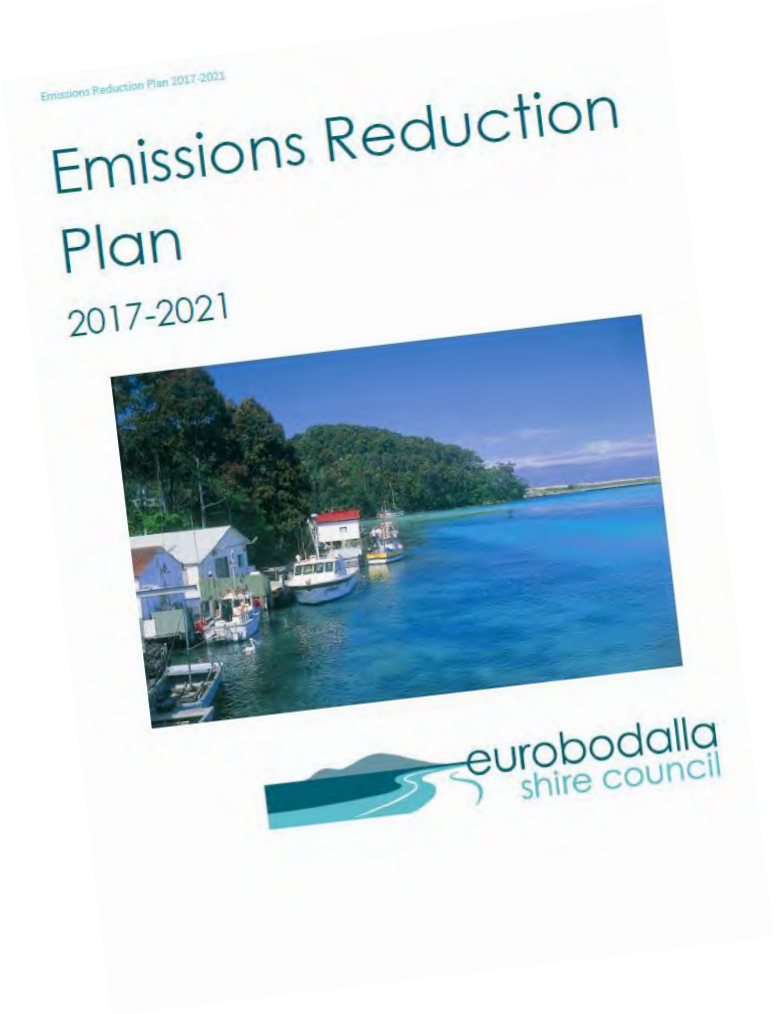
RENEWABLE ENERGY OPTIONS ANALYSIS FOR EUROBODALLA SHIRE COUNCIL

Lessons learned and applicability to other councils

9 October 2018

100% renewables

2017-2021 Emissions Reduction Plan



Council's goals included:

- Reduce emissions by 25% by 2020 for council operations
- Reduce energy emissions by 80% by 2030 for council operations
- Source 100% of Council's electricity from renewable energy by 2030

eurobodalla
shire council

Renewable energy options analysis

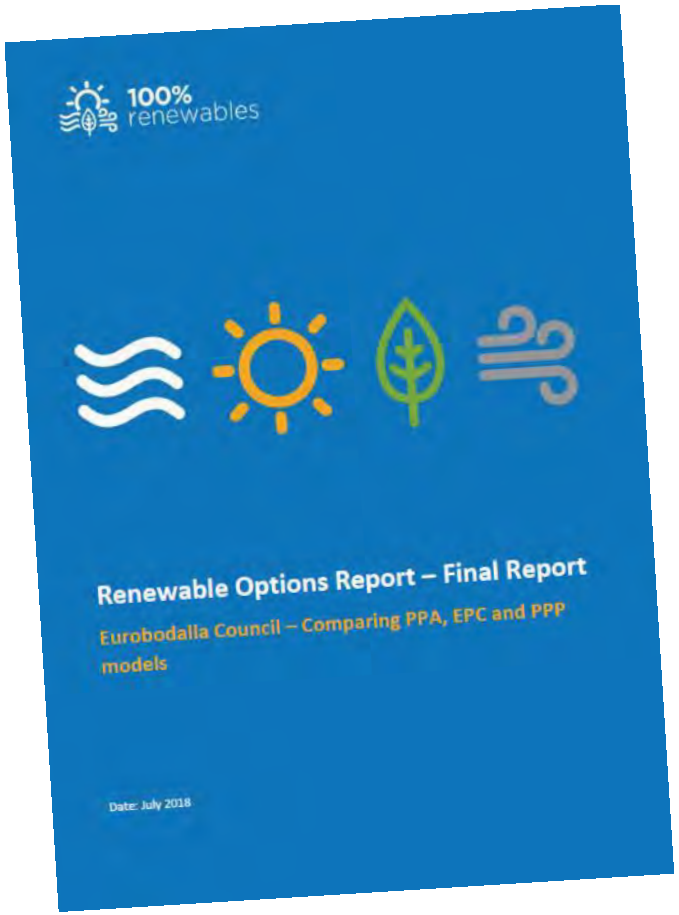
17. Investigate the costs and benefits of working towards a corporate target of 100% renewable energy by 2030.

19. Complete a feasibility study of implementing a large scale solar farm.

Coming off electricity contract 31/12/18 – exposure to higher prices

eurobodalla shire council

Pathways to 100% renewable energy



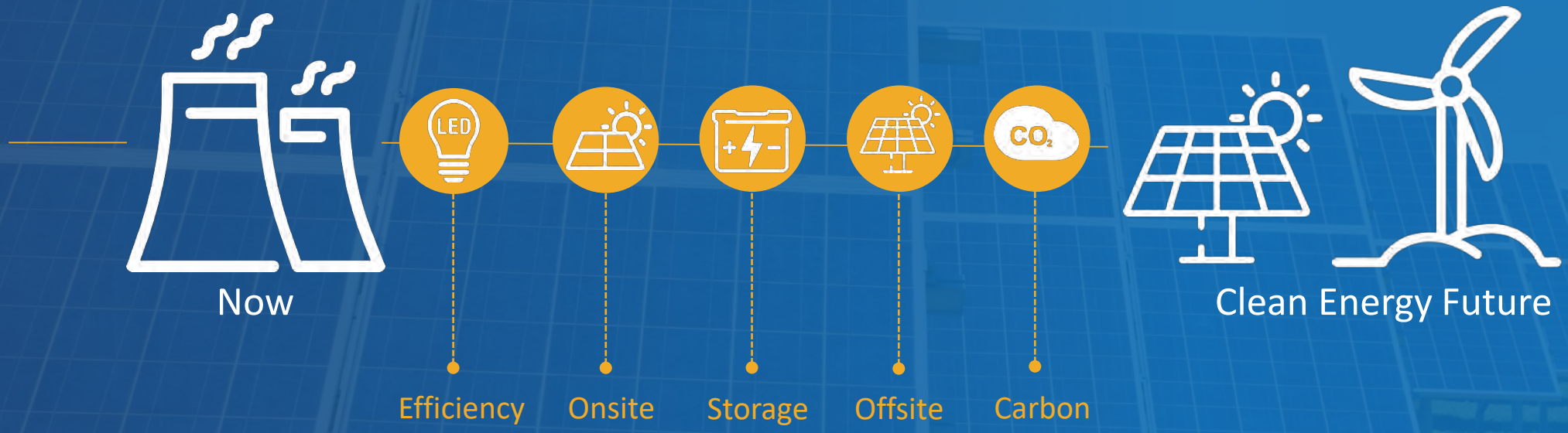
Various options that can cut costs and source renewable energy.

1. Build a solar farm
2. Buy into a share of a renewable generator
3. Contract renewable energy directly

eurobodalla shire council


100% Renewables
&
Sourced Energy

We help business transition to clean energy and net zero



100% Renewables

- Preferred supplier to NSW, ACT, Commonwealth Governments
- Trusted advisor to more than 25 local councils in NSW
- Independent of any product suppliers

