Subject to the below, the copyright in this Guidebook belongs to Frontier Impact Group and this document must not be copied or reproduced in any other electronic or physical form.

Frontier Impact Group is pleased to allow the material provided in this Guidebook to be reproduced in whole or in part solely for educational and non-commercial use, provided the meaning is unchanged and its source, publisher and authorship are acknowledged.

Advice to users of the guide

This Guidebook has been prepared based on information available as at December 2016.

This Guidebook and the information contained in it does not constitute an offer in relation to any project and does not entitle a recipient to participate in any process relating to any project.

The information contained in this Guidebook is indicative and is a guide only and the information does not constitute advice of any kind whatsoever (legal, accounting, financial, commercial or otherwise). A person who receives this Guidebook (and any information contained in it) represents and warrants to Frontier Impact Group and its representatives (jointly and severally) that it does not rely on this Guidebook and the information contained in it (a) as a statement of fact, representation or warranty of any matter whatsoever and (b) in making any decision of any kind whatsoever in relation to any future project.

Persons who receive this Guidebook and the information contained in it must make their own enquiries to verify and satisfy themselves of all aspects of this Guidebook and the information contained in it.

This Guidebook may contain forward-looking statements, forecasts, estimates and projections (Forward Statements). No representation or warranty is given as to the reasonableness of the Forward Statements or that the Forward Statements will be achieved.

While this Guidebook and the information contained in it has been prepared in good faith, no representations or warranties (express or implied) are made by Frontier Impact Group or its representatives as to the accuracy, currency, completeness, suitability, correctness, fitness for purpose or otherwise of such document and information. The provision of this Guidebook does not place Frontier Impact Group or its representatives under any obligation to provide any further information in relation to the subject matter or any projects, or to update this Guidebook or any additional information or to correct any inaccuracies in any such information which may become apparent.

To the maximum extent allowed by Law, neither Frontier Impact Group nor its representatives, officers, employees, contractors or agents, shall be liable to any person for any loss, liability, damage or expense arising directly or indirectly from or connected in any way with any use of or reliance on such document and information.

DISCLAIMER
A.1 Introduction
A.2 Behind the Meter and Other Models
A.3 Why Behind the Meter?
A.4 Funding Behind the Meter Solar PV Projects

Appendix I - Successful Community Energy Projects
Appendix II – Financial Contacts
Appendix III – Definitions
Appendix IV – Community Energy Behind the Meter Case Studies

SECTION A

SECTION B

SECTION C

SECTION D

Foreword

Project Elements Overview
C.1 Technology Choice
C.2 Project Scale
C.3 Community Engagement
C.4 Business Structure
C.5 Project Development Resourcing
C.6 Site Selection and Acquisition
C.7 Resource Assessment
C.8 Construction
C.9 Network Connections
C.10 Permitting
C.11 Operational Resourcing
C.12 Project Funding
C.13 Power Sales
C.14 Financial Modelling
C.15 Risk Management

B.1 Financial Modeling
The development of community energy (CE) projects is gaining significant momentum and at the time of publication of this guidebook, over thirty CE projects have been developed with many more under development (some of the successful projects are listed in Appendix D of this guidebook). A key driver for communities is to achieve energy security, reduce the impact of climate change through the reduced use of fossil fuels and the ability for the community to participate in the returns of local projects. One of the key barriers that has been expressed by CE project developers is the challenge to secure funding and improve their financial literacy. Thus the aim of the toolkit is to up-skill the financial literacy of community energy developers and increase the likelihood that their projects can be funded. This CE Funding Toolkit currently consists of two guidebooks the Funding Basics Guidebook and this Behind the Meter Solar PV guidebook. Subject to funding, the next guidebooks will cover Grid-Connected Solar PV and wind projects followed by energy storage projects.

At the time of publication, our project team identified that Behind the Meter solar projects were the most likely to be commercially viable and have strong potential to be replicated. This guidebook focuses on demonstrating the steps needed to develop and successfully fund community Behind the Meter solar PV projects. A large proportion of the successful projects developed to date are Behind the Meter solar PV projects.

Attached to this module are case studies. Complementing both the modules, the supporting case studies provide excellent examples of how communities are developing innovative ways to secure funding for their CE projects.

I would like to specifically acknowledge the support of the following key entities:

ARENA - for their continued efforts of inspiring renewable energy adoption across the country and their advice, support and guidance has been invaluable. Taryn Lane from Embark and Nicki Ison and Tom Nockolds from Community Power Agency together representing the Coalition for Community Energy (C4CE). Their insight and experience in community stakeholder engagement, and the development of new community investment models, has been critical in understanding the key issues around financial literacy and what was required to enable more communities to successfully fund CE projects.

Project steering committee members – the NSW Department of Environment and Heritage and the Clean Energy Finance Corporation – for their insight and guidance through the development of this toolkit.

A big thank you to:

- Mal Campbell who is co-author of this toolkit
- Dan, Alison and Phoebe from the Frontier Impact Group team who have contributed
- The teams at Baker and McKenzie and Norton Rose who have undertaken reviews for us
- Latitude Group for their amazing work on the design of the toolkit

On behalf of the project team I hope you find this toolkit useful and that it assists in the funding of many community energy projects across Australia.

Yours sincerely,

Jennifer Lauber Patterson
Managing Director
Frontier Impact Group

FOREWORD
This guidebook provides guidance on actions and factors that need to be considered by project developers as part of the process of achieving funding to develop Behind the Meter solar PV projects.
Solar panels at Geelong Primary School, Geelong VIC
Photo courtesy of Geelong Sustainability Group
INTRODUCTION

This guidebook is part of a Funding Toolkit that has been developed to assist community energy (CE) project proponents in the development and delivery of community renewable energy projects. The Funding Toolkit is designed to be a centralised, simplified and accessible repository of information to support the funding of community energy projects throughout the various stages of the project development process.

The aim of this particular guidebook is to provide assistance specifically to solar photovoltaic (PV) projects that are installed “behind the meter”, i.e., on a host site where the electricity is purchased by the host site rather than selling the electricity into the electricity market via the main electricity network (grid). A good example is a local club that installs a PV project on its roof and uses the energy for its own purposes.

There are other types of CE projects including bioenergy that can be applied to Behind the Meter projects but, for simplicity, this guidebook focuses on solar PV as it is currently the most common technology type for Behind the Meter projects including in the CE sector (as evidenced by the project list in Appendix D).

This guidebook is designed to be used in conjunction with the ‘Funding Basics Guidebook for Community Energy Projects’ to assist project developers to understand the minimum criteria that should generally be met at each stage of project development to assist in achieving successful project funding.

Community energy is where a community comes together to develop, deliver and benefit from a clean energy project.

These projects can be on the supply side (community renewables projects), on the demand side (community renewable energy efficiency programs), or even community approaches to selling or distributing energy.

CE projects are considered to be ones that involve the community undertaking a number of the following activities:

• Initiating
• Developing
• Operating
• Owning and/or
• Benefitting from a renewable energy project.

Any of the first four of these items is sufficient for the project to be considered within the scope of the toolkit.
Behind the Meter
- A host site agrees to have the CE project provide electricity directly for its own usage which is ‘behind’ the meter.
- The host site may be a commercial building, factory or other premises that can utilise the electricity produced by the CE project.

Grid-Integrated
- A Grid-Integrated CE project is essentially a hybrid of a Behind the Meter and a Grid-Connected project.
- It has a Behind the Meter connection on a host site but the majority of the electricity produced is not ‘behind the meter’ and is instead exported into the main electricity grid.
- In this case the CE project may sell only some of the electricity produced to the host site and will rely on electricity sales to third parties for the balance of its revenues.

Grid-Connected
- A Grid-Connected project is connected directly to the electricity network via its own network-managed meter.
- Since there is no host site to sell electricity to these types of CE projects rely entirely on sales of electricity to third parties.

BEHIND THE METER AND OTHER MODELS
This guidebook concentrates on Behind the Meter operating models. The three basic network connection models are described below. The first two fall into the Behind the Meter category, while the third category (Grid-Connected) is beyond the scope of this guidebook.
2.1 Funding Toolkit Structure

The Funding Toolkit is set up on a modular basis and includes a series of guidebooks. The core Funding Basics Guidebook supports project-based guidebooks with the first project module being this Behind the Meter Solar PV Guidebook. This guidebook is expected to be followed by a Grid-Connected Solar PV and Wind Guidebook and other future Guidebooks in response to demand and subject to funding.

2.2 Behind the Meter Solar PV Guidebook Structure

This guidebook provides guidance on actions and factors that need to be considered by project developers as part of the process of achieving funding to develop Behind the Meter solar PV projects. It sets out the information needed to give confidence to the funders that the project is financially viable and worthy of investing in and/or financing. The guidebook provides a financial template and more detailed guidance on the requirements for a project to become ‘investment ready’.

- **1. The financial template** sets out the information and calculates the financial metrics required to:
  - Initially assess the likely financial viability of a CE Behind the Meter project
  - Satisfy the requirements of investors and financiers in assessing the financial viability of a CE project.

- **2. Detailed guidance on how to:**
  - Develop the financial template
  - Ensure that key project elements have been appropriately addressed at each stage of project development to assist in increasing the likelihood of accessing project funding, be that from investors or finance lenders.

- **3. Case studies demonstrating the application of the guidebook.**

Throughout the guidebook is a series of tips that flag key issues to address. In addition to the information in the guidebook itself, links are provided to external reference sources that are able to provide more detailed information on specific topic areas. Access these links on our website: [frontierimpact.com.au/external-resources](http://frontierimpact.com.au/external-resources).

2.3 Project Development

The Funding Toolkit considers four stages of project development when factoring in the funding requirements for Behind the Meter solar PV projects.

- **The concept phase** describes where a CE project idea has been conceived and various options for the development of the project have been discussed at a high (conceptual) level.

- **The prefeasibility phase** evaluates key project elements in more detail and includes a financial model and scoping. This guidebook incorporates a financial template which is recommended to be used as a key input into making a number of key decisions on Behind the Meter solar PV projects. (See the Disclaimer in relation to use of the financial template.)

- **The feasibility phase** incorporates confirming in more detail all of the project element options including establishing more certainty around project costs and revenues. Once these are fixed up, project proponents will be in a position to then validate outcomes of the initial modelling undertaken during prefeasibility and develop a more detailed level of modelling required in order to achieve final funding.

- **Final funding** refers to the phase where all project elements have been developed in full detail including firm construction costs, confirmed revenue streams established, all contracts have been agreed and the project is ready to be funded. Once final funding is achieved, a project should be able to move into construction.

Not all CE projects will be successful but if you follow this guidebook the chances of success are likely to be increased.

Generally small Behind the Meter Solar PV projects do not have distinct concept and prefeasibility stages and, as such, the structure of this Guidebook is structured to consider the concept and prefeasibility stages as being one combined phase.
2.4 Project Elements

This guidebook uses a framework based around the various project elements required to develop and implement a successful project. Each of the project elements shown below is addressed in this Guidebook as being part of the process for the achievement of funding goals of a project, through each of the project development phases.

- Technology
- Project Scale
- Community Engagement
- Business Structure
- Project Development / Resourcing
- Site Selection & Acquisition
- Resource Assessment
- Construction
- Network Connection
- Permitting
- Operational Resources
- Project Funding
- Power Sales Agreements
- Financial Modelling
- Risk Management

Each of these elements is considered in detail in Section C of this guidebook.

However, the project elements cannot be considered in isolation of one another. For example, the technology choice and project scale will impact, and be impacted by, the network connection arrangements and the site selection.

It is important for project developers not to concentrate on an individual project element in isolation without considering the interdependency with all other project elements.

Note: there are other elements that may need to be considered in the development of a CE project that are not considered in this guidebook as they are not considered critical to the funding aspects of a project.

WHY BEHIND THE METER?

The main reason to consider Behind the Meter installations rather than Grid-Connected projects is the potentially higher revenues that can be obtained from Behind the Meter installations.

For Grid-Connected installations the revenue from electricity sales is competing with the wholesale price of energy. However for Behind the Meter installations the electricity produced that is not exported beyond the meter is competing with much higher retail prices and as such can attract higher revenues. This is explained further below.

3.1 Wholesale Electricity Prices

The wholesale price is the price a project receives when exporting electricity to the grid. The wholesale price is relatively low in comparison to retail electricity prices so selling power via a direct grid connection will attract a lower rate than would be achievable in a Behind the Meter situation.

3.2 Retail electricity prices

The retail price is the price a business pays for electricity. This includes the sum total of the following:

- The wholesale (value of electricity generation) electricity price plus
- Network charges (transmission and distribution costs) plus
- Retail overhead charges plus
- Retail profit margins plus
- Retailer environmental charges (e.g., LDCs and STCs) fees plus
- Electricity market based fees plus
- Losses (transporting the electricity).

Behind the Meter projects allow for sales at avoidable retail prices because the host site is able to avoid a significant component of its retail energy bill if energy is generated Behind the Meter rather than sourced from the network.

The general difference between wholesale charges, retail charges and avoidable retail charges is illustrated in the following chart.

The avoidable retail charges are variable charges that are volume-based and include:

- Retailer energy charges
- Retailer environmental charges
- Retailer market fee (AEMO) charges
- Network energy charges.

There are certain retailer charges and network charges that cannot be avoided. These charges include fixed charges (that are generally expressed in $/day or cents/day) and network demand charges which are usually difficult to avoid due to the intermittent nature of Solar PV output.

The retail price could be between two and seven times the wholesale energy price so a higher price can be paid when selling Behind the Meter than selling into the wholesale market through the network.
Your project can achieve energy security, and reduce the impact of climate change through the reduced use of fossil fuels.
Wholesale, Retail and Avoidable Retail Price Comparison

Wholesale Retail

Wholesale + All Network + All Retailer Charges

Avoidable Retail

Wholesale + Avoidable Network Charges + Avoidable Retailer Charges

3.3 Behind the Meter vs Network-Connected

There has been an extensive penetration of rooftop solar PV in Australia in the residential sector and to a lesser extent the commercial sector. A lot of this growth has been driven by government-supported feed-in-tariff (FIT) subsidies. The price of FITs has reduced significantly in recent years, and in fact some of these are no longer available. Consequently the economic incentives for investing in solar PV that is exported into the grid may not be commercially viable. CE developers are advised to always review factors such as the prices of electricity (including network tariffs) and Renewable Energy Certificates as these constantly change and so the economics can also change.

