Off-Site Renewable Energy
Stakeholder Workshop #1
24th Nov 2016
“Off-site RE”

=  

Corporate PPAs (i.e. power purchase agreements)

=  

Direct procurement of RE
Why is this important?

- What is the difference from ‘Business As Usual’?
Project team

- Graham Mills
- Iain MacGill
- Anna Bruce
- Sharon Young
Project Overview

<table>
<thead>
<tr>
<th>Title</th>
<th>Facilitating large energy user deployment of off-site renewable generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding</td>
<td>CRC for Low Carbon Living</td>
</tr>
<tr>
<td>Duration</td>
<td>12 months</td>
</tr>
<tr>
<td>Motivation</td>
<td>Recent market explosion in the US Initial movements in Australia but perceived lack of transparency/information</td>
</tr>
<tr>
<td>Methodology</td>
<td>Case studies Market survey Stakeholder workshops</td>
</tr>
</tbody>
</table>

Panel discussion!
Corporate Renewable Deals
2010 – 2017

Publicly announced contracted capacity of corporate Power Purchase Agreements, Green Power Purchases, Green Tariffs, and Outright Project Ownership in the US and Mexico, 2012 – 2016. Excludes on-site generation (e.g., rooftop solar PV) and deals with operating plants. Last updated: February 21, 2017.

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For more information, please visit http://www.businessrenewables.org/ or contact BRC@RMI.org
And the Australian context?

- Project initiated based on a couple of pioneering projects
  - Could this be a game changer??

- The answer was unclear 12 months ago but…
  - Yes
  - (Lucky for us 😊)
Project Rationale - Objectives

• **Rationale**
  To bring information into the public domain which supports end user decision making and reduces transaction costs associated with implementing direct procurement deals

• **Objectives**
  1. to explore the **options** available to end users in directly procuring offsite renewable energy; and
  2. to describe the market for such services in the Australian electricity industry context;
  3. to describe the current status of offsite contracting in Australia and identify drivers and barriers to market development.
Transaction costs and market maturity – where we want to go
Spectrum of options for RE

GreenPower®
Accredited Renewable Energy

Direct purchasing from off-site renewable generators

Large energy users

$
Conceptualising the off-site RE market

- **End-User Preferences**
  - Market matching
  - Information flows
  - Product development
  - Aggregation forms

- **Transaction Costs**
  - Counterparty identity
  - Role of electricity retailer
  - 'Physical' / 'virtual'

- **Specific Outcome**
  - Agreement term
  - Denomination of agreement
  - Allocation of risk
  - Pricing
Example: Google

Google:
- 2.6 GW contracted commitments by end 2016
- Set to be 100% RE this year

Australia:
- Total installed capacity 5.4 GW
  (APVI Australian PV Market Analysis [http://pv-map.apvi.org.au/analyses])

https://blog.google/topics/environment/100-percent-renewable-energy/
Marketing opportunities
Conceptualising the off-site RE market

- End-User Preferences
  - Transaction Costs
  - Market Structure
    - Information flows
    - Product development
    - Aggregation forms
  - Business Model Structure
    - Counterparty identity
    - Role of electricity retailer
    - ‘Physical’ / ‘virtual’
  - Contract Structure
    - Agreement term
    - Denomination of agreement
    - Allocation of risk
    - Pricing
  - Specific Outcome
Tri-partite market

Market Structure - process through which parties (supply and demand side) match given their individual preferences and objectives

End users

Intermediaries

Electricity retailers

RE project developers

Financiers
How to make everyone happy

Market evolution will be an iterative process of identifying the set of options that work for all parties

"The sweet spot"
### Overview of participants in our study

#### End Users

<table>
<thead>
<tr>
<th>Category</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>8</td>
</tr>
<tr>
<td>Local govt</td>
<td>5</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4</td>
</tr>
<tr>
<td>Property</td>
<td>6</td>
</tr>
<tr>
<td>Universities</td>
<td>4</td>
</tr>
<tr>
<td>Utilities</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

#### Others

<table>
<thead>
<tr>
<th>Category</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailers</td>
<td>6</td>
</tr>
<tr>
<td>Project developers</td>
<td>7</td>
</tr>
<tr>
<td>Intermediaries</td>
<td>4</td>
</tr>
<tr>
<td>Case studies</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>
Market survey interviews

Drivers and attitudes
- Energy costs
- CSR and RE
- Drivers
- Experience and attitudes:
  - Green Power
  - On-site generation
  - Off-site generation

Off-site RE preferences
- Buy vs own
- Green or black
- Counterparty identity
- Aggregation
- Additionality

Forward looking
- View on the likely development in Aust.
- Barriers
- Recommendations

For electricity retailers
- Business drivers
- Product offerings
- Deal preferences

For project developers
- Business drivers
- Deal preferences
- Financing
- Risk allocation
Drivers

- End users drive the market, but why would they want to do this?