Meet the presenters

BARBARA ALBERT

Director, 100% Renewables

PATRICK DENVIR

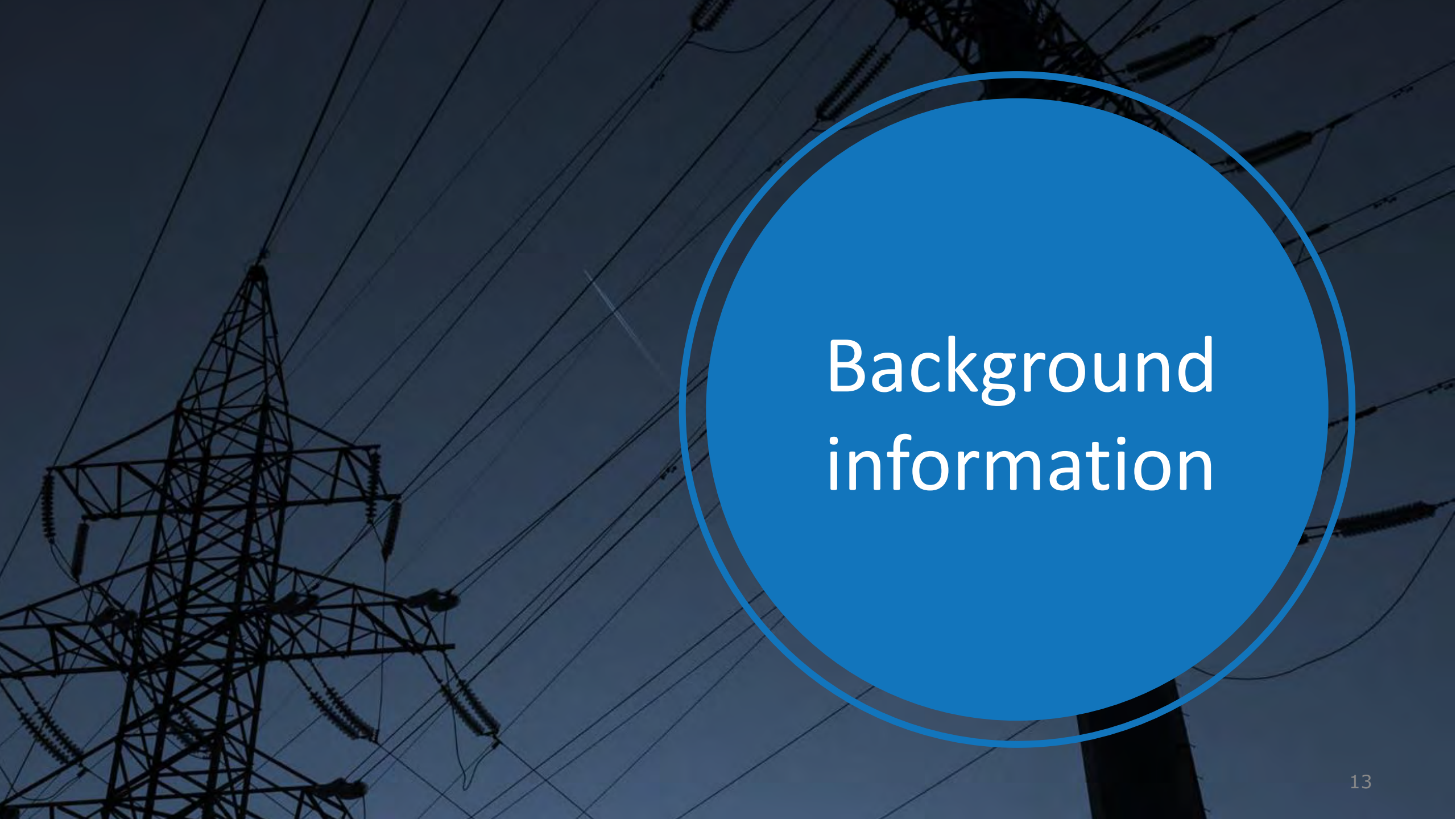
Director, 100% Renewables

DAVID WEST

Director, Sourced Energy

Sourced Energy

- Sourced Energy is an advisory firm of top energy industry professionals with niche expertise to deliver market leading energy advice and services.
- Sourced Energy's services help its commercial and government clients reduce energy cost, management burden and environmental impact.
- Our experts are trusted advisers that have worked with the major energy users and innovators in Australia.
- We believe that it is possible to save the planet and save money.



Background information

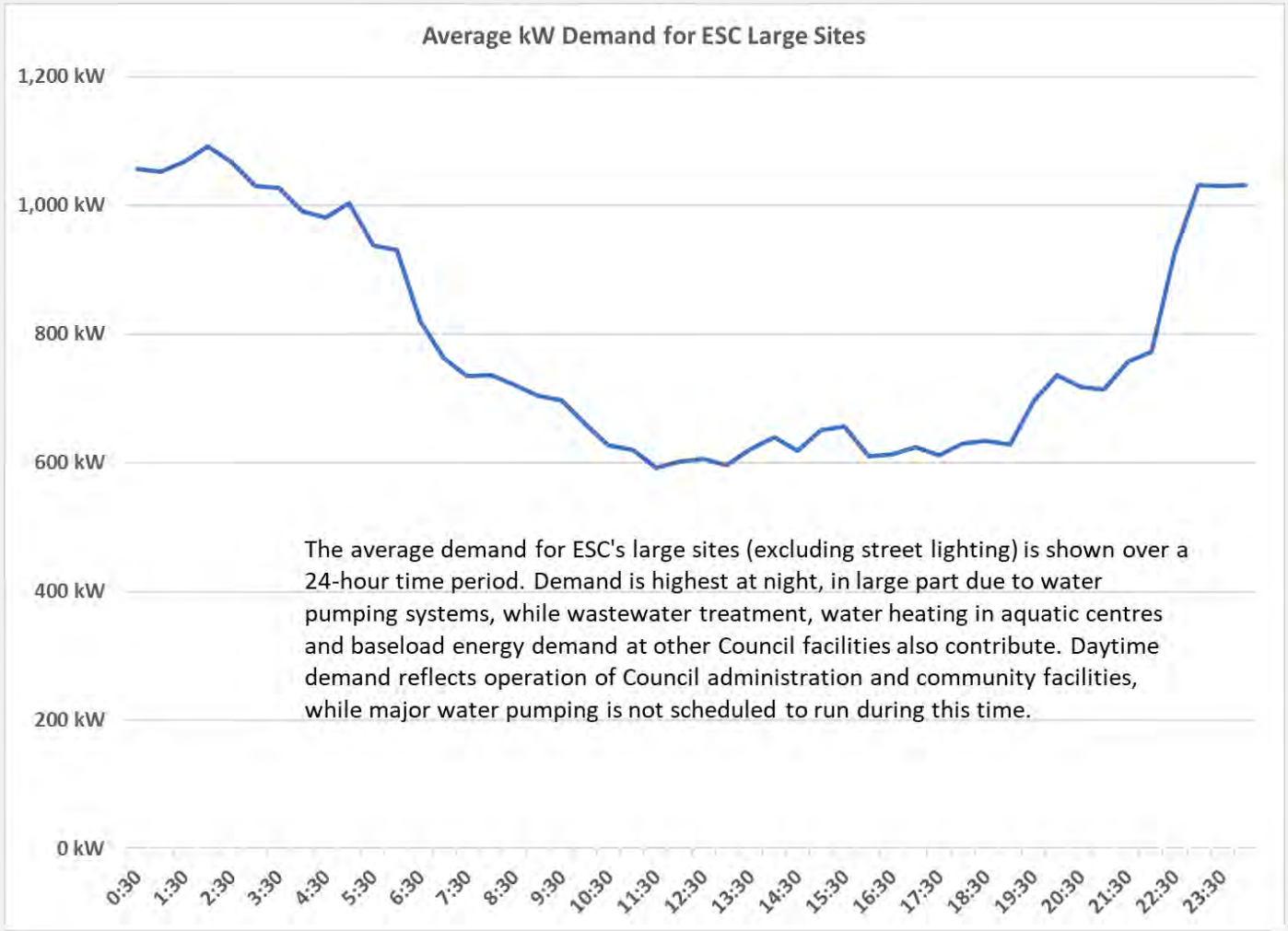
Evaluated options for Eurobodalla Shire Council

Achieve
100% renewable energy
at the same or lower cost
than grid electricity

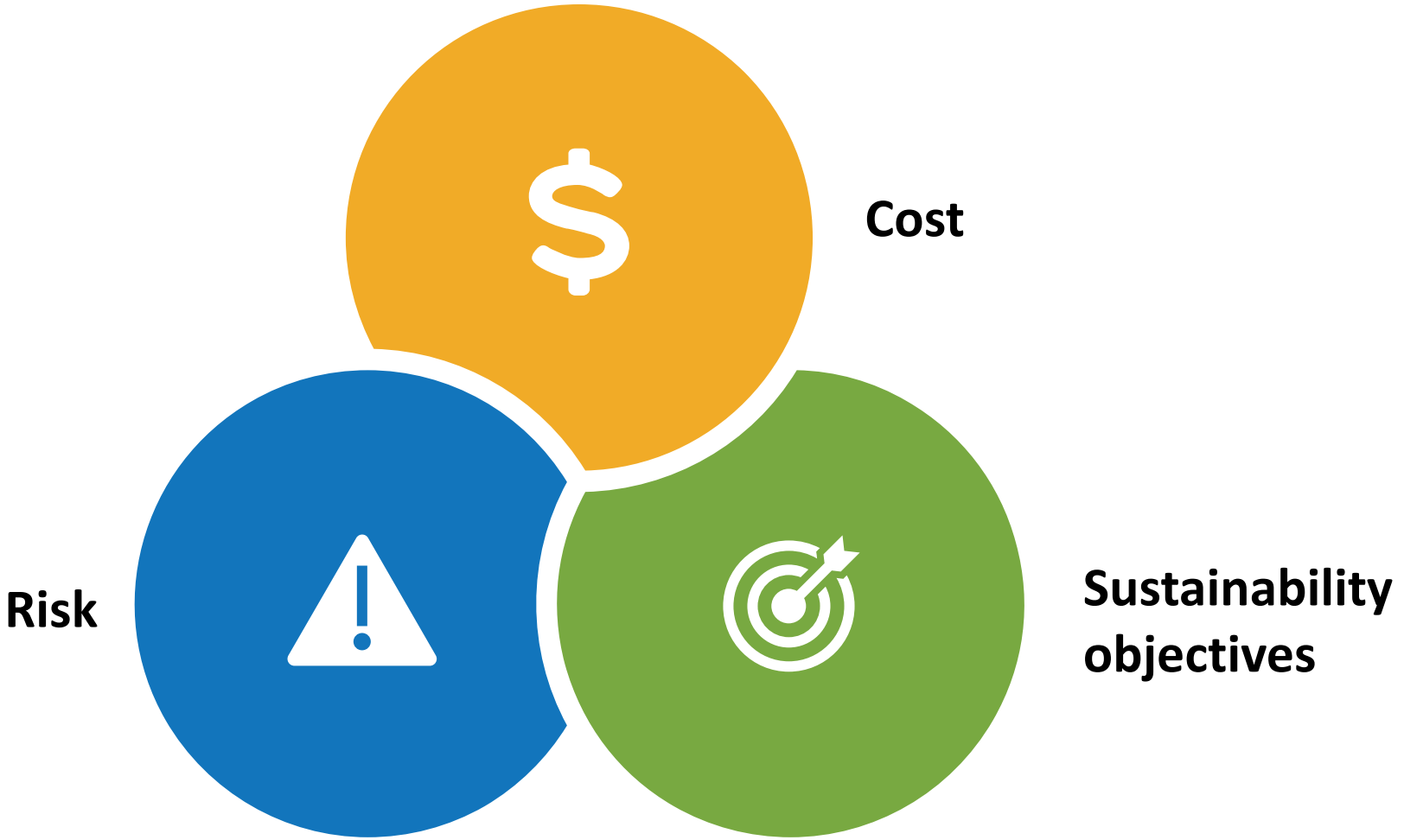
- **Build and own**
  ~10 MW solar farm
- Co-invest: 30 MW solar farm
  Public Private Partnership
- Contract directly via a
  Power Purchase Agreement

100% renewables

ESC’s electricity consumption



Finding the best fit renewable energy solution



Types of generators under AEMO rules

SCHEDULED

Generating unit participates in central dispatch. Greater than 30 MW

1

NON-SCHEDULED

No participation in CD. 5-30 MW if some/all energy sold in the NEM. < 30 MW if energy purchased by local ret. or customer located at same connection point.