The current trend is the preference for developing CE Behind the Meter projects because, as explained above, the revenue that can be generated through selling electricity to the host site is higher. To optimise the financial return in a Behind the Meter solar PV project, the scale of the solar PV installation should ideally be less than the electricity usage of the host site so as to maximise the amount of electricity used by the host site as opposed to selling electricity back to the grid.

Information on determining the optimal capacity (size) of the project and other factors are contained in later sections of this guidebook.

Behind the meter installations assist host sites to avoid network and retail costs which is why they attract higher revenues.

TIP

Our stakeholder engagement identified that CE projects have struggled to deliver projects and a key barrier has been funding. As such, this toolkit aims to improve this success rate by improving financial literacy generally and increasing the understanding of those factors that will improve the chance of a Behind the Meter project achieving successful funding.

The funding requirements will vary at each stage of the project development phase and different funding sources may be better suited during particular stages of project development.

The table below shows the most common funding sources available for CE projects in general at this time.

Common Funding Sources for CE Models

<table>
<thead>
<tr>
<th>Funding Source</th>
<th>Concept</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-kind Contribution</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Grant Funding</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Donations</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Retail Investors</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Angel Investors</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Wholesale Investors</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Social Impact Funds</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>Debt Financing</td>
<td>❌</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>
Solar panels being installed at John Fawkner College, Fawkner, VIC
Photo courtesy of Moreland Energy Foundation
FINANCIAL MODELLING

A comprehensive financial model plays an important role in being able to take a Behind the Meter CE project concept and developing it through to a successful final funding implementation. The financial model and supporting toolkit resources are designed to allow project developers to quickly grasp the key financial elements of their project and target the financially challenging areas as high priority items to address.

Financial modelling is key to obtaining funding through all stages of the development process and will assist in:

1. Understanding the project and alternative project funding types
2. Assessing equity returns to attract investors
3. Proving financial prefeasibility for financial decision making
4. Demonstration of cashflows to securing final funding commitments

The funding toolkit incorporates a spreadsheet-based financial template to assist developers in modelling the financial impact of the various project elements considered in this Guidebook. An explanation on how to utilise and interpret the financial template is provided below.

1.1 How to Apply the Behind-the-Meter Model Template

This Guidebook’s financial model template is designed to assist projects seeking funding for all stages of project development. Modelling is important as it allows the project economics to be tested and validated and the key elements that underpin the financial viability to be quickly identified so that the project can be further developed to attract the required funding.

Initial financial modelling should include sensitivity analysis to identify project elements that need to be addressed in order to achieve required financial outcomes. For example, sensitivity analysis will show the impact on the investor return of changes in construction costs, project revenue rates and project life.

If these project elements cannot be adequately addressed to provide the financial returns required to attract investor or financier funding then consideration needs to be given to abandoning the project or reconceiving/redesigning certain project elements.

This level of modelling included in the provided financial template concentrates primarily on project cash flow elements and does not consider complex elements such as loan structuring or all details of tax and accounting treatments. For Behind the Meter projects these additional elements can be fine-tuned by your financial advisers as the project develops.
1.1.1 Financial Template Structure

The financial model template includes the following eight key worksheets (there are also additional worksheets that are used for sensitivity analysis but these require no input from users):

1. A Cover Worksheet for the project name and date of preparation of the model
2. A Contents Page to allow easy navigation between worksheets
3. An Input Assumptions worksheet that requires users to enter specific financial details of their project, certain host site details and assumptions underpinning various project elements
4. A Host Site Benefits worksheet that sets out the commercial benefits to the host site of entering into a commercial agreement under the modelled project parameters
5. An Investment Return Summary worksheet which provides a summary of the financial viability of the project including sensitivity analysis
6. A Profit and Loss worksheet that sets out a financial Profit and Loss Statement for the project
7. A Balance Sheet worksheet that sets out a financial Balance Sheet Statement for the project
8. A Cash Flow Calculations worksheet which requires no user input but shows the cash flows utilised to generate the investment return summary values

User input is only required in the input assumptions worksheet and investment return summary worksheet. The following sections explain how to interpret the results of the Investment Return Summary worksheet and apply sensitivity analysis on the results.
### Financial Term Description Interpretation Use

<table>
<thead>
<tr>
<th>Financial Term</th>
<th>Description</th>
<th>Interpretation</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equity Investment</strong></td>
<td>The amount invested in the project as equity by shareholders and other equity providers</td>
<td>This is taken directly from the input assumptions worksheet</td>
<td>This provides the amount of capital to be provided by investors in the project</td>
</tr>
<tr>
<td><strong>Debt Financing</strong></td>
<td>The amount of debt used to finance the project</td>
<td>This is taken directly from the input assumptions worksheet</td>
<td>This provides the amount of debt being sought to finance the project. In simple terms the debt amount being sought will be the gap between the total cost of the project and the amount of equity investment available. For projects like small Behind the Meter solar there may be no debt required as equity may be available for the entire project</td>
</tr>
<tr>
<td><strong>Debt (gearing) Ratio</strong></td>
<td>The ratio of debt to the total cost of the project</td>
<td>The percentage of debt in relation to the total investment in a project. E.g. if debt provided 60% of the project funding and equity amounted to 40% the debt gearing ratio would be 60%</td>
<td>Lenders will generally not fund all costs of a CE project (similar to borrowing for a house – the lending institution will not fund 100% of the purchase price and requires the buyer to pay a certain percentage of the valuation of the house so the debt ratio achievable is not 100%). The higher the debt ratio being sought the less likely the lender will provide the debt and the higher the interest rate if the debt amount is provided. So the lower the debt ratio the better the chance of obtaining the debt funding</td>
</tr>
<tr>
<td><strong>Discount Rate (after tax)</strong></td>
<td>The discount rate used in discounted cash flow analysis</td>
<td>This rate is seen as the minimum return that investors in the project would expect to see on their investment after tax (sometimes referred to as project hurdle rate). The level will depend on the type of investor and might range from 0% (e.g., for investors not interested in achieving a return on their money but simply seeking their initial investment to be returned given the community benefits of the project) to 20% or more for seed investors who perceive that they require higher returns because of potential risks in achieving those returns. Typically community energy investors are receiving 3-9%</td>
<td>The discount rate is used as a benchmark for the investor to see if their return expectations are to be met by the project</td>
</tr>
<tr>
<td><strong>Modelling Period</strong></td>
<td>The period over which the project cash flows are to be evaluated</td>
<td>This is taken directly from the input assumptions worksheet</td>
<td>This is the period over which the project's cash flows will be assessed for the purpose of calculating the various investment/debt measures</td>
</tr>
<tr>
<td><strong>NPV ($’000) (at nominated discount rate)</strong></td>
<td>The sum of all net cash flows to investors discounted annually at the discount rate</td>
<td>The value of the project investment to investors at the required discount rate. It is calculated by discounting the value of future cash flows by an annual discount factor. As such it takes into account the time value of money</td>
<td>A positive NPV value indicates that the project meets or exceeds the required investor rate of return (as indicated by the discount rate above) A negative NPV value indicates that the project will not meet the investor-required rate of return</td>
</tr>
<tr>
<td><strong>Payback (years)</strong></td>
<td>The number of years before the project returns the initial equity investment (disregarding any return on investment or profit requirements)</td>
<td>The number of years before the project dividend returns to the investor equal the initial equity investment</td>
<td>This measure simply tells the investor how many years before the project will return the equity invested in the project to the investor through dividend payments. After this period the investor will achieve some level of profit on the investment</td>
</tr>
</tbody>
</table>
Financial Term | Description | Interpretation | Use
---|---|---|---
**ROI (%)**<br>This is Return on Investment | In its strictest sense Return on Investment is a relatively simple measure that is calculated as the sum of the dividends returned to investors over the project life divided by the equity investment | ROI is used to give a relatively simple calculation of the ratio of total dividend payments received by investors to the equity invested in the project | This indicates the annualised returns on the equity investment in the project (i.e., investor rate of return after the project company tax has been paid). If the value is higher than the discount rate then the project will have a positive NPV value and the converse applies – if the IRR is less than the required discount rate then the NPV will be negative. This is Return on Investment. It represents the calculated rate of return to the investor after any project company tax has been paid. | This indicates the annualised returns on the equity investment in the project (i.e., investor rate of return after the project company tax has been paid). If the value is higher than the discount rate then the project will have a positive NPV value and the converse applies – if the IRR is less than the required discount rate then the NPV will be negative. | IRR tells investors what the actual annualised return on their investment would be based on dividend payments received compared to their equity investment. Generally IRR is a much better measure than ROI or even average annual ROI for long-term investments such as energy projects because IRR takes into account the actual timing of the dividend payment. | This is the calculated rate of return to the investor factoring in any franking credits arising from any company tax having been paid. | This indicates the annualised returns on the equity investment in the project (i.e., investor rate of return) factoring in any franking credits that an investor might receive as a result of the company already having paid tax on the net revenues it has received. | This IRR value allows investors to compare the returns that they might receive from alternative investments such as bank interest rates which are always quoted pre-tax. | This is the minimum value of the debt service cover ratio over the life of the project and is only relevant to projects that incorporate debt funding. | DSCR is calculated on a periodic basis (annually in the case of this template) as the ratio of the net cash flow generated by the project during the period to the debt repayments during that period. | DSCR is used by lenders to assess how much cash is available each year to meet principal and interest repayments. Different lenders will have different requirements but ideally the number should be 1.5 or higher depending on the perceived certainty of project cash flows. | 1. The first column shows the Base Case Assumptions for key input variables (from the input assumptions worksheet). Under this column the investment measures for the Base Case Assumptions are shown. There is no user entry required in this column. 2. The second column called Sensitivity Variation allows users to enter an amount that varies the Base Case Assumption variable by a percentage amount (plus or minus). The users enter these percentages. 3. The third column includes the Sensitivity Adjusted Values, i.e., the Base Case variables adjusted by the Sensitivity Variation as: Sensitivity Adjusted Value = (1+Sensitivity Variation) x Base Case Value. Under this column the investment measures are shown. From this analysis users can see the impact of changing key input assumptions on the investment measures and consequently the variables that have most impact on the project economics. There is no user entry required in this column. 1.1.4 Applying Sensitivity Analysis 1.1.5 Sensitivity Inputs

As a minimum it is recommended that +/-10% sensitivities should be examined but some inputs may require greater sensitivity values especially during the concept and early feasibility phase modelling. For power sales revenue from electricity and LGC sales it is recommended to use a minimum sensitivity of +/-20% unless you have firm power sales agreements under negotiation at rates you are reasonably confident of obtaining.
King Island Advanced Hybrid Power Station solar panels, TAS
Photo courtesy of ARENA
The overall framework used in the development of the financial toolkit is shown on the following pages. This section sets out the key steps to undertake to ensure the success of a CE project and provides guidance on completing the financial template.
See below an overview of high-level objectives that CE project developers may need to achieve at each project development phase of each project element to achieve funding of a CE project.

1 Technology Choice

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The type of renewable energy project under consideration.</td>
<td>For Behind the Meter solar PV the choice will be primarily between solar cell and inverter manufacturers and technologies used in each. Budget quotes for the technology options should be readily obtainable for input into financial modelling.</td>
<td>Detailed price estimates obtained from one or two potential suppliers having investigated manufacturers and their technology adequately and having the site inspected.</td>
<td>Firm prices available from one or two experienced suppliers. Technology verification undertaken and available for validation by others if necessary.</td>
</tr>
</tbody>
</table>

2 Project Scale

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The peak design output size of the project in kW/MW</td>
<td>Capacity range of project determined, e.g., 30 – 100kW, 100kW – 500kW, &gt; 500kW. Total CAPEX range estimated based on technology and project scale noting the advantages of &lt;100kW projects under the current market arrangements.</td>
<td>Project scale determined to narrow bandwidth.</td>
<td>Project scale determined and set.</td>
</tr>
</tbody>
</table>

3 Community Engagement

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interaction with community stakeholders to increase participation in or support for the project. This may extend to marketing to and seeking capital raising from community investors.</td>
<td>Core organising group in place with high-level project objectives in mind (benefits for the community), Initial gauge of community interest and support. Potential key stakeholders identified. Active community engagement undertaken with project benefits clearly communicated. Support base identified and able to be relied upon. Key stakeholders identified and engaged. Marketing of the project for community investors for equity contributions if this is the preferred model for capital raising.</td>
<td>Project communicated to relevant community stakeholders exposing project benefits. All key stakeholder issues addressed and factored into overall project considerations. Advanced development of capital raising from community investors.</td>
<td>Clearly demonstrable support for the project with all key issues and risks addressed to provide confidence to lenders/investors that no cost overruns, etc., could occur as a result of community related issues. All documentation in place to enable community investor capital raising and demonstrable investor support fully quantified.</td>
</tr>
</tbody>
</table>

4 Business Structure

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The type of business (legal/tax/financial) structure used to develop and operate the project.</td>
<td>Options discussed for both the governance of the project during project development and for the final governance arrangements once the project is operational. Business structure then developed with final structure given consideration – operating project structure may be different from development structure. Project governance structure put in place.</td>
<td>Final business structure decided and ready to be established. Project governance working and addressing all governance issues.</td>
<td>Final business structure in place. Project governance structure aligned with business structure and in place.</td>
</tr>
</tbody>
</table>
## 5 Project Development Resourcing

**Project Element**

<table>
<thead>
<tr>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The resources required to develop the required elements of a project from concept through to Final Funding and prior to implementation.</td>
<td>Skills identified and detailed cost estimate to progress from feasibility through to construction and commissioning determined.</td>
<td>Cost allowances for project construction estimated broadly.</td>
</tr>
</tbody>
</table>