**For RE generally:**
- End user control
- Environmental or CSR targets;
- Political or community values
- Government policy vacuum

**Specific to Off-site RE:**
- Cost
- Cost hedging
- Marketing value
- Traceability/Tangibility
- Flexibility for multi-site operations
Drivers (barriers)

- The other drivers are actually barriers to alternative options

**Barriers to “behind the meter” RE:**
- Facility barriers: Space; roofing condition; electrical installation; facility flexibility;
- Tenant Landlord: Split incentives; negotiation cost; short term lease/long term asset lifetime.

**End user attitudes towards GreenPower:**
- Additional cost: Green power is an expensive option;
- Tangibility: lacks tangibility; untraceable;
- Integrity/marketing: lacks integrity;
The decision/option model

- The top two levels of the RE procurement process funnel are the primary focus for this study.
- The framework describes the decisions which need to be made by end users in structuring an offsite RE procurement deal.
- Decision model describes 192 different structures.

<table>
<thead>
<tr>
<th>Structure:</th>
<th>Buy (PPA)</th>
<th>Own</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project type:</td>
<td>New</td>
<td>Existing</td>
</tr>
<tr>
<td>Approach:</td>
<td>Single end user</td>
<td>Aggregated</td>
</tr>
<tr>
<td>PPA counterparty:</td>
<td>Retailer</td>
<td>End user</td>
</tr>
<tr>
<td>Purchase of:</td>
<td>LGC only</td>
<td>Electricity</td>
</tr>
<tr>
<td>LGC treatment:</td>
<td>Sell</td>
<td>Surrender</td>
</tr>
<tr>
<td>Structure:</td>
<td>Buy (PPA)</td>
<td>Own</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>-----</td>
</tr>
<tr>
<td>Melbourne RE Project</td>
<td></td>
<td>Sunshine Coast CC</td>
</tr>
<tr>
<td>Sydney Metro NW</td>
<td></td>
<td>Ikea</td>
</tr>
</tbody>
</table>

- Decision depends on:
  - Cost of capital
  - In-house expertise
<table>
<thead>
<tr>
<th>Project type:</th>
<th>New</th>
<th>Existing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yarra trams</td>
<td></td>
<td>UTS / Singleton</td>
</tr>
</tbody>
</table>

- Decision depends on:
  - Appetite for long term
  - Additionality
### Approach:

<table>
<thead>
<tr>
<th>Single end user</th>
<th>Aggregated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newcastle City Council</td>
<td>Melbourne RE Project</td>
</tr>
<tr>
<td>Victorian State Govt</td>
<td>WWF buyers group</td>
</tr>
</tbody>
</table>

- Decision depends on:
  - Size of end user
  - Ability to compromise
<table>
<thead>
<tr>
<th>PPA counterparty:</th>
<th>Retailer</th>
<th>End user</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Melbourne RE Project</td>
<td>UTS / Singleton</td>
</tr>
</tbody>
</table>

- Decision depends on:
  - Desire for flexibility vs desire for simplicity
PPA Counterparty – Direct or intermediated

- Electricity retailer’s role is to manage risk
  - Direct agreement (end-user as counterparty to PPA)
  - Intermediated agreement (retailer as counterparty to PPA)
- There was a preference for a direct agreement;
- Direct agreement better for flexibility, tractability, marketing
- A direct agreement has electricity retail licensing issues.
<table>
<thead>
<tr>
<th>Purchase of:</th>
<th>LGC only</th>
<th>Electricity</th>
<th>Bundle</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vic Govt</td>
<td>Melb RE Proj</td>
<td></td>
</tr>
</tbody>
</table>

- Decision depends on:
  - Simplicity
  - Cost
  - Marketing
RE generation value (‘Black’) vs RECs (‘Green’)

• A key preference expressed by a broad range of end users was for RE generation value to be procured with/or without RECs;
• It should be noted that this is not a physical proposition, it instead reflects a financial arrangement;
• Issues in this regard:
  – RECs as offsets are an additional cost options and abstract mechanism which was hard to describe;
  – Acquiring generation value will reduce electricity costs;
  – Marketability and tangibility all enhanced;
• It was not entirely clear the extent to which all end users appreciated the physical vs financial nature of generation value procurement.
• Decision depends on:
  – Cost
  – Additionality
### Case Studies