2

SEMI-SCHEDULED

Participation in CD under specified circumstances. Greater than 30 MW. However, AEMO can, at its discretion, classify the plant as a scheduled generator.

3

Spot market and fixed-price offtake: AEMO can curtail output or ask to stop generating when there is network congestion

17

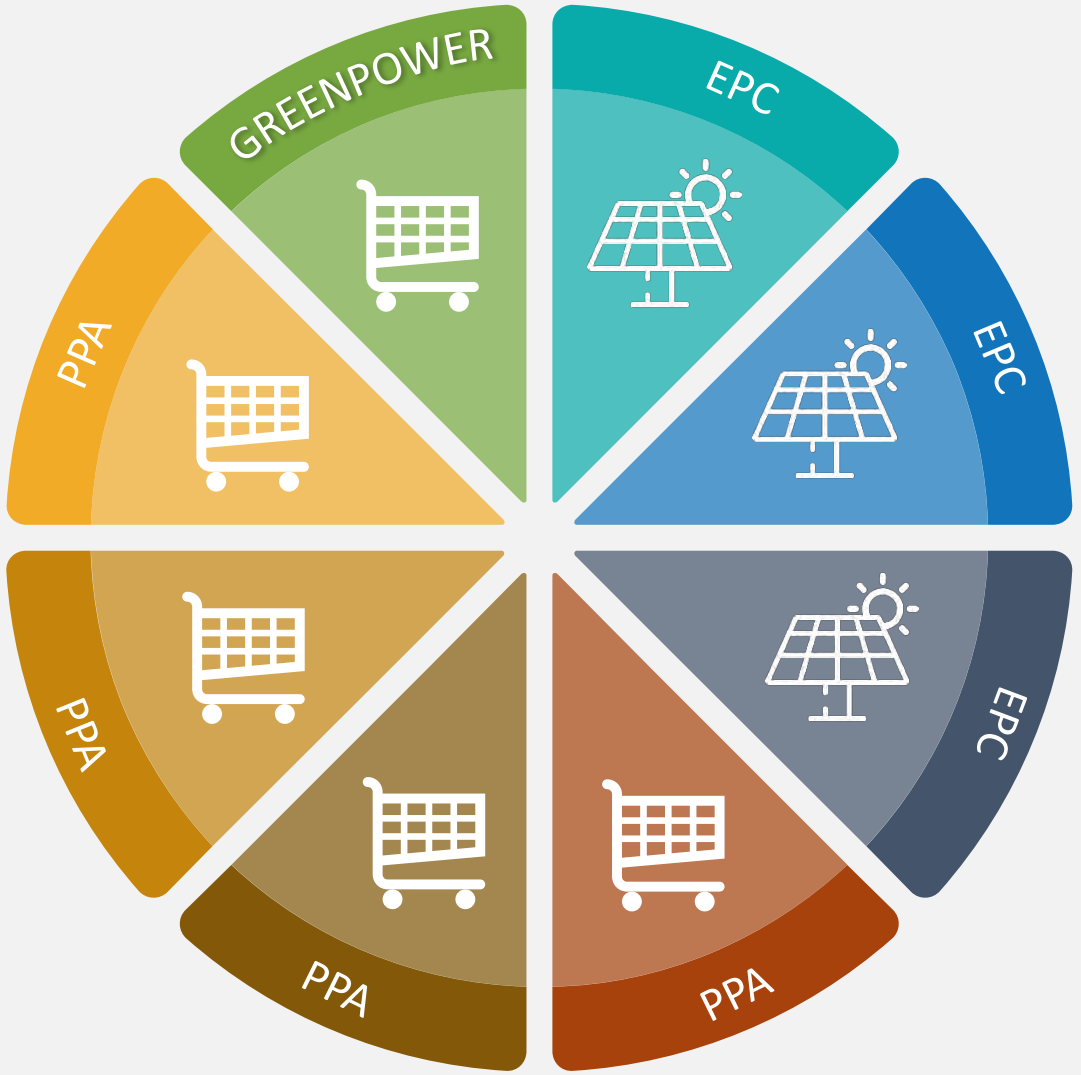
Evaluated ways for reaching 100% renewable energy

1 GREENPOWER
Purchase of Government accredited GreenPower® or LGCs through a broker

2 SLEEVED PPA
Agreement with retailer for both renewable and standard grid power

3 DIRECT PPA
Agreement directly with renewable energy project developer

4 LGC-ONLY PPA
Purchase of green attributes of renewable energy generation



8 FEED-IN-TARIFF EPC
Retail electricity agreement includes Feed-in-Tariff clause

7 SPOT MARKET EPC
Renewable energy generation is sold to spot market via export meter

6 FIXED PRICE EPC
The renewable energy generation is sold at an agreed price per MWh

5 VIRTUAL PPA
Standalone financial derivative. No physical delivery of electricity.

Purchase GreenPower® or LGCs through a broker

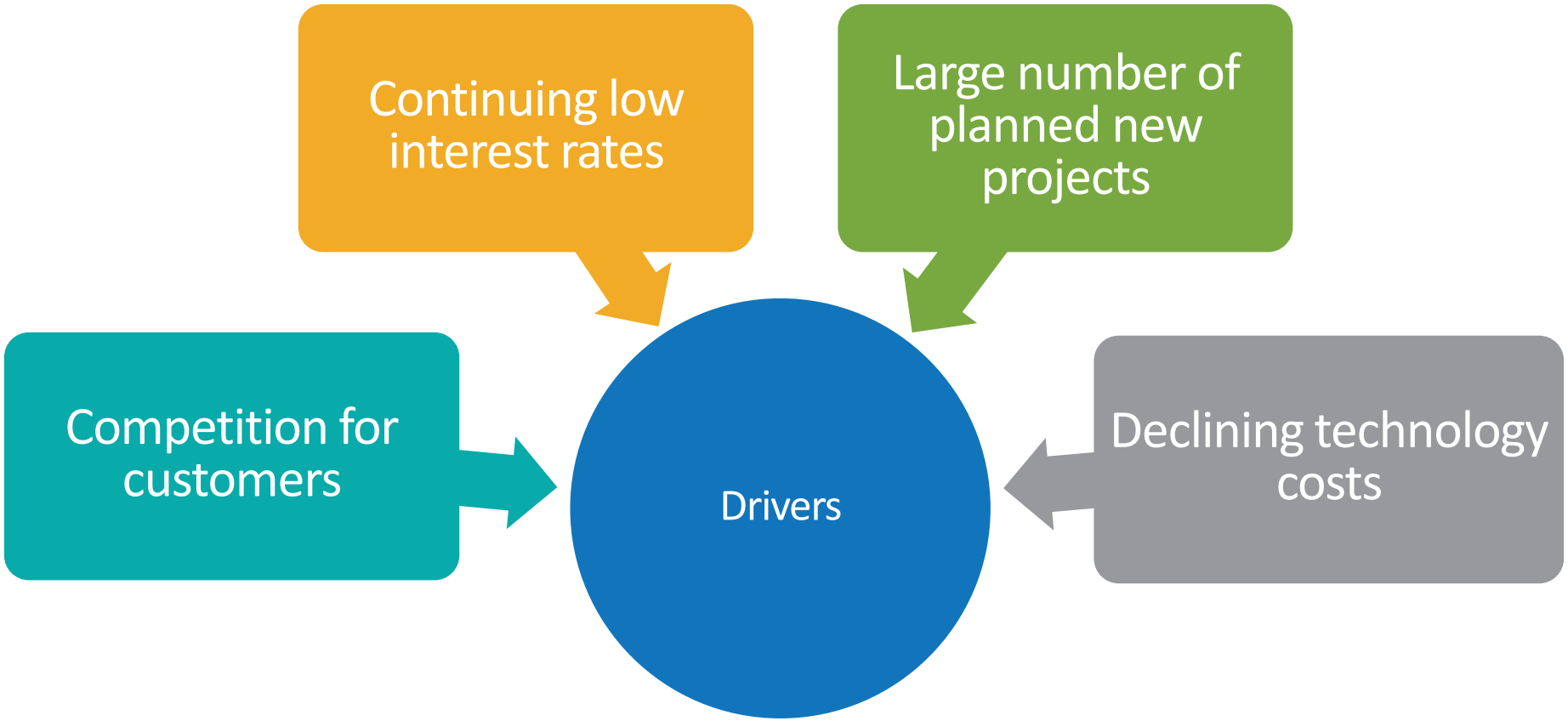
- Most electricity retailers have their own products sourced from accredited GreenPower® generators
- GreenPower® comes at a premium to grid electricity contracts
- GreenPower is a great option for smaller energy users who may not be able to enter into a PPA
- It is also possible to source GreenPower® under a GreenPower® PPA, which reduces cost substantially
- Standalone LGCs can be bought through independent brokers, usually in lots of 5,000

Power Purchase Agreements (PPAs)