## 6 Site Selection and Acquisition

**Project Element**

<table>
<thead>
<tr>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing, selecting and gaining access to a good host site for a Behind the Meter solar PV CE project</td>
<td>Host site selected and access to site secured through lease or other secure site access mechanism. Site suitability assessed and confirmed.</td>
<td>Detailed cost estimates obtained from reputable solar installer contractors.</td>
</tr>
</tbody>
</table>

## 7 Resource Assessment

**Project Element**

<table>
<thead>
<tr>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the amount of energy (kWh/MWh) that a project can produce annually over its life.</td>
<td>Verified resource availability based on final professional solar design. Detailed sensitivity analysis included.</td>
<td>Firm cost quotations available for CAPEX and OPEX assumptions clearly outlined and able to be validated for. An agreed network connection agreement may be required.</td>
</tr>
</tbody>
</table>

## 8 Construction

**Project Element**

<table>
<thead>
<tr>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the costs to obtain equipment, install it and commission the project to operational stage.</td>
<td>Cost allowances for project construction estimated broadly.</td>
<td>Detailed cost estimates obtained from reputable solar installer contractors.</td>
</tr>
</tbody>
</table>

## 9 Network Connections

**Project Element**

<table>
<thead>
<tr>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the technical requirements and financial costs of connecting the project Behind the Meter in relation to network connections.</td>
<td>Budget cost allowance for network capital costs and ongoing annual costs based on general area estimates available from network company websites. Preliminary connection inquiry made with network company.</td>
<td>Specific cost estimates (CAPEX and OPEX) based on one or two sites.</td>
</tr>
</tbody>
</table>

## 10 Permitting

**Project Element**

<table>
<thead>
<tr>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtaining all necessary regulatory, licensing and planning approvals to allow a project to be built and operated.</td>
<td>Permits in place or available subject to final funding. Compliance activities post-operation scheduled and budget allowed for them.</td>
<td></td>
</tr>
</tbody>
</table>

28 FRONTIER IMPACT GROUP

BEHIND THE METER PV SOLAR FUNDING GUIDEBOOK 29
### 11 Operational Resourcing

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ongoing costs of operating the project and business structure once commissioned and fully operational.</td>
<td>Initial assessment of operational resources required (operational and admin personnel, maintenance, etc.) and cost allowance made.</td>
<td>Detailed analysis of operational costs undertaken and quotes obtained for third party services, e.g., equipment maintenance services.</td>
<td>Detailed and verifiable operational costs supplied encompassing all operation costs of the project.</td>
</tr>
</tbody>
</table>

### 12 Project Funding

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The funding required to develop a project from concept through to the commencement of the Operations phase.</td>
<td>Potential funding sources identified to progress to feasibility stage and estimates of source values made including donations and grants. Potential investors identified and consider if debt financing will be required for modelling purposes. Marketing collateral developed for socialising with community investors.</td>
<td>Investor sources identified and detailed estimates of any debt financing required determined. Debt quotes and conditions obtained if required through discussions with shortlist of potential lenders.</td>
<td>Equity commitment demonstrated (from community investors and/or other equity providers). Funding requirements clearly communicated in formal application process. Lender targeted if debt finance required. Outcome of Final Funding will be committed finance in the form of a comprehensive finance facility agreement if debt finance is required.</td>
</tr>
</tbody>
</table>

### 13 Power Sales

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial agreements to achieve contracted sales revenues.</td>
<td>Identify and roughly quantify potential revenue sources. These may come from host site PPAs, LGCs if &gt;10kW in size, sales of export energy (if any). Analysis of host site(s) electricity costs undertaken to determine potential avoidable host site costs as part of assessment of realistic revenue stream modelling.</td>
<td>Host site(s) PPA structure(s) or other revenue sources identified and discussions with one or two host site owners well advanced. Export and LGC revenue sources identified if these are applicable.</td>
<td>Power sales agreement secured with host site owner and any other revenue source agreements (export electricity and LGCs) negotiated and ready for execution.</td>
</tr>
</tbody>
</table>

### 14 Financial Modelling

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of financial modelling and various financial factors in assessing and fine tuning project elements.</td>
<td>Use templates to undertake prefeasibility financial modelling and assess whether to proceed to feasibility, terminate or review the project.</td>
<td>Use templates to undertake feasibility financial modelling and assess whether to proceed to Final Funding, terminate or adjust project.</td>
<td>Detailed financial model do the satisfaction of financiers and/or investors incorporating sensitivity modelling.</td>
</tr>
</tbody>
</table>

### 15 Risk Management

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification and management of key risks associated with the project.</td>
<td>Key risks identified and documented with some risk mitigation approaches considered.</td>
<td>Key risks identified, risk mitigation approaches finalised, risk management strategies developed and risk management plan drafted.</td>
<td>Detailed risk management plan prepared.</td>
</tr>
</tbody>
</table>

---

**Solar panels at Lismore Workers Club, Lismore NSW**

Photo courtesy of Farming the Sun
Technology Choice

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The type of renewable energy project</td>
<td>For Behind the Meter solar PV the choice will be primarily between solar cell and inverter manufacturers and technologies used in each. Budget quotes for the technology options should be readily obtainable for input into financial modelling.</td>
<td>Detailed price estimates obtained from one or two potential suppliers having investigated manufacturers and their technology adequately and having the site inspected.</td>
<td>Firm prices available from one or two experienced suppliers. Technology verification undertaken and available for validation by others if necessary.</td>
</tr>
</tbody>
</table>
For reasons set out earlier in this guidebook, the prevailing market dynamics strongly favour Behind the Meter solar PV installations. As such, this guidebook is targeted specifically at Behind the Meter solar PV CE projects. However, project technologies such as Behind the Meter solar PV with battery storage can also utilise this guidebook with some minor adaptations to produce financial models relevant to those technologies.

When considering your solar technology choice, it is important not to just go with the lowest cost option. Warranties, insurance, efficiency of the solar installation, maintenance availability and costs, and other factors also need to be considered as part of your selection.

**1.1 Solar PV Technology**

Solar photovoltaic (PV) is the conversion of sunlight directly into electricity using photovoltaic (solar) cells. Behind the Meter solar PV systems can be installed on rooftops as part of building infrastructure or can be installed on land on host sites. The key components of a solar PV installation are:

1. Solar PV panels to convert energy from the sun into electricity
2. An inverter that converts direct current (DC) electricity from the panels to alternating current (AC) electricity that is compatible with the network-supplied electricity
3. A mounting framework to support the solar panels (and in some cases to move the solar panels to track the sun through the day to achieve optimum solar radiation input into the panels)
4. Electrical wiring to transport the electricity between the solar panels and inverter to a switchboard and a meter where the energy output of the project is measured for revenue calculation purposes
5. Monitoring equipment to measure and report system performance.

When considering your solar technology choice, it is important not to just go with the lowest cost option. Warranties, insurance, efficiency of the solar installation, maintenance availability and costs, and other factors also need to be considered as part of your selection.

**1.2 Resource Links**

For further information see:

Project Scale

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The peak design output size of the project in kW/MW.</td>
<td>Capacity range of project determined, e.g.: 30–100kW, 100kW–300kW, &gt;300kW. Total CAPEX range estimated based on technology and project scale noting the advantages of &lt;100kW projects under the current market arrangements.</td>
<td>Project scale determined to narrow bands/dh.</td>
<td>Project scale determined and set.</td>
</tr>
</tbody>
</table>
The scale (or size) of a Behind the Meter Community Energy (CE) project needs to be carefully considered given the cost and revenue implications in particular. For Behind the Meter CE projects bigger is not always better. In fact in certain cases it may be more financially effective to have a large number of distributed smaller-scale projects than have the same total capacity installed at a single site under a single project.

As an example, larger installations may attract network connection costs which smaller Behind the Meter projects might not. Conversely, generation distributed across multiple sites will potentially require additional time and effort in terms of site identification and acquisition as well as access arrangements (refer to section on Site Selection).

In general terms the scale of a CE project needs to be large enough to cover the development and ongoing operating costs of the project and provide a reasonable return to project investors. However, the size must be of a scale small enough to be able to be largely funded by investors and debt providers. The scale should also ideally be linked to the host site energy usage so that the amount of power exported and subject to the network connection process may be minimised (refer to section on Power Sales for more information).

For solar PV, current market dynamics are such that Behind the Meter solar is the only model that really works commercially without having some form of financial assistance. In particular, Behind the Meter solar projects of a size less than 100kW have distinct advantages in that they have the ability to:

- Have STCs reduce part of the capital cost
- Connect with lesser (although in some cases not insignificant) network connection issues or costs
- Avoid network and other electricity market related costs meaning that they can offer a higher revenue stream

Solar projects that are 100kW or greater have the issue that they cannot create STCs upfront and instead must rely on LGCs as an additional revenue stream until the end of the Renewable Energy Target period which is currently the end of 2030.

Additionally, >100kW to 500kW projects, even if they are Behind the Meter, are often faced with increased costs on a revenue stream that cannot support those additional costs because:

- The network connection process may be more complicated and potentially more expensive.
- The amount of capital required is higher and may require a different and more expensive business structure and capital raising process to raise sufficient capital

Consequently, projects in the range of 100kW to say 500kW may suffer from higher upfront capital costs, potentially higher operating costs and lower favourable economics.

2.1 Capital Cost (CAPEX)

The overall capital expenditure (CAPEX) required for a project will naturally be higher the larger the project. Although increased scale factors may improve returns, the additional capital required can present a significant challenge from both a project development and final funding perspective. The capital costs referred to below for Behind the Meter Solar refer to the costs of solar elements only. There are civil works and other broader capital considerations to incorporate in the overall CAPEX cost of a project (refer to section on Construction) and the information below is only providing an overview of providing a high level range of costs for a particular project scale.

2.1.1 Solar PV CAPEX

Solar PV installations can range from small single panel (<1kW) installations to large solar farms. The 102MW Nyngan Solar Plant in New South Wales is Australia’s largest solar power project. However, large-scale solar PV projects are not yet commercially viable without government subsidies.

Typical Behind the Meter solar PV installations have a CAPEX range of $150,000 to $250,000. For a 100kW project the capital cost of the solar PV elements might be in the range of $150,000 to $250,000.

The capital costs may vary depending on many factors including:

- Efficiency of the solar panels and overall installation (how much energy is able to be produced for a given level of solar radiation)
- Higher efficiency panels are often used on large solar farms and while they produce more electricity they are more expensive to purchase. Note: solar panel performance is measured in terms of both initial efficiency and the performance of the solar panels over their life. Solar panel efficiency will reduce over the panel’s life due to natural material degradation but the extent of this degradation will vary with quality of the panels and environmental conditions.
- Typical industry degradation values range and might be in the range of 0.4% to 0.8% per annum
- Warranties provided: The longer the warranties the better and solar panel performance warranties typically extend for 20 years. Depending on the business model sometimes the risk is transferred elsewhere. For example, there is a specific case of a Lismore CE project model involving the community and Lismore Council where the Council provides the warranty (refer to http://farmingthesun.net/lismore/)
- The approach to installation: Installations that use tracking systems to allow the panels to track the sun to maximise solar radiation input to the solar panels will naturally be more expensive than fixed mounted systems (refer to the section on Construction).
2.2 Financial Template Inputs

2.2.1 Solar Scale
The financial template requires users to input the peak power capacity of the solar installation. Once the scale of the project has been determined the model requires the input of project peak design output in kW. For solar this is generally referred to as kWp – the peak design output. In addition, the treatment of STCs as a capital reduction upfront, as opposed to a revenue source upon operation, can have significant impacts on the cash flow returns for the project and as such you may want to limit the project scale to be less than 100kW. In determining the scale of the project the factors referenced earlier in this section of the guidebook need to be taken into consideration but from a physical limitation perspective the scale is also limited by the space available to install solar panels in the selected location. For rooftop solar there will be a physical limitation related to the roof area available to install solar PV panels. Solar installers or experienced engineering consultants can advise on this point.
### Community Engagement

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The interaction with community stakeholders to increase participation in or support for the project. This may extend to marketing to and seeking capital raising from community investors.</td>
<td>Core organising group in place with high-level project objectives in mind (benefits for the community). Initial gauge of community interest and support. Potential key stakeholders identified.</td>
<td>Project communicated to relevant community stakeholders espousing project benefits. All key stakeholder issues addressed and factored into overall project considerations.</td>
</tr>
<tr>
<td></td>
<td>Active community engagement undertaken with project benefits clearly communicated. Support base identified and able to be relied upon. Key stakeholders identified and engaged.</td>
<td>Advanced development of capital raising from community investors.</td>
<td>All documentation in place to enable community investor capital raising and demonstrable investor support fully quantified.</td>
</tr>
<tr>
<td>Marketing of the project for community investors for equity contributions if this is the preferred model for capital raising.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As the name implies, CE projects rely on the community for their inception, promotion and ultimate success. As such, community engagement is core to the establishment of a successful CE project. Clearly community engagement is essential to the establishment of any generation project because, no matter the environmental benefits of a specific technology, there is always going to be a community impact in the form of at least visual elements in the case of solar PV. Community engagement is essential in order to attract funding sources to assist in the development of CE projects either directly or indirectly.

In a direct sense the community is a significant potential source of investment funds for direct equity investment in projects. Indeed, for most of the smaller solar PV projects developed and being developed, community-based investors are the sole providers of project funding. Consequently, marketing the project to the community from both an overall community benefit, and as a potential investment for members of the community, is a key project development aspect of many CE projects.

Engaged community members often enhance the financial aspects of CE projects from volunteer contributions and in-kind support. This is especially relevant for small-scale Behind the Meter projects whereby community volunteers will undertake much of the ongoing administration. CE is a popular model as it empowers people to play a role in renewable energy projects. Whether it's selecting local projects for a community grant or a benefit-sharing model appropriate for their unique context, they are able to take part in reducing climate change over and above what they can achieve through domestic-scale energy-saving measures.

In an indirect sense, debt and other funding providers will want to ensure that the community has no major objections or, better still, supports a project before lending money to the project.