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Who?</th>
<th>BOO/Buy</th>
<th>Single/Aggreg.</th>
<th>Black/LGC only</th>
<th>Retailer involved?</th>
<th>Status</th>
<th>Case study?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desalination Plant</td>
<td>Sydney Water</td>
<td>Buy</td>
<td>Single</td>
<td>Black+LGC</td>
<td>Retailer = developer</td>
<td>Complete</td>
<td>*</td>
</tr>
<tr>
<td>Singleton Solar Deal</td>
<td>UTS</td>
<td>Buy</td>
<td>Single</td>
<td>Black only</td>
<td>Supply unserved load</td>
<td>(Pre-existing)</td>
<td>*</td>
</tr>
<tr>
<td>RE Reverse Auctions</td>
<td>ACT state govt</td>
<td>Buy</td>
<td>Single</td>
<td>LGC only</td>
<td>No</td>
<td>Complete</td>
<td>*</td>
</tr>
<tr>
<td>RE Purchasing</td>
<td>Victorian state govt</td>
<td>Buy</td>
<td>Single</td>
<td>LGC only</td>
<td>No</td>
<td>Construction</td>
<td>*</td>
</tr>
<tr>
<td>Sunshine Coast Solar Farm</td>
<td>Sunshine Coast City Council</td>
<td>BOO</td>
<td>Single</td>
<td>n/a</td>
<td>Pass through spot exposure</td>
<td>Construction</td>
<td>*</td>
</tr>
<tr>
<td>Solar Yarra Trams</td>
<td>Victorian state govt</td>
<td>Buy</td>
<td>Single</td>
<td>LGC only</td>
<td>No</td>
<td>Construction</td>
<td>*</td>
</tr>
<tr>
<td>Zinc refinery solar farm</td>
<td>Sun Metals</td>
<td>BOO</td>
<td>Single</td>
<td>n/a</td>
<td>No, on-site. (behind meter?)</td>
<td>Construction</td>
<td>*</td>
</tr>
<tr>
<td>Melbourne RE Project (MREP)</td>
<td>Melbourne City Council</td>
<td>Buy</td>
<td>Agreg</td>
<td>Black+LGC</td>
<td>PPA counterparty</td>
<td>Tender</td>
<td>*</td>
</tr>
<tr>
<td>Sydney Metro North West</td>
<td>Transport for NSW</td>
<td>Buy</td>
<td>Single</td>
<td>Black+LGC (probably)</td>
<td>PPA counterp (probably)</td>
<td>Tender</td>
<td>*</td>
</tr>
<tr>
<td>RE Buyers Forum</td>
<td>WWF/JLL</td>
<td>Buy</td>
<td>Agreg</td>
<td>Black+LGC</td>
<td>PPA counterparty</td>
<td>EOI</td>
<td>*</td>
</tr>
<tr>
<td>Summerhill Solar Farm</td>
<td>Newcastle City Council</td>
<td>BOO</td>
<td>Single</td>
<td>n/a</td>
<td>TBC</td>
<td>EOI</td>
<td>*</td>
</tr>
</tbody>
</table>
Market formation

The conditions have been created over the past couple of years…
End-user market context

• Internal decisions:
  – Energy procurement teams vs sustainability teams
  – Risk adverse management

• Doing deals:
  – Information asymmetry (compared to retailers/developers)
  – Typical energy procurement process in 3-year cycles
  – Desire to retain flexibility
Electricity Retailer market context

• Drivers:
  – Retain existing or attract new customers, i.e. market differentiation
  – Large retailers less interested
  – Smaller retailers lack the necessary credit rating

• Profit margins are thin in commercial/industrial contracts
  – Bespoke agreements impose higher costs
  – Risk management costs for intermittent generation

Lack of understanding/acceptance from end users about these costs
Project Developer market context

• Drivers
  – Increase diversity of effective customer base

• Constraints
  – Requirements of financiers
  – Finance cost is a function of project size, term, credit rating
  – Counterparty risk (some end users have better rating than retailers!)

• Preferences
  – Off-take contracts for bundled RECs and generation value
  – Contract with a single representative counterparty if end users are aggregated in a buyers group
Looking forward

• Market facilitation
  – A trusted, independent body is needed for information, education and matching services
  – E.g. RMI Business Renewables Centre in the US, 193 members

• Deal standardisation
  – The most obvious way to reduce transaction costs and speed up market ‘throughput’
  – Is it feasible??
    o Discussion at our workshop last week suggested not.
    o However, opportunities exist to simplify offerings via government programs or aggregated deals