Background information

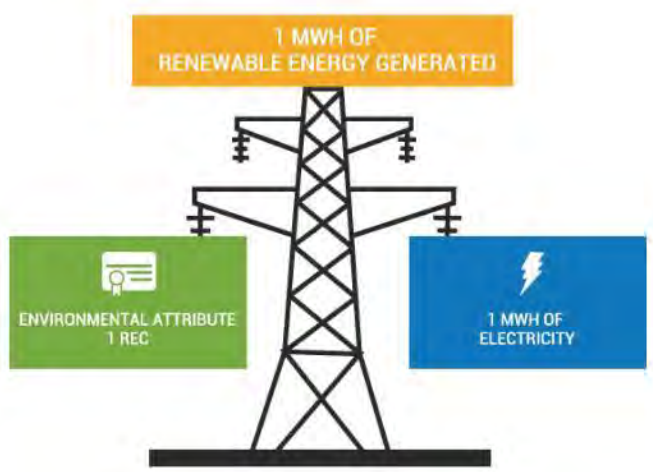
- Buyer pays $/MWh
- This rate covers all costs including financing, construction and maintenance
- No capital investment required
- PPA project developer owns the generation asset
- Performance risk sits with the developer
- As a customer of a PPA, there are less concerns about the technical aspects of the RE plant and more focus on the price and supply of delivered volume

Current PPA market



Bundled versus LGC-only PPAs

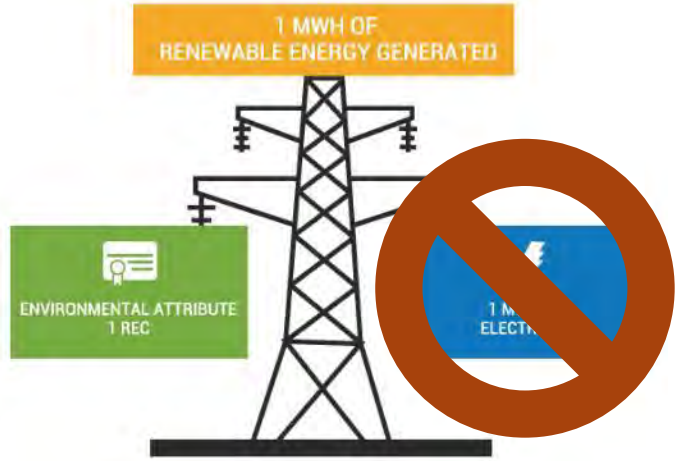
BUNDLED OFFTAKE AGREEMENT



A bundled agreement is likely to achieve a cheaper price for the LGCs than an LGC-only agreement.

VS

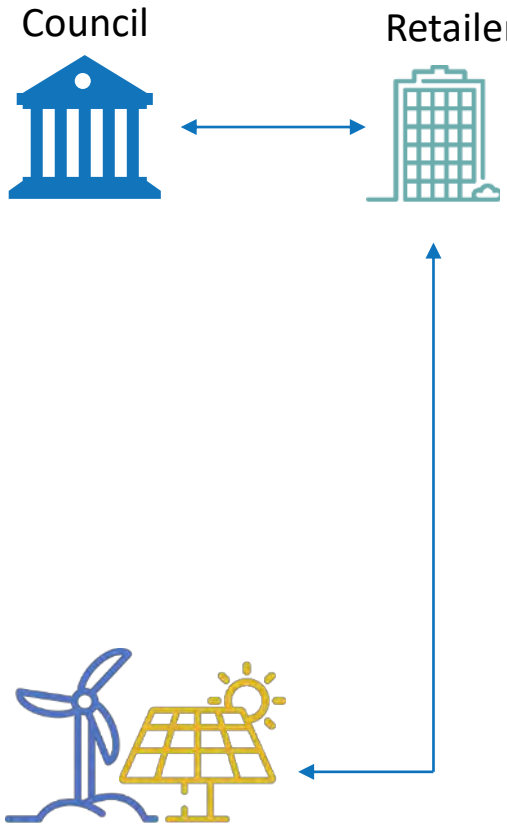
LGC-ONLY OFFTAKE AGREEMENT



No need for load balancing

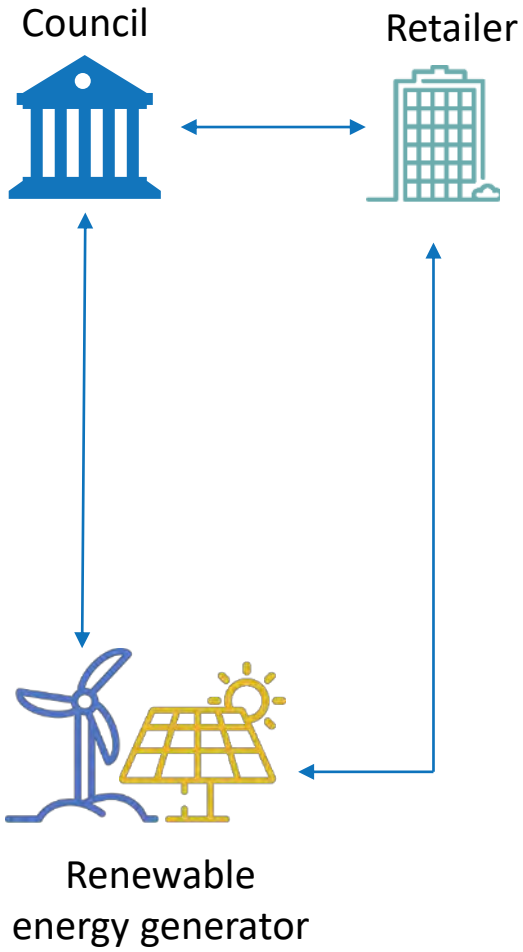
100% renewables

Sleeved PPA



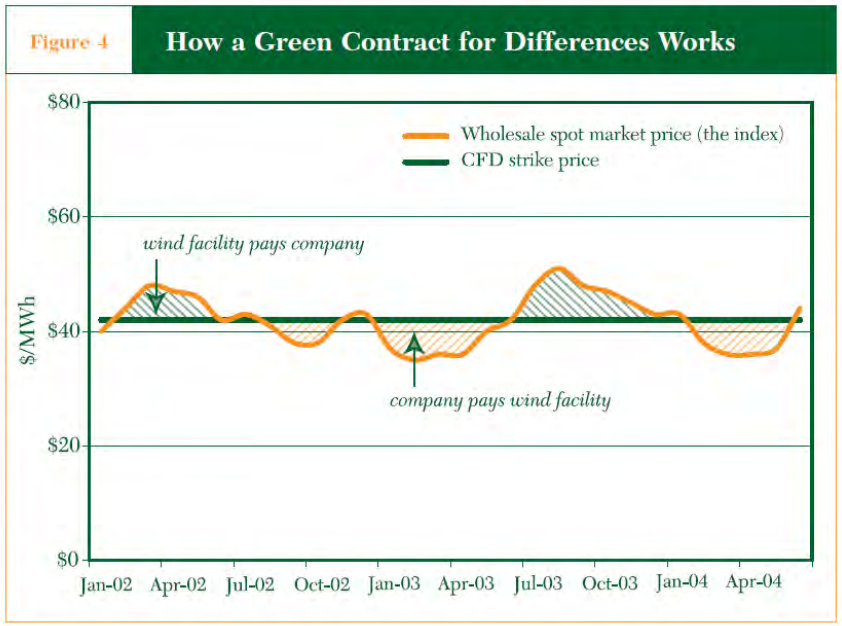
- Similar to a regular grid power agreement
- However, the underlying electricity generation is from a specific renewable energy project
- Customer has agreement with retailer for both renewable and standard grid power
- Underlying this agreement, the retailer has a renewable energy supply agreement with a project developer either at a fixed rate or using a contract for difference
- The retailer sells the electricity (including a margin) to the customer and manages the risk of generation fluctuations
- Customer typically pays either a
  - risk included rate for all power or
  - separate rates for RE and regular grid power

Direct PPA



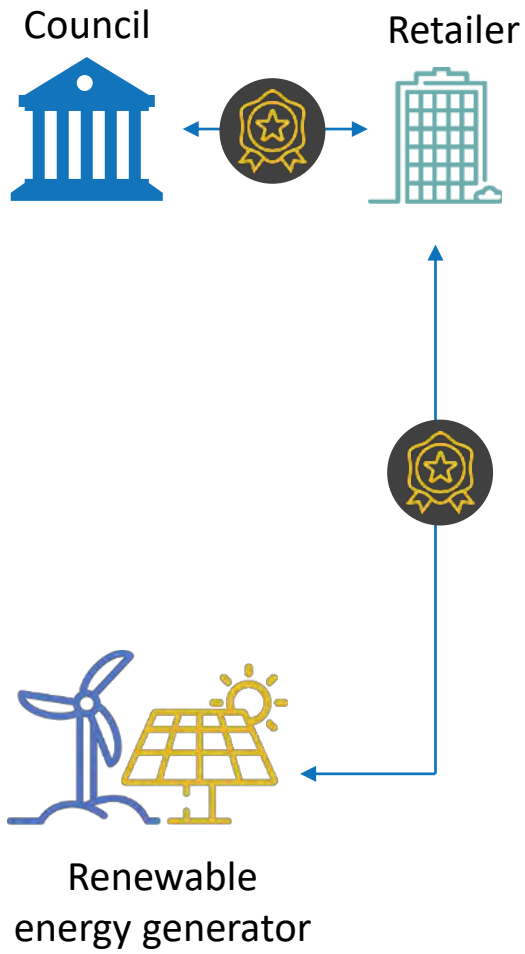
- Involves a customer buying electricity directly from a renewable energy project developer
- Typically at a fixed price over a term of 7, 10 or 15 years
- Requires a retailer to
  - pass through terms of agreement between developer and customer
  - risk-manage any fluctuations in generation against a required amount of MWh of electricity
  - Reconcile and bill for the renewably generated electricity
- In the past, retailers have agreed to this PPA type where volume of RE is a small part of the overall electricity load (still making a margin on most of load supplied by regular grid power)

Virtual PPA



- Decouples link between a grid supply agreement & RE generation
- No physical delivery of electricity
- Stand-alone financial derivative agreement that guarantees a fixed price return for the project developer
- The customer and the developer agree on a ‘strike price’
- Agree to settle difference between strike price and the spot electricity market
- If spot market > strike price, then the customer receives $
- If spot market < strike price, then the customer pays $
- There is a Ministerial Order preventing councils from directly investing in derivatives