3.1 Community Engagement Costs

From a financial modelling aspect the community engagement costs would depend on the approach taken. This is one area where voluntary resources can be deployed. Community engagement is a crucial prerequisite element that needs to be addressed as a precursor to successfully obtaining funding. However, the cost of community engagement is unlikely to be a significant cost component of a CE project as part of overall project development unless external resources are required, in which case the costs can be significant. From a financial modelling perspective these costs should be included under the Other Project Development Costs section of the financial template. Community engagement is a crucial element and the time, effort and potential costs involved in this process should not be underestimated.
## Business Structure

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Structure</td>
<td>The type of business (legal/tax/financial) structure used to develop and operate the project.</td>
<td>Final business structure decided and ready to be established. Project governance working and addressing all governance issues.</td>
<td>Final business structure in place. Project governance structure aligned with business structure and in place.</td>
</tr>
<tr>
<td>Options discussed for both the governance of the project during project development and for the final governance arrangements once the project is operational. Business structure then developed with final structure given consideration - operating project structure may be different from development structure. Project governance structure put in place.</td>
<td>Final business structure decided and ready to be established. Project governance working and addressing all governance issues.</td>
<td>Final business structure in place. Project governance structure aligned with business structure and in place.</td>
<td></td>
</tr>
</tbody>
</table>
Business structure refers primarily to the legal form of enterprise that is used for the purpose of the CE project. In determining the most appropriate business structure, elements such as tax, cost of operating, fundraising capability and other factors need to be considered.

The final business structure associated with the operation of a successful CE project may have no resemblance at all with initial or transitional organisational and/or business structures used to conceive and develop a CE project. Equally, the structure may stay unchanged throughout. There are two key and complementary elements to this project element:

1. The structure of the community enterprise itself
2. The project governance processes associated with the community enterprise.

4.1 Business Structure Examples

Some examples of business structures that have been applied to various CE projects are set out in the table following, together with the various pros and cons each have in relation to project funding. More details can be found in the Funding Basics Guidebook.

<table>
<thead>
<tr>
<th>Business Structure</th>
<th>Fundraising Disclosure</th>
<th>Challenges</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-operative</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| e.g. Hepburn Wind and Pingala Co-operative | Requires a disclosure document to be approved by a registrar | • Can be more difficult to access legal advice as is based on Co-operatives Law rather than the more common Corporations Act  
• Membership shares cannot appreciate in value | • Allows for unlimited members and therefore no limitations on the number of investors  
• Disclosure document checking process is less onerous than under Corporations Act  
• Can distribute profits before tax  
• Crowdfunding for membership is permitted |
| Incorporated association | N/A | • No equity investment permitted | • Low cost to establish and operate |
| e.g. Pingala Association | N/A | | |
| Company limited by guarantee | N/A | • No equity investment permitted; members specify the amount they are willing to contribute to the property of the company on its winding up and this will determine or limit the liability of the company’s members  
• More onerous conditions than incorporated association | • Low cost to establish and operate |
4.2 Project Governance

Regardless of the business structure all CE projects will require a form of project governance that provides comfort to potential investors and finance providers. Certain elements of project governance will naturally follow on from the establishment of an appropriate business structure. With less formal business structures in particular, project governance mechanisms become crucial to the project’s ability to attract funding. CE projects typically start out with a small group of environmentally aligned individuals seeking to develop a good idea into a successful CE project. Initially this group would tend to meet informally and then, as the concept progresses, meetings would become more structured. As effort and other resources (including money) are expended, accountability for resource expenditure becomes a key consideration. Further, it becomes necessary to establish project governance structures that are transparent and allow for efficient and objective decision-making.

4.3 Business Structure/ Project Governance Costs

There are a number of cost factors associated with establishing and operating business structures and these need to be considered when determining the optimal business structure. Factors include:

- Fundraising (equity and debt)
- Tax
- Legal costs
- Compliance and auditing requirements
- Insurance.

It is important that the impact of these elements is incorporated in financial modelling as well as the tax implications of the selected funding structure.

From a financial modelling perspective the costs of establishing and operating business structure(s) throughout a project are considered in two areas of the template:

1. Business structure setup and operating costs during the project development phase of the project and from a financial modelling perspective.

2. Business structure operating costs. These are the ongoing costs each year of the project once the project is in operation and are included under operating costs component of the financial model (refer to the section on Operational Resourcing)

* Capitalised means that the expenditure can be added to the capital cost of the project and can then be depreciated for accounting and taxation purposes over the useful life of the project.

4.4 Resource Links

For further information see: frontierimpact.com.au/external-resources
### Project Development Resourcing

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The resources required to develop the required elements of a project from concept through to Final Funding and prior to implementation.</td>
<td>Skills identified and budget cost estimate to progress from concept through to construction and commissioning determined. Funding and/or resources available identified to ensure project can proceed at least to feasibility stage.</td>
<td>Skills identified and detailed cost estimate to progress from feasibility through to construction and commissioning determined. Funding and/or resources available identified to ensure project could proceed to the final funding phase.</td>
<td>Skills identified and budget cost estimate to progress from Final Funding through to construction and commissioning determined.</td>
</tr>
</tbody>
</table>
Project development is perhaps the most difficult component of establishing a project. CE projects tend to rely on volunteer contributions in early stages of development, as it is difficult to attract third party funding based on a project concept. If services such as legal, financial and technical/engineering services can be provided out of a volunteer pool this would reduce any financial burden. It is important to identify the required skillset to develop the project and to fill any key gaps. The toolkit will provide an invaluable tool to assist in early stage project development.

5.1 Project Development
Plan / Budget
It is essential to recognise that funds will be required to progress a project from concept through prefeasibility and feasibility to final funding. The newer a project progresses towards final funding the greater the rate at which development funds will be expended so it is important through each stage of the process that budgets are reviewed to ensure there are sufficient funds forecasts for the project to proceed to the next stage of development.

Project developers need to have a plan developed to ensure that the project is developed in a structured and efficient manner and the project development budget is a key part of that planning process. While, from a financial modelling perspective project development costs are generally capitalised when undertaking project evaluations, the project needs to ensure that sufficient capital is incorporated in the business to meet ongoing cash flow needs for project development. In other words, developers need to ensure that they have sufficient working capital to progress the project to the next stage of the project development process and need to plan the cash requirements for the projects as part of a budgeting process. This requires a cashflow budget to be prepared so that the project cashflows can be managed along with ongoing funding requirements to meet the cashflows.

5.2 Financial Modelling of Project Development Costs
In general, the financial model template considers project development costs to be capitalisable costs but project proponents should seek financial advice on this matter.

Apart from specific project development costs, which are covered under other project element sections of this guidebook, the following project development specific cost items are included in the financial model template:

- Financial Advice – this item covers financial advice associated with items such as solar design, network load flow modelling and technical analysis of network constraints as part of network connection analysis. This will normally not apply for small (often <30kW) Behind-the-Meter projects and may not even apply for larger Behind the Meter installations. The extent of any potential export beyond the host site is one of the major considerations on the requirement for network analyses. Refer to the section on Network Connections for more resources detailing these requirements. Note: If you decide to work exclusively with a single solar supplier then much of the technical work such as the solar design and any network connection analysis is often undertaken by that supplier on a low cost or even nil cost basis as a trade-off for agreeing to purchase the solar installation from that supplier.

- Technical Costs – this item covers technical/engineering advice associated with items such as solar design, network load flow modelling and technical analysis of network constraints as part of network connection analysis. This will normally not apply for small (often <30kW) Behind-the-Meter projects and may not apply for larger Behind the Meter installations. The extent of any potential export beyond the host site is one of the major considerations on the requirement for network analyses. Refer to the section on Network Connections for more resources detailing these requirements. Note: If you decide to work exclusively with a single solar supplier then much of the technical work such as the solar design and any network connection analysis is often undertaken by that supplier on a low cost or even nil cost basis as a trade-off for agreeing to purchase the solar installation from that supplier.

- Other Project Development Costs – other project development costs include project development elements not specifically included above and may incorporate items such as:
  - Regulatory costs – Business structure costs associated with establishing and operating business structures during the project development phases
  - Insurance Costs – insurance costs associated with the business structure during the project development phases. An estimate of these costs can be obtained from insurance websites and as a minimum would include Public Liability Insurance.

5.3 Resource Links
For further information see: frontierimpact.com.au/external-resources
## Site Selection and Acquisition

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing, selecting and gaining access to a good host site for a Behind the Meter solar PV CE project.</td>
<td>Broad host site selection criteria established based on location and project scale initially and then narrowed down to a few host site choices based on estimated costs and initial site assessment criteria.</td>
<td>Narrowed down to one or two host sites with relatively firm cost estimates and detailed site assessment and access details either negotiated or under negotiation.</td>
<td>Host site selected and access to site secured through lease or other secure site access mechanism. Site suitability assessed and confirmed.</td>
</tr>
</tbody>
</table>
The selection of suitable sites for a CE project can be quite complex given the range of other factors impacted by site choice and is a critical decision that needs to be made relatively early in the development process. Resource availability and network connection access costs are just some of the elements that are impacted by the choice of site. Resource availability and network connection elements are considered in other sections of this toolkit but there are a number of other specific site considerations that should be factored in when deciding upon a choice of location and specific sites with that location. Funding availability at various stages of the development will be dependent on the site choice and the ability to secure access to suitable sites.

For Behind the Meter solar PV installations it is important to find a host site that supports the scale of project being contemplated in terms of roof area available for panel installation and the electricity consumption pattern of the host site.

A (non-exhaustive) list of important factors is set out below:

- Roof space or available land
- Solar access
- Host site electricity usage profile
- Host retail costs including a breakdown of all costs including network charges
- Community benefit of host site
- Shading considerations
- Roof slope that minimises tilt costs
- Orientation that supports panels facing in a northerly direction

The information to the left represents the key technical parameters for a host site. However, one of the key challenges faced in accessing a suitable site is finding a host site operator that is amenable to installation of the solar equipment and who is receptive to the benefits of the solar installation from both a commercial perspective and an environmental perspective. The financial template includes a host site benefits worksheet that will assist in identifying both the commercial and environmental benefits for the host site operator.

Many CE project developers will not commence any other project work until they have already engaged with a host site operator who is receptive to a Behind the Meter Solar PV installation.

### 6.1 Site Costs – Financial Modelling

The site costs included in the financial templates fall into two categories:

1. Those applicable to securing and facilitating access to the site as part of the project development process. For financial modelling purposes these costs are assumed to be capitalisable but financial advice should be sought in this regard. In the financial template the relevant inputs are:
   - Legal costs associated with negotiating and agreeing use of the host site(s). Such an agreement is usually negotiated and incorporated as part of the overall power sales agreement for Behind the Meter installations.
   - Assumed escalation on Host site lease payments for Behind the Meter Solar PV installation.

2. Those applicable to ongoing payments associated with utilisation of the site(s) as part of ongoing operations and which fall into the category of operating expenditure in the financial modelling. These are referred to as land/site rental costs and would include:
   - Host site lease payments for Behind the Meter installations

### 6.2 Host Site Benefit – Financial Modelling

The host site benefits are modelled in the financial template using the following factors:

- Annual Electricity Usage: The total amount of electricity used on the host site in kWh
- Current Retail Pricing: The current average retail price paid by the host site in c/kWh
- Avoidable Retail Pricing: The avoidable element of the retail price paid by the host site in c/kWh
- Assumed escalation on Host site pricing: The assumed annual increase in electricity retail prices at the host site as a percentage of the annual inflation rate e.g. 100% means prices are escalated at the full inflation rate.
- Business Discount Rate: The discount rate the business owner would use for any discounted cashflow analysis
- Business Tax Rate: The tax rate payable by the business
- Project Evaluation Period: The timeshams in years over which the Host Site economic evaluation will be undertaken (usually the same as for the project)

### 6.3 Resource Links

For further information see: frontierimpact.com.au/external-resources

**TIP**

The direction that the solar panels are facing is important so as to optimise the generation from the system. Facing somewhere between NE and NW in direction is best.
# Resource Assessment

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the amount of energy (kWh/MWh) that a project can produce annually over its life.</td>
<td>Initial calculation based on solar calculators. More detailed calculations can be provided by solar providers based on manufacturer information and local conditions.</td>
<td>Verified resource availability based on final professional solar design(s) with sensitivity analysis.</td>
<td>Verified resource availability based on final professional solar design. Detailed sensitivity analysis.</td>
</tr>
</tbody>
</table>
The generation output and the subsequent revenue stream from a CE project are dependent upon solar radiation, which varies with weather conditions and geographical position.

There are many online resources available to assist in assessing the amount of power that can be produced from solar panel installations. There are a significant number of factors that will influence the power output from a solar installation and so while online solar calculation resources may be useful starting points, professional solar system designers should be used to assess energy output from a solar installation, noting that often CE groups have solar professionals involved. The resource links at the bottom of this section include links to a number of solar resource calculation sites.

7.1 Annual Capacity Factor

Annual capacity factor is a relative measure of the availability of solar resource in relation to the peak output capacity of a generation project. This factor is calculated as the ratio of forecast or actual generation that can be obtained from a project to the maximum generation output capacity.

Annual Capacity Factor = Total Energy Produced Annually / (Peak Capacity x 8760)

Note: 8760 is the number of hours in a year

The higher the capacity factor the more output that could be produced from a specific project size and conversely the lower the capacity factor the lower the output. The capacity factor of rooftop solar installations will vary considerably depending on a number of factors but might typically be in the range of 12% to 25%.

7.2 Network Loss Factors

When electricity is transported significant distances power is lost through physical processes associated with heating resistance and other electrical related factors. These losses can impact retail electricity costs and may be applied in power sales agreement calculations although this is a matter of commercial negotiation in Behind the Meter power sales agreements.

Each location on the network is assigned loss factors in the main electricity grids in Australia. Typically the loss factors might range from 0.7 to 1.5. The higher the loss factors the greater the opportunity for the Behind the Meter generation project to increase revenue. The source of these loss factors for Behind the Meter installations is an electricity account for the host site. This might be split into a Transmission Loss Factor (TLF) and Distribution Loss Factor (DLF) or a combined loss factor which is equivalent to TLF x DLF or can be calculated as such. The combined loss factor may be included in the financial template but depends on how the power sales agreement is structured. If the power sales agreement does not include specific provision for losses then set these loss factor values to 0% in the template.