LGC-only PPA

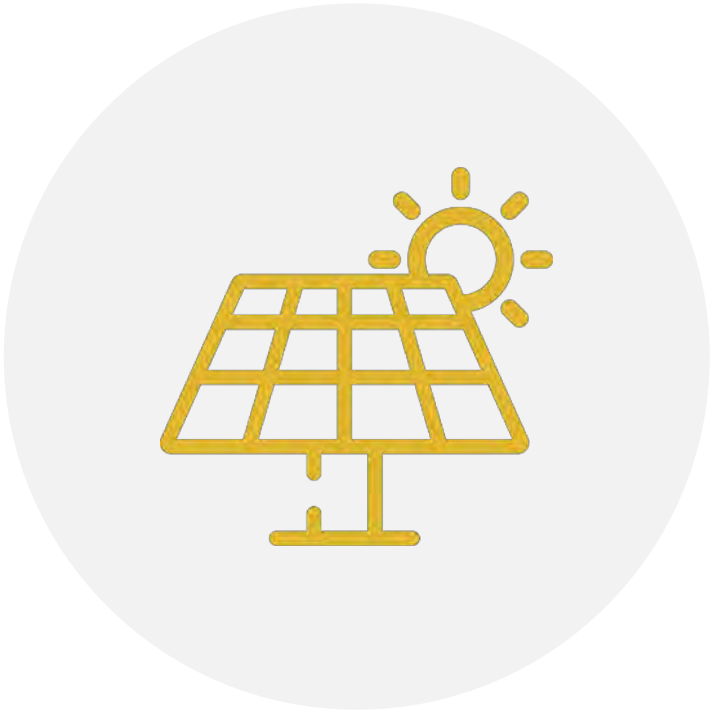


- Relatively simple
- Council would only purchase the green attributes of renewable energy generation
- No concern about balancing energy demand with RE output
- Little risk in matching the number of LGCs purchased to the electricity consumed in any given year
- Little or no change to the retail electricity agreement
- However, Council may be able to achieve a better price through a bundled PPA
- Striking a deal with a RE generator for LGCs-only may not be sufficient for a new RE project to get off the ground

PPA market is rapidly evolving

- Currently, PPA market is immature
- More customer-focused models
- PPAs are becoming more like regular energy supply agreements
- Innovative contractual arrangements
- New market places
- Major retailers are examining corporate PPA products that integrate renewable and grid power into a single agreement – supplied from their existing portfolio of utility-scale projects
- **Streamlined PPA processes that may allow businesses to more easily buy renewables at competitive rates**

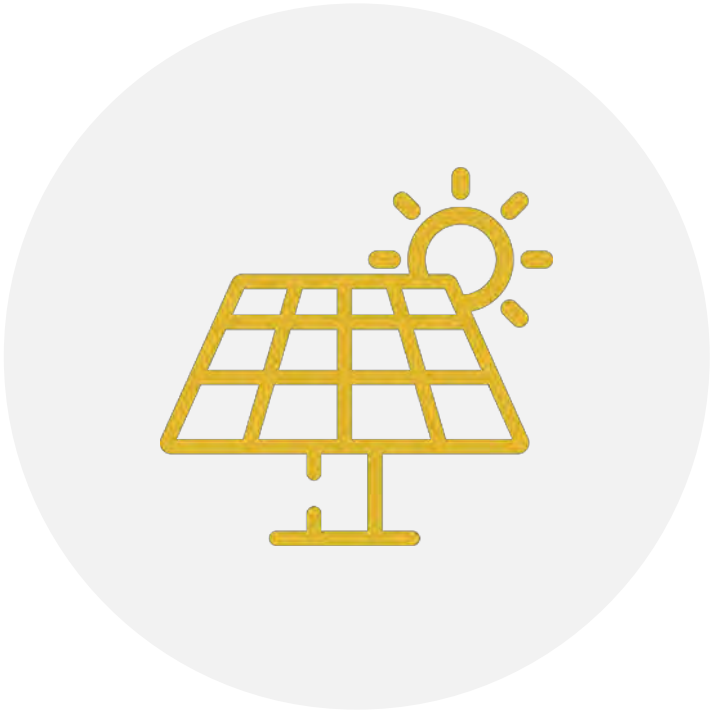
Engineer, Procure, Construct (EPC)



Background information

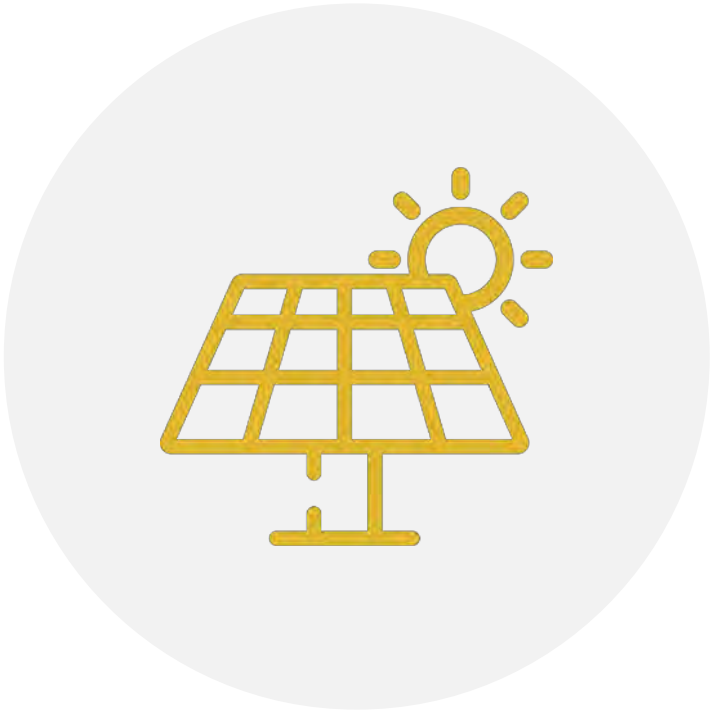
- Council invests capital and directly or indirectly manages the construction of a renewable energy asset
- EPCM model adds maintenance
- Ownership transferred to Council upon commissioning or after an agreed period of operation
- Council takes on the management and risk of ongoing performance
- Greater interest in the technical aspects

EPC and sell fixed priced off-take including LGCs



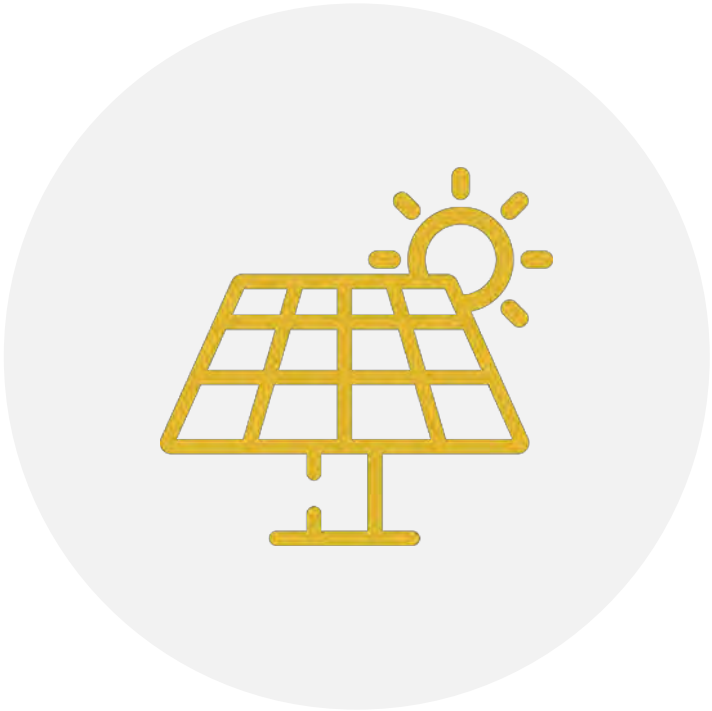
- Construction agreement is EPC
- Generation from the plant is exported to market to supply a third party offtaker.
- The generation is sold through a separate agreement at an agreed fixed price per MWh as council cannot offer as a contract for difference (CFD).
- A retailer needs to pass through or sleeve this separate agreement
- Typically, the offtake price will be at a discount to market
- LGCs are optional to sell/purchase
- Size of solar farm > 5 MW AC generation → project will likely need to be registered as a semi-scheduled generator with AEMO

EPC and receive spot market revenue



- Council registers as a generator
- Likely a semi-scheduled market generator (less than 30 MW generation) market participant
- Generation sent to market via an export meter
- Spot market revenue received from AEMO