7.4 Resource Links

For further information see: frontierimpact.com.au/external-resources
<table>
<thead>
<tr>
<th>Modeling Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Solar Generation</td>
<td>If this value is left blank or set to 0 then the annual solar generation will be calculated from the 6 factors below. If entered it represents the estimated net power produced from the solar installation in the first year of operation. This value will be reduced by the solar panel output derating each subsequent year. The annual solar generation will vary by geographical location and other local installation factors and can be estimated using a solar calculator or preferably by a professional solar system designer.</td>
</tr>
<tr>
<td>Average solar output per day</td>
<td>This value is dependent upon the amount of solar radiation available in a given location. It is usually based on panel design efficiency and the available solar resources in that location. A number of potential calculation resources are referenced in the Resource Links section below and it is recommended that the one most applicable to your potential sites be used. A solar equipment supplier will be able to supply this information for a specific site and solar panel orientation.</td>
</tr>
<tr>
<td>Solar panel output derating</td>
<td>This value should be provided by solar panel manufacturers as part of the performance warranty provided with the solar panels and should be expressed in % per annum as the solar panel efficiency decreases over time due to material degradation.</td>
</tr>
<tr>
<td>Available peak power per unit area</td>
<td>This factor is used for a basic check that the available site area (see below) will accommodate the peak power capacity proposed for the site. This information should be readily available from solar panel manufacturers and suppliers and is provided in watts (W) per square metre or can be derived from solar panel peak output rating (in watts) and the actual physical area of the solar panels (in square metres and is equal to Solar Panel Peak Output divided by Solar Panel Area).</td>
</tr>
<tr>
<td>Available Site Area for installation of solar PV cells</td>
<td>This is the available roof (or land area) suited for the installation of solar panels.</td>
</tr>
<tr>
<td>Inverter Efficiency</td>
<td>An inverter is required to transform the solar panel electrical output and connect it to the grid. These are not 100% efficient and some loss of power occurs in the transformation process. Typical values range from 95% to 99.9%. Manufacturers will be able to provide this information.</td>
</tr>
<tr>
<td>Other solar losses</td>
<td>There are other sources of losses of power compared to the power that could theoretically be produced under ideal conditions. This loss factor, expressed in % terms, should be the sum of the following loss elements [note there are others but a solar designer can provide more details]:   • Shading Losses – these occur when some of the solar radiation is blocked from accessing some or all of the panels due to the shading impacts of nearby buildings, trees, etc. A professional solar designer would be able to assess this impact. Sites should be chosen to minimise this potential loss impact   • Temperature Losses – solar panels do not perform as well on hot days and power is lost due temperature impacts. For a particular location this impact should be able to be modelled by solar calculators   • Voltage drop (wiring) losses – these occur as a result of the length of wire from solar panels all the way to the metering point. As such there will be a reduction in power produced from the project. A properly-designed system will minimise this but it could be in the range of 1 to 3%   • Dust (soiling) losses – over time solar panels will become covered with dust and other particles, which filter the solar radiation reaching the panels. Routine cleaning will reduce this impact but it might impact performance by 1% up to 5%.</td>
</tr>
</tbody>
</table>
## Construction

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the costs to obtain equipment, install it and commission the project to operational stage.</td>
<td>Cost allowances for project construction estimated broadly. A potential solar PV supplier can usually provide budget costs very readily.</td>
<td>Detailed cost estimates obtained from reputable solar installer contractors.</td>
<td>Solar Installer Contractor identified and cost estimated based on comprehensive and detailed firm quote.</td>
</tr>
</tbody>
</table>
Construction (including equipment) costs are a key cost component and it is important to obtain initial estimates and then have these firmed up as part of the progressive financial modelling process. In general solar PV costs are quite well-established and given competition amongst solar installers it should be relatively easy to obtain reasonable initial estimates followed by good quality firm costings. The major variations would relate to individual site aspects.

8.1 Construction Contracts

Typically for large scale projects an EPC (engineering, procurement and construction) contract is the most efficient way to manage activities in the construction phase. For large-scale projects, debt lenders tend to prefer a construction contract with a well-recognised experienced EPC contractor as this “derisks” the project from the lender’s perspective. However, given their scale and relative simplicity, Behind the Meter solar PV installations do not require the complexities of an EPC contract and firm quotations can be readily obtained from solar installers. Basic contract documentation can be used to support the contract for the supply, installation and commissioning of the solar PV project equipment.

8.2 Financial Modelling of Construction Costs

The following construction related costs are included in the financial template and need to be provided by project evaluators:

- **Solar installation (panels and installation)** – this item covers the per kW cost of the procurement and installation of solar panels and their mounting framework. This should be readily obtainable from equipment suppliers. Note this cost is exclusive of any STC rebates that may be applicable (refer to section on Power Sales).
- **Inverter cost** – this item reflects the cost of inverter supply and installation. This is important to be separately priced as inverter lives are typically half or less than that of solar panels and need to be replaced part way through the project life and as such their cost needs to be factored in when replacement is required.
- **Electrical infrastructure costs** – These costs are associated with connecting the solar panels and inverters to the host site’s electrical installation switchboard. These costs can be readily estimated via quotes from solar installers and should include the costs of items such as metering the solar output, cabling to the inverter from the solar panels and from the inverter to the host site switchboard including any switchboard additions or modifications required.
- **Civil infrastructure costs** – These are costs associated with establishing civil infrastructure to support the equipment installation but not involved in the actual equipment installation and erection. This might include, for example, supporting civil works associated with reinforcing the root of a host site if there is a requirement for such to support the weight of the solar panels.

8.3 Resource Links

For further information see: frontierimpact.com.au/external-resources
## Network Connections

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the technical requirements and financial costs of connecting the project Behind the Meter in relation to network connections.</td>
<td>Budget cost allowance for network capital costs and ongoing annual costs based on general area estimates available from network company websites. Preliminary connection inquiry made with network company.</td>
<td>Specific cost estimates (CAPEX and OPEX) based on one or two sites.</td>
<td>Firm cost quotations available for CAPEX and OPEX assumptions clearly outlined and able to be validated. An agreed network connection agreement may be required.</td>
</tr>
</tbody>
</table>
The costs associated with connecting to the network could be large and in the toolkit we refer to them as initial network connection costs. As well as the costs associated with connecting to the network there may also be operating costs associated with continuing to be connected to the network. In this toolkit these are referred to as network charges.

The network connection process and associated costs will vary by site and in particular by scale of the project. If at all possible, you should structure your projects to avoid having to go down the path of negotiated network connection agreements, as it can be quite complex and costly!

If you can structure your project so that the scale is not too large and there is not a large amount of export you should be able to use a standard network connection agreement which is simpler and much cheaper.

For Behind the Meter projects the process is generally much simpler due to the typically smaller size of the projects and the lower levels of export resulting in a much lower impact on the network and a much simpler network connection process. The easiest way to minimise network charges is to keep the projects small with a relatively low level of network export. The size at which a project begins to attract more complex network approval arrangements and higher network costs varies between distribution network operator areas and can vary down to a specific site location in a specific distribution network area. Many distribution network operators currently have a threshold of 30kW above which more complex network approval processes apply. However, you should make yourself familiar with the requirements of a particular distribution network operator and factor the rules in when deciding on the scale of your project. Be prepared to compromise or negotiate on the scale and network connection arrangements. In some instances distribution network operators will prohibit the exporting of energy so you may need to have your solar installer allow for export limiting devices to be installed.

9.1 Small Scale Including Behind the Meter

See the online resource link for a guide providing information on the connection of small generation facilities including Behind the Meter solar PV, which are below 100kW in size.

9.2 Medium Scale

The Clean Energy Council has produced an ‘Embedded Generation Connection Guide’ aimed at providing information applicable to the connection of medium scale embedded generation including Behind the Meter solar PV to distribution networks. It is designed to apply to generators in the size range of 100 kW to 1 MW and as such is applicable for Behind the Meter installations which are 100kW or greater in size. The guide has been produced through consultation with Australia’s distribution businesses and takes into account the relevant network rules and guidelines. Individual distribution businesses will have different requirements so it is important to know which distribution business’ network you may be connecting to. A link to the guide is provided below.

9.3 Financial Modelling of Network Connections

The toolkit includes the following modelling factors that need to be input in relation to network connections:

- Initial network connection costs – This is the initial capital cost associated with connecting to the network. For <30kW Behind the Meter this will generally be small provided significant export is not proposed in rural locations with a very low capacity network available for connection. For >30kW installations and those with significant export in particular, in order to estimate costs enquiries need to be made into the relevant distribution network business and you may require technical advice. Unfortunately network factors can be quite site specific so it is not possible to estimate costs without specific enquiries being made.

- Grid availability – Grid (network) availability refers to the amount of time that the network connection is available for the conveyance of power from the generation connection point to electricity consumers. The availability will depend on the connection point in the network and could range from around 95% up to nearly 100%.

9.4 Resource Links

For further information see: frontierimpact.com.au/external-resources
## Permitting

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the technical requirements and financial costs of connecting the project Behind the Meter in relation to network connections.</td>
<td>Required permits identified (planning approvals, heritage, environmental) and cost allowance made. Solar suppliers can often assist with this element and also provide indicative costs as they often arrange the approvals.</td>
<td>Permitting commenced and detailed cost estimates available.</td>
<td>Permits in place or available subject to final funding. Compliance activities post operation scheduled and budget allowed for them.</td>
</tr>
</tbody>
</table>
Planning approvals should be considered early in the project development process. One of the key compliance requirements is to obtain planning approvals to proceed to construct and operate a CE project. These vary depending on the nature of the project and to a lesser extent on the government jurisdiction. For Behind the Meter solar PV the local Council where the host site is located would normally be the planning approval authority.

Depending on the Council location and the size of the project, Behind the Meter solar installations may not even require a building application to be submitted although this would be an exception and not the normal situation. Certainly for larger installations a building application would be required and potentially a development application as well. The local Council would be the first place to start when trying to assess the required planning approvals and any associated permitting as part of those planning approvals. In certain instances heritage aspects may be relevant for buildings of historical or architectural significance and may require specific additional approval elements to be undertaken while in other very small solar installations no specific approvals may be required, as they may automatically be considered as being a complying development.

If you are not selling the electricity to a licensed electricity retailer and not selling it via a feed-in tariff then in theory you would need to obtain an electricity retail licence to see the electricity output from the solar PV unit. This can be a very onerous process requiring ongoing reporting requirements and incurring potentially significant costs, which are not warranted for a CE project. Fortunately a retail licence exemption can be obtained for the sale of electricity and in particular for Behind the Meter installations through the Australian Energy Regulator (AER). Complete details of the process for obtaining an exemption can be obtained from the AER website.

10.1 Financial Modelling of Permitting Costs

The toolkit includes the following modelling factor that needs to be input in relation to permitting costs:

- Permitting costs – This covers the project development costs associated with permitting which are capitalised in the financial template although you should obtain financial advice as to the appropriateness of this treatment. For Behind the Meter solar PV installations the permitting costs would generally be minimal and may only require a building application/small development application. However, issues such as heritage assessments need to be considered if relevant and can add costs to the project if these need to be accommodated. Solar installers will generally be equipped to carry out the most of the permitting process on your behalf.

10.2 Resource Links

For further information see: frontierimpact.com.au/external-resources
## Operational Resourcing

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ongoing costs of operating the project and business structure once commissioned and fully operational.</td>
<td>Initial assessment of operational resources required (operational and admin personnel, maintenance, etc.) and cost allowance made.</td>
<td>Detailed analysis of operational costs undertaken and quotes obtained for third party services, e.g., equipment maintenance services.</td>
<td>Detailed and verifiable operational costs supplied encompassing all operation costs of the project.</td>
</tr>
</tbody>
</table>
Operational Resourcing looks at requirements to manage the ongoing operations of a CE project (as opposed to the costs of developing the project which is covered under the section on Project Development). The technology and scale of the project will determine the ongoing operating costs, in particular the maintenance costs. In many cases CE projects use volunteer resources to carry out many of the administrative elements of the operational resourcing where specialist professional skills are not required.

11.1 Financial Modelling of Operational Resourcing Costs

The following factors related to ongoing operating costs are included in the financial modelling and require user input:

- **Insurance** – This item covers the cost elements associated with two insurance elements:
  - Insurance for the operation of the business structure – estimated costs associated with this item could be obtained from insurance companies. Insurances should include Public Liability, Directors’ Insurance and others depending on the requirements of the project.
  - Insurance for the operation of the solar installation – estimated costs can be obtained from insurance companies. In some cases the host site operator may be able to cover the cost as part of their own building insurance.

- **Inverter life** – This represents the life of the inverter after which time the inverter needs to be replaced. Inverter manufacturers should be able to provide this information. It is typically 5 or 10 years with 10 years obviously being preferable.

- **Maintenance cost escalation** – This item represents the percentage of inflation by which the maintenance costs increase over time. A default value of 100% should be assumed unless better information is available.

- **Accounting and legal** – this item covers the costs associated with routine financial accounting and auditing. An accountant should be able to provide indicative costs.

- **Maintenance costs** – this item covers the costs of routine maintenance including cleaning of the solar PV installation. For solar installations the costs might equate to around 0.5% to 1% of the capital cost of the project but can be obtained from the supplier of the equipment and a long-term maintenance contract could be provided by the supplier if price certainty was required.

- **Administration** – this item covers the costs associated with operating the business structure including invoicing and managing payments associated with revenue sales and project expenditures.

- **Share registry** – if the project is issuing shares to obtain funds from investors then a share registry needs to be established and maintained. This is a specific administrative cost that needs to be considered.

- **Ongoing community engagement and benefit programs** – this covers the situation where the CE project may distribute some of the project profits/revenues back into the community in some way.

**TIP**

Inverters have a shorter life than the PV panel and replacements need to be factored in. Insurance products are available to insure system equipment performance but come at a cost.
### Project Funding

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The funding required to develop a project from concept through to the commencement of the Operations phase.</td>
<td>Potential funding sources identified to progress to feasibility stage and estimates of source values made including donations and grants. Potential investors identified and consider if debt financing will be required for modelling purposes. Marketing collateral developed for socialising with community investors.</td>
<td>Investor sources identified and detailed estimates of any debt financing required determined. Debt quotes and conditions obtained if required through discussions with shortlist of potential lenders.</td>
<td>Equity commitment demonstrated (from community investors and/or other equity providers) and funding requirements clearly communicated in formal application process. Lender targeted if debt finance required. Outcome of Final Funding will be committed finance in the form of a comprehensive finance facility agreement if debt finance required.</td>
</tr>
</tbody>
</table>
Project funding relates to the raising of funds to enable the project to progress through the construction phase to full commercial operation and includes working capital for ongoing operations. Should you need further information on funding options this is covered in the Funding Basics Guidebook.

Many CE projects may not be financially viable compared to large-scale non-renewable and renewable projects. However, given the other benefits offered by CE projects there may be the ability to assist the financial viability of CE projects through other sources. These sources may include grants and donations to cover the development costs, particularly in the early stages of project development.

However, regardless of the type of project, financial modelling needs to be carried out in order to establish the likely level of funding support required to make a project viable. There are often many projects seeking grant funding and it is likely that those with clear financial modelling which are near-commercial would receive higher consideration for funding in advance of similar projects without a similar level of modelling having been undertaken.

The final funding stages will incur expenditure to establish the funding (typically sourced from equity) for CE Behind the Meter projects. For larger Behind the Meter projects some debt may be required. The fees associated with establishing the funding need to be factored into the financial modelling as described below.

12.1 Modelling of Project Funding

The financial template incorporates the following items related to project funding:

- Grants – this item covers the level of grant funding able to be procured in relation to the project being evaluated. There are no guarantees that grant funding will be available so at the concept and prefeasibility stages it should be assumed that grant funding is not available
- Donations – this item covers the receipt of donations to assist in funding the project, particularly during early stage development phases
- Funding costs – this item covers the costs associated with:
  * Capital raising – the costs payable to third parties for assistance in raising funds. For Behind the Meter solar PV projects this would normally be zero or a very low percentage amount. However, if the expertise is not available in the team, a commercial external advisor is may be required to assist in the fundraising process. Payment for these services may be on the basis of a scheduled rate or a success fee and may be limited to developing an information memorandum or prospectus, or extend to finding investors and arranging finance
  * Debt establishment fees – the costs of establishing debt facilities, typically around 1.5% of the debt amount, which is an amount that is charged by the financier. The financier that you are dealing with will disclose this figure.

12.2 Resource Links

For further information see:
frontierimpact.com.au/external-resources

Newlands Community House solar panels, Coburg VIC
Photo courtesy of Moreland Energy Foundation
## Power Sales

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial agreements to achieve contracted sales revenues.</td>
<td>Identify and roughly quantify potential revenue sources. These may come from host site PPAs, LGCs if &gt;100kW in size, sales of export energy (if any). Analysis of host site(s) electricity costs undertaken to determine potential avoidable host site costs as part of assessment of realistic revenue stream modelling.</td>
<td>Host site(s) PPA structure(s) or other revenue sources identified and discussions with one or two host site owners well advanced. Export and LGC revenue sources identified if these are applicable.</td>
<td>Power sales agreement secured with host site owner and any other revenue source agreements (export electricity and LGCs) negotiated and ready for execution.</td>
</tr>
</tbody>
</table>
Revenue from Behind the Meter PV installations can come in a number of forms. Traditionally many of the projects are structured to have their main revenues come for Power Purchase Agreements although this is changing. Power purchase agreements (PPAs) or offtake agreements are arrangements for the purchase of power from the solar PV system.

### 13.1 Wholesale Electricity Prices

The wholesale price is the price a project receives when exporting energy to the grid. The wholesale price is relatively low in comparison to retail energy rates so selling power via a direct grid connection will attract a lower rate than would be achievable in a Behind the Meter situation, as set out in this guidebook.

### 13.2 Retail Electricity Prices

The retail price is the price a business pays for electricity. This includes the wholesale price plus network charges, retail charges, retail margins, LGC and STC fees and other market-based fees (all adjusted up for network losses). The retail price could be between two and seven times the wholesale energy price. Behind the Meter projects allow for sales at avoidable retail prices because the host site is able to avoid a significant component of its retail energy bill if energy is generated Behind the Meter rather than sourced from the network.

Avoidable retail charges are usually volumetric charges, denoted on an electricity bill as being charged on a cents/kWh basis, as opposed to fixed charges ($/day) or demand charges ($/kVA/month or $/kW/month). Fixed charge are not avoidable and demand charges are generally not avoidable for solar unless coupled with some form of storage such as batteries.

### 13.3 STC Revenue

Under the Federal Government’s Renewable Energy Targets (RET) legislation solar PV units with less than 100kW of capacity and total annual electricity output of less than 250MWh are eligible to create Small Technology Certificates (STCs). The number of STCs able to be created are deemed to be equivalent the total renewable energy output over the life of the project until the end of 2030. An online STC calculator is used to calculate the number of STCs that can be created from the project. Because the STCs are available from the start of the project they can be used to offset the capital costs of the eligible CE installation through their transfer to the solar contractor on completion of the installation.

### 13.4 LGC Revenue

For Behind the Meter solar PV projects above the STC threshold levels (>= 100kW) there is an ability to create Large Generation Certificates (LGCs), which are also saleable instruments. One LGC is created for every megawatt hour (MWh) of electricity produced as metered at the generator output source. Once LGCs are generated they can be created and then sold either as part of a power sales arrangement or a separate sales arrangement.

### 13.5 Power Sales Structures

Obtaining a long-term agreed power sales agreement that provides certainty of revenue for a CE project is perhaps the single most important element in successful project funding arrangements (provided of course that the pricing levels support the required level of return to investors). The following contractual power sales structures might be considered:

#### 13.5.1 Behind the Meter Power Purchase Agreements (PPAs)

A Power Purchase Agreement (PPA) is an agreement with a party to purchase the electricity output from a generation project such as a Solar PV installation. Ideally such an agreement might include the purchase of both the electricity generation and the Renewable Energy Certificates.

For Behind the Meter installations a PPA and site leasing agreement are often combined in the one document entered into by the customer (host site) behind whose meter the CE project is installed. For Behind the Meter installations the PPA price is based upon the avoidable retail prices where the project achieves sufficient revenue and the host site also achieves cost savings (as described in Section 13.2).

---

**TIP**

Energy costs also include the cost of electrical losses. Behind the Meter installations will assist the host site to avoid the cost of losses so don’t forget to factor this saving into your negotiations!
Generally, the pricing of such PPA agreements will be in one of two forms:

1. Based on a fixed price (with escalation provisions of the fixed price being negotiated around the prevailing avoided retail price), or,
2. Based purely on calculated avoidable retail prices of the host site which will vary each year.

The first structure is typically preferable for a CE project developer as there is no risk associated with movements in retail prices. Under the second structure the host site is usually guaranteed to be paying a price for electricity that is less than the prevailing retail prices but the CE developer takes on the risk that avoidable costs could become lower, thus reducing the revenue for the project. This risk exposes investors to any restructuring of network tariffs that move more of these charges to be “fixed” which would reduce the variable (avoidable) energy related charges and therefore the value of the Solar PV installation output.

A Behind the Meter PPA/sales arrangement might include the following key commercial elements:

- The term of the contract (the number of years over which the PPA will extend – preferably the life of the project)
- The basis for calculating the volume under the contract. This will be with reference to the meter(s) associated with the project and is generally calculated directly from the meter volumes or from the meter volumes adjusted for transmission and distribution loss factors
- The volume of electricity being contracted which will be the entire project energy in just about every case
- The price of electricity including any price escalation factor over time (e.g., at CPI, at 75% of CPI, at a fixed escalation percentage or at a fixed price over the term of the contract)
- In the case of LGCs being produced (> 100kW projects) the developer may choose to separately manage the sale of the LGCs or assign some or all to the host site owner at a price
- The billing frequency associated with the contract (most PPAs are calculated and billed on a monthly basis which is consistent with commercial electricity bill filings)
- The payment terms associated with each PPA bill

- In some cases Behind the Meter PPAs provide for the equipment to be handed back to the host site after a period of time (usually 10 to 20 years)

An example relating to Behind the Meter PPAs and combined PPA and associated development and leasing agreement can be found online.

13.5.2 Export and LGC Sales

Where the project is exporting power “beyond the meter” into the network the export power will be subject to a feed-in tariff or a separate sales arrangement with the host site’s electricity retailer. Where the project is 100kW or greater in size then LGCs will be produced and ideally a long-term sales agreement for the sale of LGCs can be agreed with a third party (the host site will generally not require all of the LGCs produced). Where there is export and the production of LGCs then the first candidate for the sale of both would be the host site’s retailer although other electricity retailers are also potential sales agreement counterparties. It should be noted that feed-in tariffs are being phased out in some States so a preferable arrangement is to have an export sales agreement established with a retailer.

Wholesale, Retail and Avoidable Retail Price Comparison

A large number of the retail charges are avoided if you sell energy directly to the site.
13.6 Operating Lease and Loan Revenue Models

While not strictly power sales models, operating leases and loan agreements are alternative models where the revenue (for community investors in particular) is achieved through payments in the form of equipment lease and/or loan repayments rather than from metered electricity sales. These are simpler and lower risk arrangements for CE project investors.

13.6.1 Operating Lease Model

Under this model the community energy project would fund the solar installation and lease the equipment to the host site owner for a period of time until the installation costs are repaid (with interest) at which point in time ownership transfers to the host site. During the lease period the CE project developer would be responsible for the maintenance of the solar installation. Pingala’s Young Henrys project was designed around this model.

13.6.2 Loan Revenue Model

A loan revenue model is very similar to an operating lease model with the exception that the ownership of the project goes immediately to the host site owner and the community energy investment in funding the solar PV installation is effectively providing a loan to the host site. Revenue for investors is thus effectively principle and interest repayments on the funds invested based on the loan repayments. Lismore City Council’s proposed solar projects are designed to utilise this type of model.

13.7 Power Sales Financial Modelling

The financial template includes the following elements related to revenue requiring user input:

- **Power Sales to Host Site** – this item represents the sale price in c/kWh at which the project is able to sell its electricity to the host site. For Behind the Meter projects the prevailing variable (c/kWh) components of the host sites’ electricity accounts represent the sale price that could potentially be achieved. Some host sites may be willing to pay a small premium on top of the retail price if the community nature of a CE project is valuable to them for marketing and corporate social responsibility reasons.

- **Export Power Sales Price** - this item represents the price from sales of electricity exported to the grid through a separate PPA, Feed-In-Tariff or other commercial arrangement.

- **Export Sales %** - this item represents the percentage of the total energy exported at the export sales price and for an appropriately sized Behind the Meter installation would ideally be zero or a very small percentage.

- **STC price** – this item represents the price of STCs that could be sold to create a revenue source to offset capital costs of the project. Most projects assign the STCs to the solar installation contractor who in turn provides a lower capital cost to the project. If this is the case then place the price of STCs as $0 in the template and for capital costs use the reduced capital cost net of STCs. Users are encouraged to seek taxation and accounting advice on the best way to manage any potential STC revenues.

- **LGC price** – this item represents the price of LGCs that could be sold to create an ongoing revenue source for the project in addition to power sales. Prevailing market prices for LGCs can be readily sourced online through the use of a simple search on ‘LGC price’ although short term LGC prices are currently generally significantly discounted if a long term LGC agreement is required.

- **Electricity revenue escalation** – this item represents the percentage of inflation by which power sales and potentially LGCs can be increased over time as part of a PPA or other sales agreement. A conservative starting point would be to assume an escalation rate of 0%.

- **Lease or loan payments** – where revenue is achieved through an operating lease or a loan arrangement this factor requires input of the monthly payments under the lease or loan arrangement.

- **Term of lease/loan** – This factor covers the length of the loan or lease arrangement in months.

- **Escalation applied to lease/loan** – this is the escalation factor (if any) that is applied to lease payments in particular.

13.8 Resource Links

For further information see: frontierimpact.com.au/external-resources

Remember STCs can be offset against the capital cost but they are only allowed in sites generating less than 100kW. TIP
### Financial Modelling

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>The role of financial modelling and various financial factors in assessing and fine tuning project elements.</td>
<td>Use templates to undertake prefeasibility financial modelling and assess whether to proceed to feasibility, terminate or adjust the project.</td>
<td>Use templates to undertake feasibility financial modelling and assess whether to proceed to Final Funding, terminate or adjust the project.</td>
<td>Detailed financial model (to the satisfaction of financiers and/or investors) incorporating sensitivity modelling.</td>
</tr>
</tbody>
</table>
14.1 Concept/Prefeasibility Modelling

Use the provided modelling spreadsheet template to guide you through the process of making initial assessments of financial viability of the project. By manipulating the various factors in the template, and the included sensitivity factors, you can gauge the key financial impediments to the financial success of the project. You can use the other information sections of this toolkit to assist you in determining how to estimate some of the key financial elements of your project.

The template allows for an early assessment of potential liabilities prior to incurring the additional expenditure needed to move to final funding.

14.3 Business Case

The financial models produced will form the basis of a business case, which will be used to initially attract project development funds for the project and eventually support funding for project construction and operations. It is important that the assumptions used in financial modelling are robust as investors are basing their funding decisions on this information.

14.4 Funding and Accounting/ Tax Factors Modelled

The financial models include the following factors that assist in the financial evaluation of a project in terms of assessing the commercial viability. All of these factors will have a potential impact on the project's cash flows and financial viability:

- Base discount factor - this rate is used as the minimum return that investors in the project would expect to see on their investment after tax – also referred to as project hurdle rate. The level will depend on the type of investor and might range from 0% (e.g., for investors not interested in achieving a return on their money but simply seeking their initial investment to be returned given the community benefits of the project) to 20% or more for seed investors who perceive that they require higher returns because of potential risks in achieving those returns. Typically, community energy investors are receiving 3-9%.
- Debt % - this is the percentage of debt funding compared to the total for the project. The level achievable will depend on the resilience of cash flows associated with the project. Many Behind the Meter projects will not require debt and so the value will be 0% in this case.
- Debt cost % - this is the interest rate associated with the debt finance. This can be estimated from prevailing interest rates.
- Leasing or debt term - This is the term in years over which lease payments are to be made or the debt funding is to be repaid.
- Tax rate - This is the tax rate applicable to the business structure used for the project.
- Accounting Depreciation Period: This is the period over which capital can be depreciated for accounting purposes. The period would typically be the life of the solar project but accounting advice should be sought.