EPC and receive Feed-in-Tariff

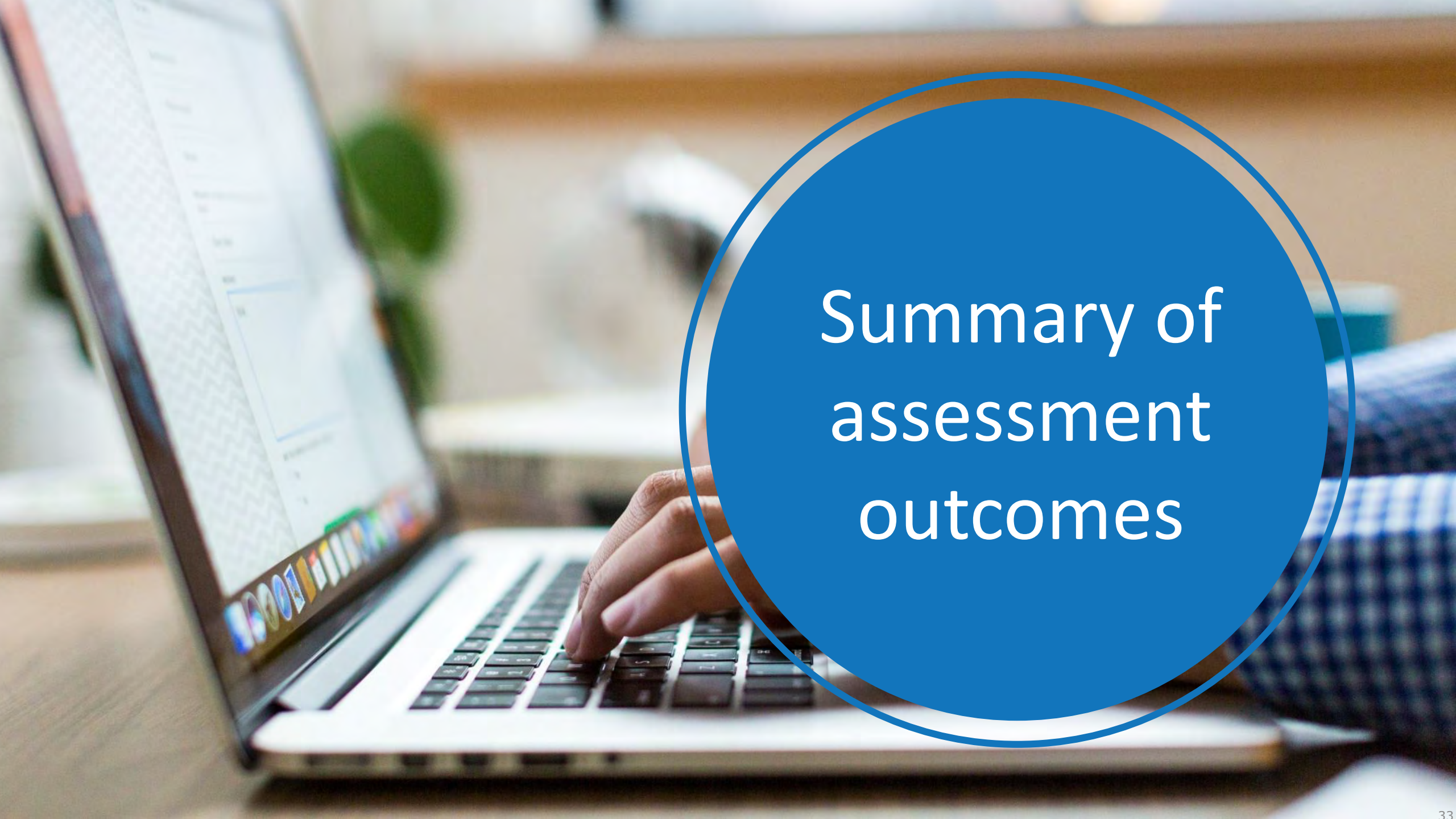


- Involves an EPC contract for construction
- Retail agreement for electricity supply
- Registration as a non-scheduled generator is typically not required under a feed-in tariff arrangement (and FiTs are not typically designed for generation at this level)
- Feed-in tariffs are being published at higher rates in the current market and form part of most large user retail electricity agreements
- Some retailers are willing to simply pass through the market rate that they achieve for the exported energy

Invest in renewables via a Public Private Partnership

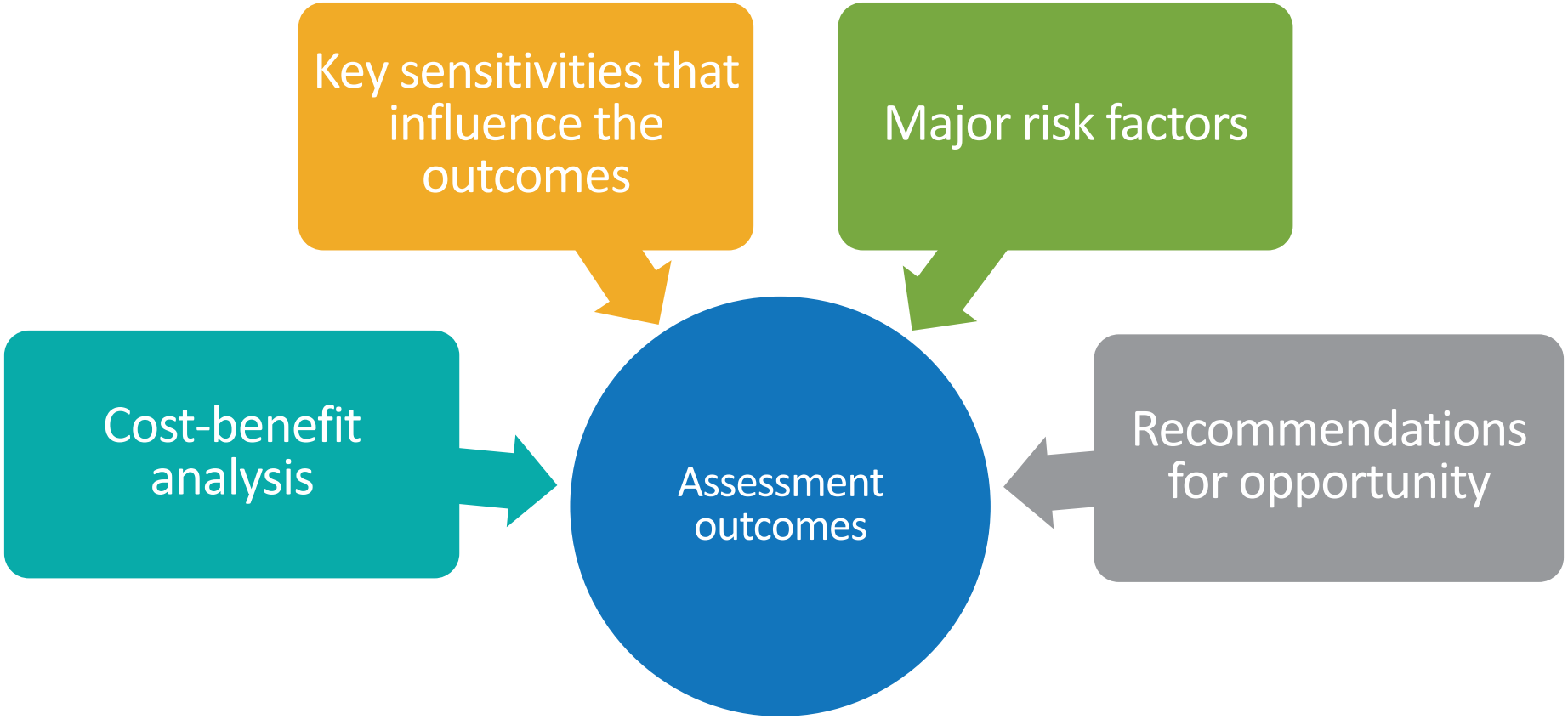
Background information

- Public-Private Partnerships can be complex and risky
- Local Government Act 1993 - Local Government Amendment (Public–Private Partnerships) Act 2004 - Part 6 in Chapter 12: new requirements for all councils in NSW when entering into PPPs
- Department of Local Government will examine whether the procedures and processes followed by councils are appropriate for the delivery of a particular project
- Responsibility for projects remains with councils
- A **council must submit a project assessment** in accordance with the PPP guidelines to the Department before entering into a PPP



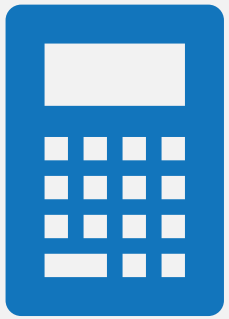
Summary of assessment outcomes

Results of assessment were developed in terms of



Cost-benefit

Cost-benefit analysis



- For each option, costs and benefits were developed based on available NSW market pricing and/or actual proposals to Council
- The PPP and EPC options involve the building of solar PV assets and deriving income from the sale of electricity and potentially LGCs
- All options have underlying PPAs in some form
- New generation asset → contractual arrangements must cover site preparation, approvals, construction, maintenance
- Requirement for retailer (transact and bill, balance of load when the RE is not generating or not generating at full capacity)

Summary

PPA options

- Favourable rates for projects generating electricity by 2020
- Motivated vendors seeking long-term customers through PPAs
- Prohibition on dealing in derivatives limits local government options
- Rapidly evolving market for PPAs with numerous models that can be tailored to fit client situation and needs

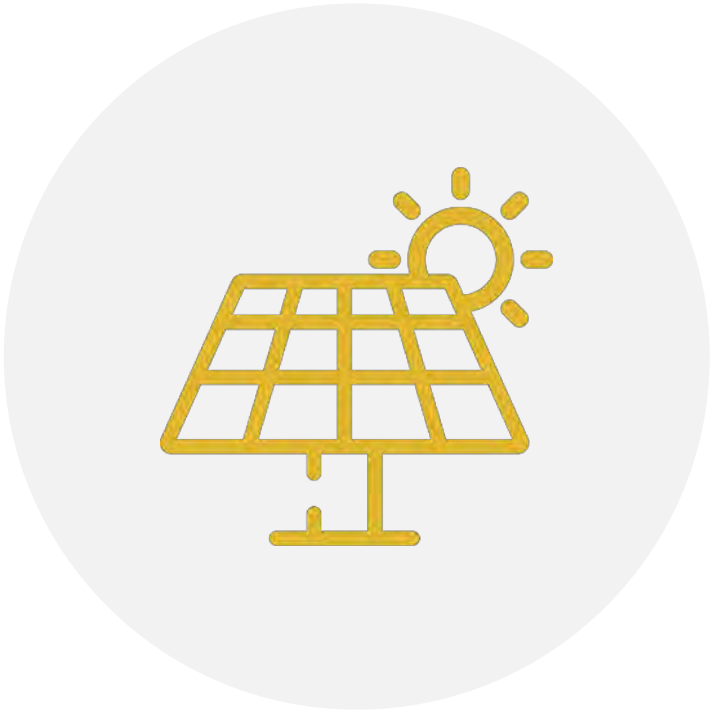
Build options (EPC and PPP)

- Assessed build options are marginal with low single-digit returns unless a social cost of carbon (SCoC) is valued and included
- Several risk factors and sensitivities impact the current business case
- Not a recommended option for ESC at this time
- Council should continue to evaluate these opportunities for possible future development (technology costs decline, electricity market evolves, policy environment may become clearer)

Key findings for specific PPA offer (virtual generation)

- Offers a high percentage of renewable energy (~75%) and would be a big step towards achieving ESC's renewable energy targets
- Model offers good pricing with low retail margin but also exposes clients to spot market volatility when renewable generation is not covering consumption. Overall 10-year $$ for PPA is approximately the same as forecast BAU grid $$
- However, only enough LGCs are delivered to cover obligations under the RET (around 20% of load) and not an LGC/MWh generated (about 75% of load) offered by other PPA variants
- Suitability may depend on whether the balance between price, % renewables and % carbon abatement meets ESC needs
- Offer was sufficiently encouraging to warrant continued consideration and development

Key findings for Build options for ESC



- Relatively high cost to develop and operate
- Low margin / low single-digit returns if built today (excl SCoC)
- Long term investment that requires management of the construction process with significant up-front costs before any benefit can be realised
- Underlying technology costs are on a downward trajectory, reducing asset value over time
- Option is less attractive to retailers as projects which they don't own generate lower margin revenue

- In summary, build options only offer a marginal benefit in the short term, carry some delivery risk and should be a lower priority for investment until build and implementation costs reduce further

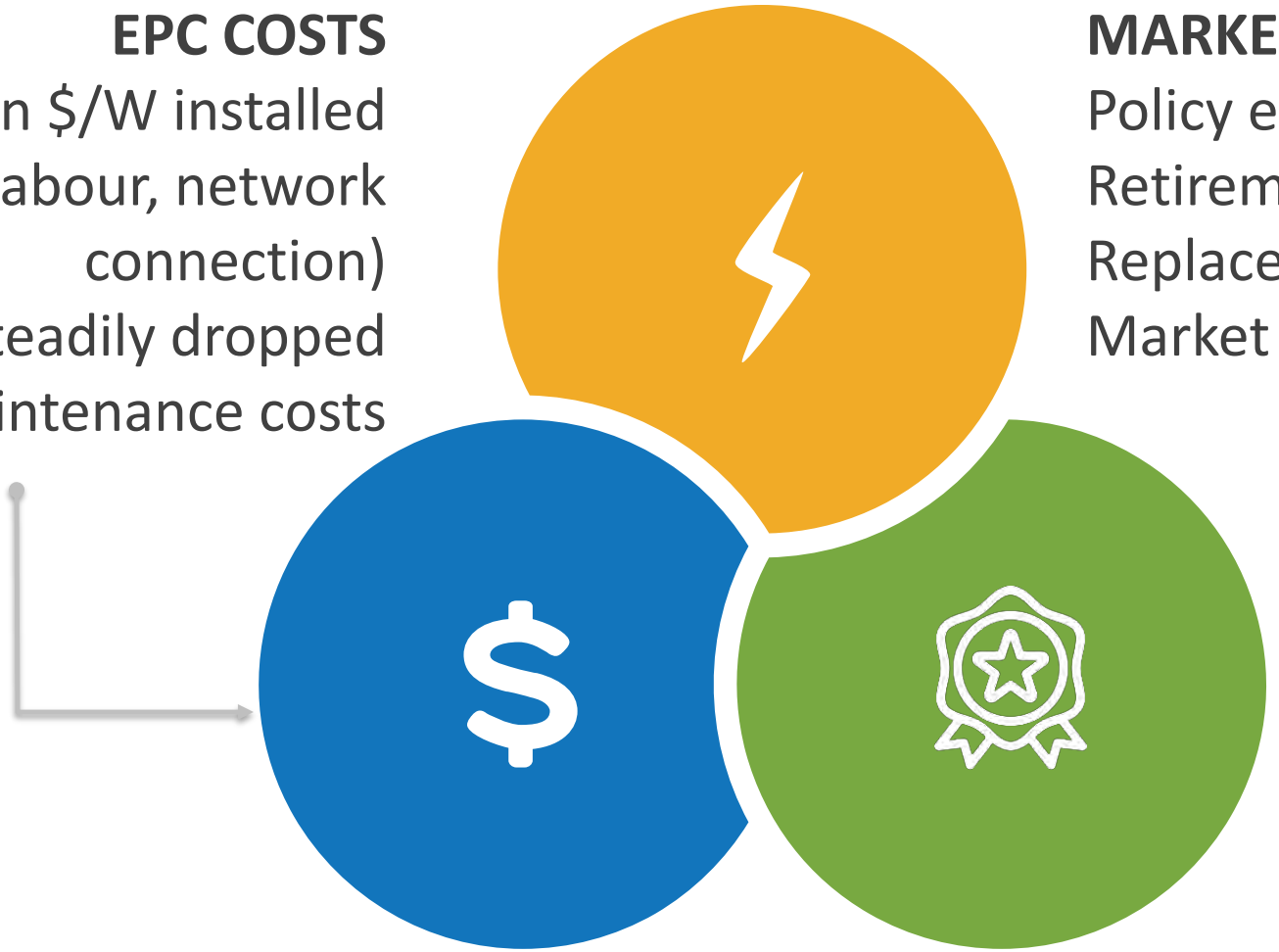
Key findings for Public Private Partnership

- Similar to ESC-build option, the PPP model requires relatively high up-front investment and low single-digit returns if built today (excl SCoC)
- Offers potential revenue via profit-share, sell surplus LGCs, interest, however not enough to raise RoI above ESC-build option
- Modelling was completed in a differently priced market to that which is currently being experienced so inflated wholesale & offtake pricing
- Modelling also suggested ambitious $/W and yield given the location and technology available, even with SAT
- Our assessment showed that if modelled in the current market, with more realistic expectations about the investment cost and yield and overlaid with the possibility of enforced curtailment as a semi-scheduled generator, then the likely benefit becomes less favourable. Hurdles to gain approval are also substantial.

Key sensitivities

Factors that influence the business case for build or buy

EPC COSTS
Quoted in $/W installed (Hardware, labour, network connection)
$/W has steadily dropped
Maintenance costs



MARKET PRICING FOR ELECTRICITY
Policy environment uncertainty,
Retirement of fossil fuel plants,
Replacement with new generation,
Market issues (e.g. supply/demand)

LGC PRICING
Increased supply from RET,
Retailers required to purchase ~20% of the load,
High now, but low in future

Risks

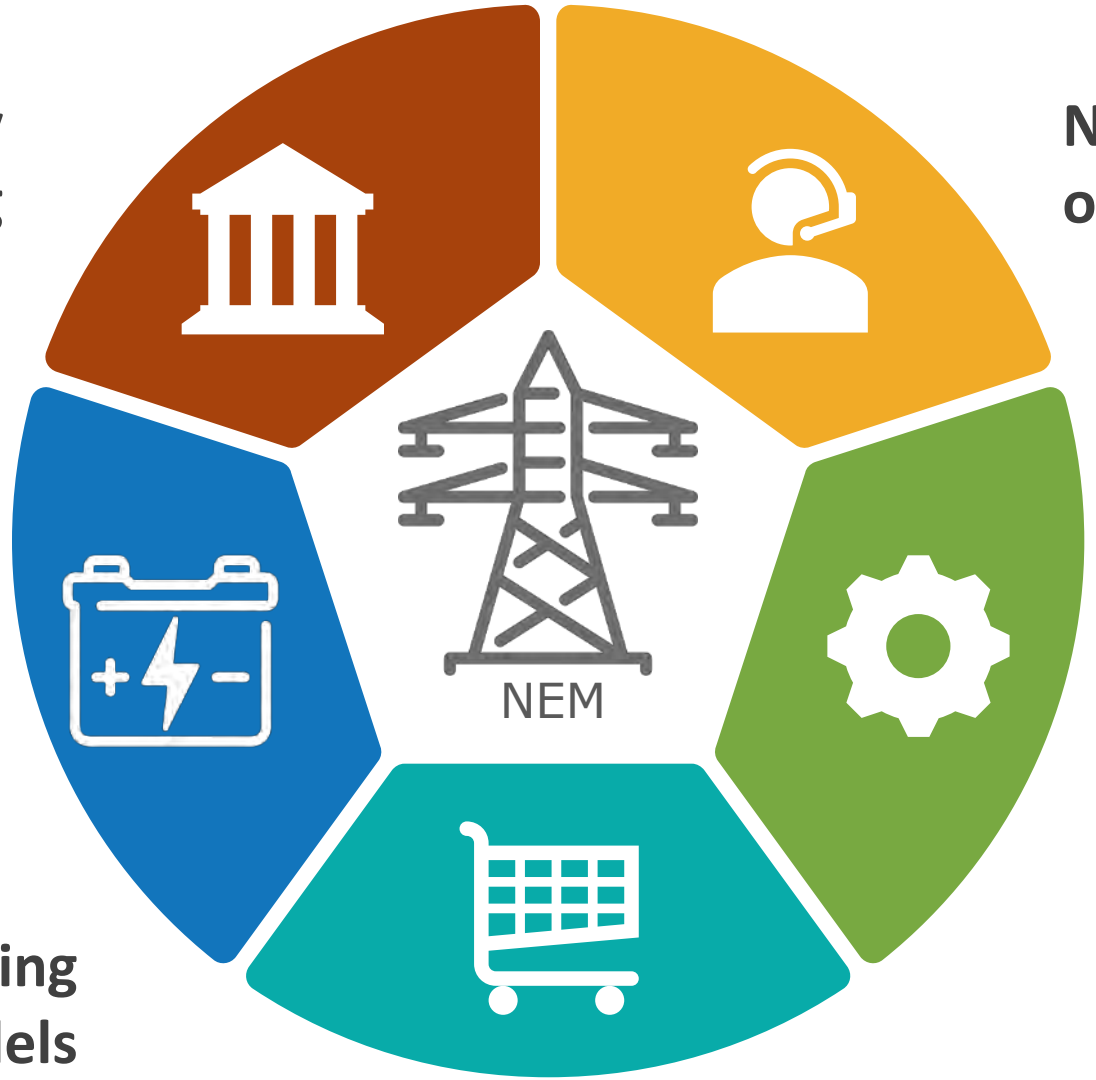
Five major risks that influence the viability of all RE options

- Offtake agreement pricing
- Energy market disruption
- Market price forecasting
- Duration risk / long-term commitment
- Lack of retail competition and take-up

Risk: offtake agreement price

- Cost of capital for RE developer ↓
- Technology and EPC costs ↓
- Connection & project management ↑
- Competitive landscape ↓

Risk: Energy market disruption



Policy setting

New retail offers

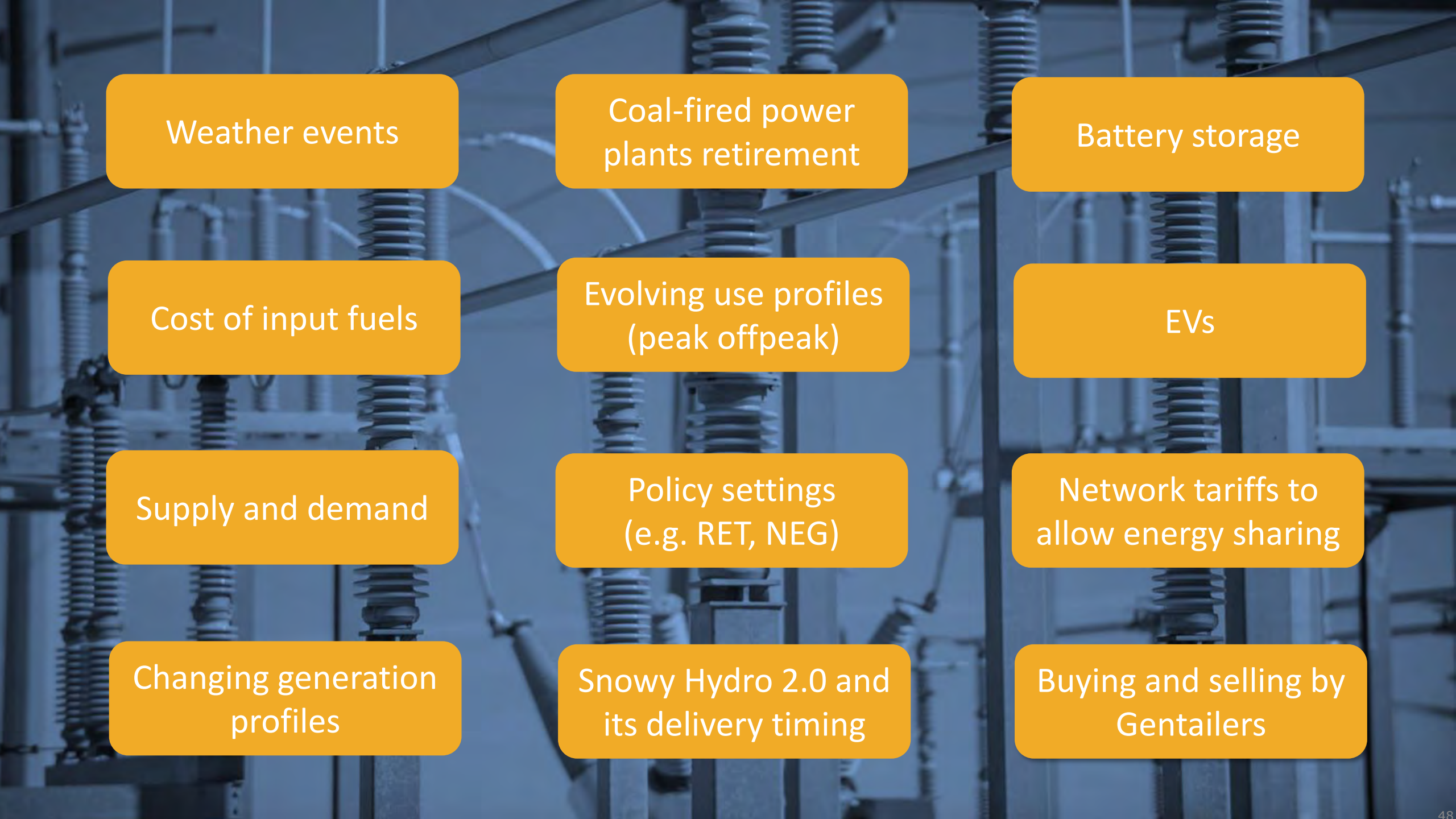
New technologies

Increased energy democracy – energy sharing

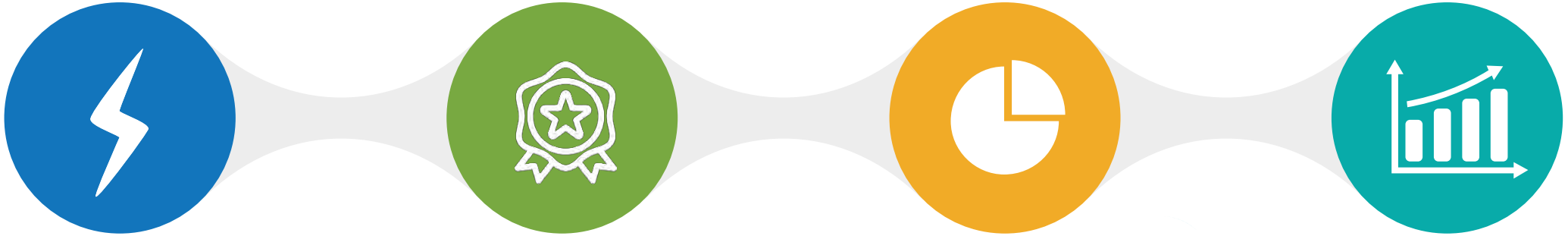
New purchasing models

100% renewables

Risk: Market price forecasting


Weather events
Coal-fired power plants retirement
Battery storage
Cost of input fuels
Evolving use profiles (peak offpeak)
EVs
Supply and demand
Policy settings (e.g. RET, NEG)
Network tariffs to allow energy sharing
Changing generation profiles
Snowy Hydro 2.0 and its delivery timing
Buying and selling by Gentailers

Duration risk due to long-term commitment



Electricity pricing?

LGC pricing?

Renewables vs grid costs?

Electricity use?

Long-term agreement, often ten years

Risk: Lack of retail competition and take-up

- **From the retailer's perspective**
  - Under NEM rules, all projects must have a retailer to sell the energy
  - Gentailers themselves purchase large-scale projects or their outputs
  - Major retailers only have moderate interest in mid-scale projects
  - Retailers need to make a margin to be profitable
  - Little margin on renewables component, and if only small amount of grid energy, little margin there

- **From the customer's perspective**
  - You need a retailer to sell energy and to provide the balance of the load outside of the renewables generation
  - Smaller retailers are more accepting of renewables projects, but greater counterparty risk, especially if entering into a long-term deal

Our recommendations

Overarching finding

Achieve
100% renewable energy
at the same or lower cost
than grid electricity

Build and own
~10 MW solar farm

Co-invest: 30 MW solar farm
Public Private Partnership

Contract directly via a
Power Purchase Agreement

In the current environment, a **PPA** is the **lowest-risk** and **easiest-to-implement** option for ESC

100% renewables

Main recommendations for ESC

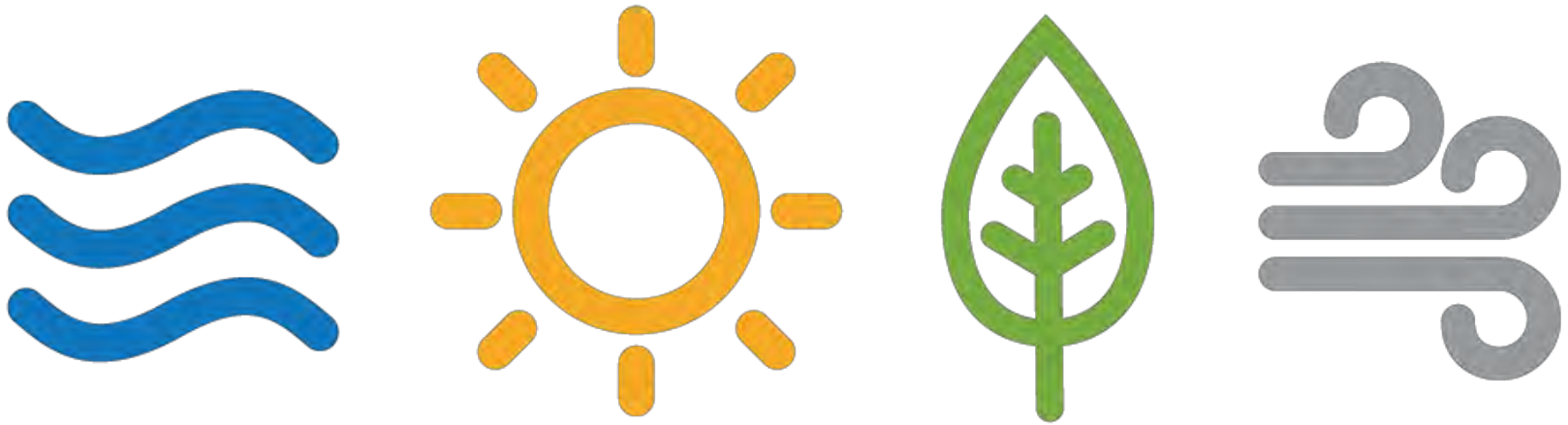
1. Review and seek advice in the short term on the market for emerging bundled PPA models for electricity and LGCs that involve reduced risk and improved cost outcomes as compared to the options investigated in this report.
2. Seek to incorporate the purchase of large scale renewable energy from the start of the next electricity contract period using a shorter-term agreement where it is found to be financially viable and has no additional risk when compared to a regular retail contract.
3. Consider forming a buying group or partnering with other councils in the region or state to increase the size of the electricity (including renewable energy) load to be contracted and the willingness of retailers to negotiate and price effectively.
4. Sense check and revisit build and operate models (EPC and PPP) to test viability against other available options following market investigations.

Where to from here

- Complexity and risk management

- Renewable energy Power Purchase Agreement

THANK YOU



100% renewables

100percentrenewables.com.au
Tel: 1300 102 195
Level 32, 101 Miller Street, North Sydney 2060
Info@100percentrenewables.com.au