The financial model template allows for an early assessment of potential liabilities prior to incurring the additional expenditure needed to move to final funding.

14.3 Business Case

The financial models produced will form the basis of a business case, which will be used to initially attract project development funds for the project and eventually support funding for project construction and operations. It is important that the assumptions used in financial modelling are robust as investors are basing their funding decisions on this information.

14.4 Funding and Accounting/ Tax Factors Modelled

The financial models include the following factors that assist in the financial evaluation of a project in terms of assessing the commercial viability. All of these factors will have a potential impact on the project's cash flows and financial viability:

- Base discount factor - this rate is used as the minimum return that investors in the project would expect to see on their investment after tax – also referred to as project hurdle rate. The level will depend on the type of investor and might range from 0% (e.g., for investors not interested in achieving a return on their money but simply seeking their initial investment to be returned given the community benefits of the project) to 20% or more for seed investors who perceive that they require higher returns because of potential risks in achieving those returns. Typically, community energy investors are receiving 3-9%.
- Debt % - this is the percentage of debt funding compared to the total for the project. The level achievable will depend on the resilience of cash flows associated with the project. Many Behind the Meter projects will not require debt and so the value will be 0% in this case.
- Debt cost % - this is the interest rate associated with the debt finance. This can be estimated from prevailing interest rates.
- Leasing or debt term - This is the term in years over which lease payments are to be made or the debt funding is to be repaid.
- Tax rate - This is the tax rate applicable to the business structure used for the project.
- Accounting Depreciation Period: This is the period over which capital can be depreciated for accounting purposes. The period would typically be the life of the solar project but accounting advice should be sought.

14.3 Business Case

The financial models produced will form the basis of a business case, which will be used to initially attract project development funds for the project and eventually support funding for project construction and operations. It is important that the assumptions used in financial modelling are robust as investors are basing their funding decisions on this information.

14.4 Funding and Accounting/ Tax Factors Modelled

The financial models include the following factors that assist in the financial evaluation of a project in terms of assessing the commercial viability. All of these factors will have a potential impact on the project's cash flows and financial viability:

- Base discount factor - this rate is used as the minimum return that investors in the project would expect to see on their investment after tax – also referred to as project hurdle rate. The level will depend on the type of investor and might range from 0% (e.g., for investors not interested in achieving a return on their money but simply seeking their initial investment to be returned given the community benefits of the project) to 20% or more for seed investors who perceive that they require higher returns because of potential risks in achieving those returns. Typically, community energy investors are receiving 3-9%.
- Debt % - this is the percentage of debt funding compared to the total for the project. The level achievable will depend on the resilience of cash flows associated with the project. Many Behind the Meter projects will not require debt and so the value will be 0% in this case.
- Debt cost % - this is the interest rate associated with the debt finance. This can be estimated from prevailing interest rates.
- Leasing or debt term - This is the term in years over which lease payments are to be made or the debt funding is to be repaid.
- Tax rate - This is the tax rate applicable to the business structure used for the project.
- Accounting Depreciation Period: This is the period over which capital can be depreciated for accounting purposes. The period would typically be the life of the solar project but accounting advice should be sought.

14.3 Business Case

The financial models produced will form the basis of a business case, which will be used to initially attract project development funds for the project and eventually support funding for project construction and operations. It is important that the assumptions used in financial modelling are robust as investors are basing their funding decisions on this information.

14.4 Funding and Accounting/ Tax Factors Modelled

The financial models include the following factors that assist in the financial evaluation of a project in terms of assessing the commercial viability. All of these factors will have a potential impact on the project's cash flows and financial viability:

- Base discount factor - this rate is used as the minimum return that investors in the project would expect to see on their investment after tax – also referred to as project hurdle rate. The level will depend on the type of investor and might range from 0% (e.g., for investors not interested in achieving a return on their money but simply seeking their initial investment to be returned given the community benefits of the project) to 20% or more for seed investors who perceive that they require higher returns because of potential risks in achieving those returns. Typically, community energy investors are receiving 3-9%.
- Debt % - this is the percentage of debt funding compared to the total for the project. The level achievable will depend on the resilience of cash flows associated with the project. Many Behind the Meter projects will not require debt and so the value will be 0% in this case.
- Debt cost % - this is the interest rate associated with the debt finance. This can be estimated from prevailing interest rates.
- Leasing or debt term - This is the term in years over which lease payments are to be made or the debt funding is to be repaid.
- Tax rate - This is the tax rate applicable to the business structure used for the project.
- Accounting Depreciation Period: This is the period over which capital can be depreciated for accounting purposes. The period would typically be the life of the solar project but accounting advice should be sought.

14.3 Business Case

The financial models produced will form the basis of a business case, which will be used to initially attract project development funds for the project and eventually support funding for project construction and operations. It is important that the assumptions used in financial modelling are robust as investors are basing their funding decisions on this information.

14.4 Funding and Accounting/ Tax Factors Modelled

The financial models include the following factors that assist in the financial evaluation of a project in terms of assessing the commercial viability. All of these factors will have a potential impact on the project's cash flows and financial viability:

- Base discount factor - this rate is used as the minimum return that investors in the project would expect to see on their investment after tax – also referred to as project hurdle rate. The level will depend on the type of investor and might range from 0% (e.g., for investors not interested in achieving a return on their money but simply seeking their initial investment to be returned given the community benefits of the project) to 20% or more for seed investors who perceive that they require higher returns because of potential risks in achieving those returns. Typically, community energy investors are receiving 3-9%.
- Debt % - this is the percentage of debt funding compared to the total for the project. The level achievable will depend on the resilience of cash flows associated with the project. Many Behind the Meter projects will not require debt and so the value will be 0% in this case.
- Debt cost % - this is the interest rate associated with the debt finance. This can be estimated from prevailing interest rates.
- Leasing or debt term - This is the term in years over which lease payments are to be made or the debt funding is to be repaid.
- Tax rate - This is the tax rate applicable to the business structure used for the project.
- Accounting Depreciation Period: This is the period over which capital can be depreciated for accounting purposes. The period would typically be the life of the solar project but accounting advice should be sought.
• What percentage of profits are to be distributed to investors? The amount of the total profits available that will be payable to investors if VARIABLE is selected from the above field.

• Inflation - this represents the average forecast level of inflation. This can be estimated from RBA forecasts of CPI. This factor is used to escalate maintenance and other costs.

• Project modelling period – this is the period over which the project is to be evaluated. For CE Behind the Meter projects this would usually be in the range of 7 to 15 years after which time the ownership of the system is often transferred to the host site, though some projects may have a period of 20 to 25 years which is the life of the solar panels.

• Project Commencement Year – this is the calendar year in which it is anticipated that the project will commence operations.

14.5 Resource Links

For further information see:
frontierimpact.com.au/external-resources

[Image: Moree Solar Farm, Moree NSW. Photo courtesy of ARENA]
# Risk Management

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Concept/Prefeasibility</th>
<th>Feasibility</th>
<th>Final Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification and management of key risks associated with the project.</td>
<td>Key risks identified and documented with some risk mitigation approaches considered.</td>
<td>Key risks identified, risk mitigation approaches finalised, risk management strategies developed and risk management plan drafted.</td>
<td>Detailed risk management plan prepared.</td>
</tr>
</tbody>
</table>

15 RISK MANAGEMENT
It is important when developing a project, and presenting it to investors, that key project risks have been identified together with an approach to manage those risks. When a project is being initially conceived, or when investors are being sought as part of the project development phase, a business plan and/or an information memorandum and/or a prospectus are required to be prepared. Part of any such planning or information documentation should encapsulate the following minimum elements pertaining to risk:

- **Risk identification** – identify all of the key risks to the project.
- **Risk quantification** – attempt to quantify the risks. Sensitivity analysis is one way to achieve this.
- **Risk mitigation strategies** – show how the risks will be managed.

### 15.1 Specific Behind the Meter Risks

The following table sets out some of the specific risks that should be considered for Behind the Meter projects together with some potential risk mitigation strategies. This is by no means an exhaustive list and developers should not rely on these as being the only risks that they need to manage:

<table>
<thead>
<tr>
<th>Risk Element</th>
<th>Description of Risk</th>
<th>Potential Mitigation Approaches</th>
</tr>
</thead>
</table>
| Network tariff structure changes | Network tariffs are changing structurally and moving more and more to fixed price and demand charges which are not avoided by installing a Behind the Meter solar PV project. If revenues are based purely on avoidable costs then the revenue base for the project may decline over time. | • Structure any PPAs to have a fixed price subject to escalation without any reference to avoidable charges.
• Use an alternative structure to a PPA such as a loan/lease-based model where the revenues are fixed based on repayments rather than energy production of the solar PV installation. |
| Energy efficiency | The host site reduces its energy such that the project exports much more energy at lower prices thereby reducing the energy base. | • Structure any PPAs to have “take or pay” provisions so that the host site owner pays whether the energy is used internally or exported.
• Select a host site which is already energy efficient or one whose load is much greater than the size of the Behind the Meter project so that there is a safety margin included to cover this situation.
• Use an alternative structure to a PPA such as a loan/lease-based model where the revenues are fixed based on repayments rather than energy production of the solar PV installation. |
| Host site owner changes or defaults on payments | The host site owner changes or defaults on payments. | • Ensure that this situation is adequately covered in any legal agreements (PPAs or loan/lease structures).
• Carry out credit checks on host site owner. |
15.2 Risk Checklist

At a very high level you should ensure that all of the project elements included in this guidebook have been considered, not in isolation individually but that their interrelationships have also been considered as per the table below:

<table>
<thead>
<tr>
<th>Project Element</th>
<th>Factors to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Choice</td>
<td>• Have you selected a proven technology that will perform reliably?</td>
</tr>
<tr>
<td>Project Scale</td>
<td>• Have you chosen an optimum project scale considering:</td>
</tr>
<tr>
<td></td>
<td>† Host site load profile?</td>
</tr>
<tr>
<td></td>
<td>† Ability to attract sufficient funding?</td>
</tr>
<tr>
<td></td>
<td>† Sufficient scale to cover ongoing operating costs?</td>
</tr>
<tr>
<td></td>
<td>† Reducing network connection costs (&lt;100kW and often 30kW ideally)?</td>
</tr>
<tr>
<td></td>
<td>† Obtaining STCs upfront (&lt;100kW) versus ongoing LGC revenues?</td>
</tr>
<tr>
<td>Community Engagement</td>
<td>• Do you have a good community engagement model in place that will:</td>
</tr>
<tr>
<td></td>
<td>† Engender community goodwill?</td>
</tr>
<tr>
<td></td>
<td>† Assist with permitting approvals?</td>
</tr>
<tr>
<td></td>
<td>† Provide a base for potential community investors to be identified and targeted?</td>
</tr>
<tr>
<td>Business Structure</td>
<td>• Is the business structure appropriate in terms of:</td>
</tr>
<tr>
<td></td>
<td>† Engaging community participation?</td>
</tr>
<tr>
<td></td>
<td>† Obtaining funding particularly from community investor sources?</td>
</tr>
<tr>
<td></td>
<td>† Keeping business operation costs under control?</td>
</tr>
<tr>
<td>Project Development Resourcing</td>
<td>• Have you identified the resources required for the development of the project?</td>
</tr>
<tr>
<td></td>
<td>• Have you prepared a business plan and a budget that can be used to manage the project?</td>
</tr>
<tr>
<td>Site Selection and Acquisition</td>
<td>• Have the following aspects been considered in relation to the host site you have chosen:</td>
</tr>
<tr>
<td></td>
<td>† Minimising export, i.e. match host site load profile to project scale?</td>
</tr>
<tr>
<td></td>
<td>† Minimising construction costs (e.g. roof structure good, not requiring additional work)?</td>
</tr>
<tr>
<td></td>
<td>† Is host site tariff high enough to provide good revenue basis?</td>
</tr>
<tr>
<td></td>
<td>† Is host site owner creditworthy?</td>
</tr>
<tr>
<td>Resource Assessment</td>
<td>• Have you undertaken the resource assessment factoring in potential variability of output as a result of:</td>
</tr>
<tr>
<td></td>
<td>† Weather variations?</td>
</tr>
<tr>
<td></td>
<td>† Network supply reliability?</td>
</tr>
<tr>
<td>Construction</td>
<td>• Do you have a reliable supplier who can back warranties offered?</td>
</tr>
<tr>
<td>Network Connection</td>
<td>• Have you avoided the need for a network connection agreement by:</td>
</tr>
<tr>
<td></td>
<td>† Choosing the right project scale?</td>
</tr>
<tr>
<td></td>
<td>† Selecting an appropriate site?</td>
</tr>
<tr>
<td></td>
<td>† If not, are the costs justified by the increased scale?</td>
</tr>
<tr>
<td>Permitting</td>
<td>• Are all permits in place?</td>
</tr>
<tr>
<td>Operational Resourcing</td>
<td>• Have you set up a structure to minimise ongoing operating costs?</td>
</tr>
<tr>
<td>Project Funding</td>
<td>• Have you prepared a budget?</td>
</tr>
<tr>
<td></td>
<td>• Have you identified all potential funding types and sources and selected the most appropriate one?</td>
</tr>
<tr>
<td></td>
<td>• Have you determined a marketing approach for attracting investors?</td>
</tr>
<tr>
<td>Power Sales</td>
<td>• Have you identified the most appropriate revenue generating structure for your project:</td>
</tr>
<tr>
<td></td>
<td>† PPA?</td>
</tr>
<tr>
<td></td>
<td>† Loan-based?</td>
</tr>
<tr>
<td></td>
<td>† Lease-based?</td>
</tr>
<tr>
<td></td>
<td>• Do you have an agreement in place that guarantees sufficient revenue?</td>
</tr>
<tr>
<td></td>
<td>• Is this agreement legally and commercially sound?</td>
</tr>
<tr>
<td></td>
<td>• Do agreements cover situation where host site lease may expire or building is sold?</td>
</tr>
<tr>
<td>Other Revenue</td>
<td>• Have all sources been identified?</td>
</tr>
<tr>
<td>Financial Modelling</td>
<td>• Have you completed the financial template and does it indicate the project is viable?</td>
</tr>
<tr>
<td></td>
<td>• Have you carried out sensitivity analysis on the template to cover potential variations in project elements?</td>
</tr>
<tr>
<td></td>
<td>• Does the modelled Power Sales revenue structure provide savings to the host site?</td>
</tr>
</tbody>
</table>
The following represents a list of some of the successful CE projects currently operating in Australia:

<table>
<thead>
<tr>
<th>CE Organisation</th>
<th>Operating Projects</th>
<th>State</th>
<th>Technology</th>
<th>Capacity installed (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Investment Based Projects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark Community Windfarm Ltd</td>
<td>Denmark Community Windfarm Ltd</td>
<td>WA</td>
<td>Wind</td>
<td>1600</td>
</tr>
<tr>
<td>Hepburn Wind</td>
<td>Hepburn Wind</td>
<td>Vic</td>
<td>Wind</td>
<td>4100</td>
</tr>
<tr>
<td>Repower Shoalhaven</td>
<td>Repower One</td>
<td>NSW</td>
<td>Solar PV</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>Repower Two</td>
<td>NSW</td>
<td>Solar PV</td>
<td>30</td>
</tr>
<tr>
<td><strong>Clean Sky Solar Investments</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrey Hills</td>
<td>NSW</td>
<td>Solar PV</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Bathurst</td>
<td>NSW</td>
<td>Solar PV</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Wollongong</td>
<td>NSW</td>
<td>Solar PV</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Boggabri</td>
<td>NSW</td>
<td>Solar PV</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Mudgee</td>
<td>NSW</td>
<td>Solar PV</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Walgett</td>
<td>NSW</td>
<td>Solar PV</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Mildura</td>
<td>NSW</td>
<td>Solar PV</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Broken Hill</td>
<td>NSW</td>
<td>Solar PV</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CE Organisation</th>
<th>Operating Projects</th>
<th>State</th>
<th>Technology</th>
<th>Capacity installed (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Citizens Own Renewable Energy Network Australia (CORENA)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bega</td>
<td>NSW</td>
<td>Solar PV</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Gawler</td>
<td>SA</td>
<td>Solar PV</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Beachworth</td>
<td>Vic</td>
<td>Solar PV</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Ravenshoe</td>
<td>Qld</td>
<td>Solar PV</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Narrabri</td>
<td>WA</td>
<td>Solar PV</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Pegasus Riding for the Disabled</td>
<td>ACT</td>
<td>Solar PV</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Moss Vale</td>
<td>NSW</td>
<td>Solar PV</td>
<td>2.12</td>
<td></td>
</tr>
<tr>
<td>Adelaide</td>
<td>SA</td>
<td>Solar PV</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Parkholme Community Child Care</td>
<td>SA</td>
<td>Solar PV</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Camden</td>
<td>SA</td>
<td>Solar PV</td>
<td>7.8</td>
<td></td>
</tr>
<tr>
<td><strong>The People’s Solar</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taralga Primary School</td>
<td>Vic</td>
<td>Solar PV</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>St Kilda Community Housing</td>
<td>Vic</td>
<td>Solar PV</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Wollongong</td>
<td>Vic</td>
<td>Solar PV</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Nannup</td>
<td>NSW</td>
<td>Solar PV</td>
<td>29.15</td>
<td></td>
</tr>
<tr>
<td>Repower Shoalhaven</td>
<td>Kangaroo Valley</td>
<td>NSW</td>
<td>Solar PV</td>
<td>9</td>
</tr>
<tr>
<td>Blue Mountains Renewable Energy Cooperative</td>
<td>Blue Mountains</td>
<td>NSW</td>
<td>Solar PV</td>
<td>4.5</td>
</tr>
<tr>
<td>Nimbin Community Solar Farm</td>
<td>Nimbin Community Solar Farm</td>
<td>NSW</td>
<td>Solar PV</td>
<td>45</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CE Organisation</th>
<th>Operating Projects</th>
<th>State</th>
<th>Technology</th>
<th>Capacity installed (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Projects that Aggregate Households</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moreland Energy Foundation Ltd (MEFL)</td>
<td>Moreland Energy Foundation Ltd (MEFL)</td>
<td></td>
<td>Solar PV</td>
<td>100</td>
</tr>
<tr>
<td>Bendigo Sustainability Group</td>
<td>Bendigo Sustainability Group</td>
<td></td>
<td>Solar PV</td>
<td>2500</td>
</tr>
</tbody>
</table>

Information courtesy of Community Power Agency
FINANCIAL CONTACTS

Andrew W. Smith
Global Head of Clean Energy, Specialised Finance
Corporate & Institutional Banking | National Australia Bank Limited
Level 32, 500 Bourke Street Melbourne VIC 3000
Tel: +61 3 8697 6565 | Mobile: +61 484 636 324
Email: andrew.w.smith@nab.com.au

David Wilson
Business Development Area Manager – Asset Finance
Client Acquisition & Specialist Solutions
Corporate Financial Services
Business & Private Banking
Level 9, Darling Park, Tower 1
201 Sussex Street, Sydney NSW 2000
Tel: +61 2 9151 8366 | Mobile: +61 423 759 906
Email: david.m.wilson@cba.com.au

Katharine Tapley
Director, Sustainable Finance Solutions
ANZ | 242 Pitt St, Sydney, NSW 2000, Australia
Tel: +61 2 8937 6093 | Mobile: +61 405 125 086
Email: katharine.tapley@anz.com

Jane Kern
Corporate Affairs Senior Consultant
Kew, VIC 3101
Tel: +61 3 9854 4847
Email: Jane.Kern@bankaust.com.au
DEFINITIONS

Angel Investors: Angel investors (also referred to as lead investors) normally provide equity during the earlier development stages where there is less certainty on project success. To compensate for the early investment risk, angel investors will typically be offered a higher return than those investing at a later stage in the project (i.e., a greater share of the project per unit of investment).

Behind the Meter: A connection where an electricity project is connected to the internal electricity network of a host site. The connection is “behind the meter” that the network company and electricity retailer use to measure the electricity consumed on the host site so that the power will be used by the host site first and any excess is exported beyond the meter into the network.

Below-the-Load: Behind the Meter projects that do not export any energy to the grid.

Capital Cost (CAPEX): The total installed cost of a project.

Community Investors: Investors who are members of the community and may be retail, wholesale, angel investors.

Concept Phase: The project development phase which is used for evaluating the concept stage once key project elements have been decided upon and the concept phase once key project elements have been decided upon and the concept phase once key project elements have been decided upon and the concept phase once key project elements have been decided upon.

Debt % (interest rate): The interest rate associated with the debt financing. This can be estimated from prevailing market interest rates.

Debt Financing: Funding via a loan arrangement where the total debt of the project is funded by debt financing.

Depreciation Method: The financial template currently supports a number of depreciation methods including Linear (straight line or prime cost method) and Diminishing Value - refer to https://www.atos.gov.au/business/income-and-deductions-for-business/Depreciating-assets/General-depreciation-slab-method-cost-and-diminishing-value-methods/ for more details on each.

Depreciation Period: The period over which the project is to be depreciated for tax and accounting purposes and should be based on tax and accounting standards and financial assumptions.

Distribution Loss Factors (DLFs): The published loss factors associated with losses in the distribution network.

Electricity Revenue Escalation: The percentage of inflation by which power sales and potentially LGCs can increase over time under the terms of a PPA or other sales agreement.

Feasibility Phase: The project development phase that incorporates the forming up of all project element options including establishing more certainty around project costs and revenues and Feed-in Tariffs: Regulated price arrangements under which retailers pay for energy exported into the grid from solar PV projects.

Final Funding: The project development phase where all project elements have been developed in detail and the project is ready to be brought to forward to potential investors for final funding to support construction and operation of the project.

Grid (network) Availability: The amount of time that the network connection is available for the conveyance of power from the generation connection point to electricity consumers. The availability will depend on the connection point in the network and could range from around 95% up to nearly 100%.

Grid Connected: A project that is connected directly to the electricity network via its own network managed meter and therefore exposed to wholesale electricity pricing.

Grid-Integrated: A project that is connected Behind the Meter but exports much of its power to the network.

In-Kind Contribution: Primarily volunteer labour but refers to any contribution to a project that does not incur cash payments for goods and services.

Inverter Life: The life of the inverter after which time it needs to be replaced. Inverter manufacturers should be able to provide this information.

Lease Payment Revenues: Where revenue from a CE project is achieved through an operating lease rather than sales of electricity. The financial template included in this guidebook models the lease as monthly payments.

LGC Price: The price of LGCs that could be sold to create a revenue source for network losses. Prevailing market prices for LGCs can be readily sourced online through the use of a simple search on ‘LGC price’.

LGC Revenue: The revenue that is obtained through the sale of LGCs at the LGC price.

Loan Repayment Revenues: Where revenue from a CE project is achieved through a loan arrangement rather than from sales of electricity. The financial template included in this guidebook models these as monthly repayments of principle and interest as a revenue stream for this project.

Maintenance Cost Escalation: The percentage of inflation by which the maintenance costs are expected to increase over time. A default value of 100% of CPI should be assumed unless better information is available.

Network Charges: Ongoing network charges associated with connection to the network. To contribute to network business maintenance costs, other overheads and returns on network investment. For appropriately sized Behind the Meter installations this would likely be zero. However, for larger (often a 30MW threshold applies) installations, and those with significant export in particular, in order to estimate costs enquires may need to be made into the relevant distribution network business and you may also require technical advice. Unfortunately network charges can be quite site specific so it is not possible to estimate costs without specific enquires being made.

Network Connection Costs: The initial capital cost associated with connecting to the network. Unfortunately network costs can be quite site specific so it is not possible to estimate costs without specific enquires being made.

Network Loss Factors: Distribution and transmission loss factors collectively.

Peak Power Capacity: The peak design output of the solar PV installation in kW.

Power Purchase Agreement (PPA): An agreement for the purchase (and sale) of electricity output from an electricity generation project.

Prefeasibility Phase: The project development phase that arises out of the concept phase once key project elements have been decided upon and options around these key elements are considered in more detail.

Project Development Costs: The costs of taking a project from concept to Final Funding phase.

Project Evaluation Period: The period over which the project is to be evaluated which could be as long as the economic life of a solar PV project, which is generally considered to be 20 to 30 years.

Retail Electricity Prices: The price a business pays for electricity. This includes the wholesale electricity price plus network charges, retail charges, retail margins, LGC and STC fees and other market-based fees (all adjusted up for network losses).

Sensitivity Analysis: Analysis of project financial performance variability through changing key template inputs.

Share Registry: If the project is issuing shares to obtain funds from investors then a share registry needs to be established and maintained.

Social Impact Funds: Funds with a specific investment focus on projects that offer a large social and environmental impact to society.

Solar Losses: The reduction in theoretical power output from solar panels as a result of various technical and environmental factors.

Solar Resource Assessment: Calculation of the amount of power that can be produced from a solar installation over (usually) an annual period which can be done using solar calculators or by engaging solar design professionals.

Sophisticated Investors: A sub-category of wholesale investors under Corporations Law that meet certain minimum asset or salary thresholds.

STC Price: The price of STCs that could be sold to create a revenue source to offset capital costs of the project. Most projects assign the STCs to the solar installation contractor who in turn provides a lower capital cost to the project.

Transmission Loss Factors (TLFs): The published loss factors associated with losses in the distribution network.

Wholesale Electricity Prices: The price a project receives when exporting electricity to the grid through either the market based on wholesale electricity pricing or via a PPA or other sales agreement.
Introduction

In this section of the Behind the Meter Solar PV Guidebook, the information provided in the early part of this guidebook and in the Funding Guidebook is illustrated through two CE case studies that describe two different funding models which can be applied to further CE projects.

The Funding Basics Guidebook itself describes various business models that may be applicable to CE projects. Currently there are over 30 Behind the Meter CE projects in Australia that are either operational or in the advanced project development phases. Many of these projects have acquired all or the majority of their funding from donations. This guidebook deliberately focuses on investment-based projects as opposed to projects funded by donations, as donation-funded projects models are unlikely to be replicable to the extent of creating a broader base of projects. Investment-based models are likely to appeal to a wider cross section of the community given there is a return on any investment (equity) in the project. A commercial, profit-based model is likely to result in the development of a greater number of CE projects. It is important to highlight that community investors may be willing to accept a much lower rate of return than institutional investors in recognition of the fact that the projects provide benefit to their local community.

The two case studies that have been selected for this Behind the Meter Solar PV Guidebook are:

Repower Shoalhaven’s Repower One project
Pingala’s Young Henrys project.

Specifically, these case studies detail:
• The funding model used in each case including the type of funding and the source of those funds as explained in the Funding Basics Guidebook
• Key lessons and tips these CE groups learnt in developing their projects and particularly in securing funding
• How the project elements set out in this Behind the Meter Guidebook have been addressed in each case.

The two case studies have a number of similarities when considering the factors above. The case studies are both Behind the Meter projects that are of a small scale using proven solar PV technology. The key differences influencing funding in these case study projects is the legal structure which was driven from different investment objectives of the two cases. Pingala is not complete at the time of writing but is expected to be operation in April/May 2016.

Other investment based models that could be considered are:
• ClearSky Solar Investments’ trust model, where they partner with a solar PV installation company
• Embark’s small-scale solar loan model that is being considered for the Farming the Sun project in Lismore
• The Sydney Renewable Power Company’s mid-scale solar public company model.

More information on the various business models is set out online.

D.IV Resource Links

For further information see: frontierimpact.com.au/external-resources
Case Study 1 – Repower Shoalhaven: Repower One Project

Repower Solar One
Local Funding $119,800
Number of investors 20
Expected minimum return 6.5%
Located in Shoalhaven Heads, NSW
99kW solar system
CASE STUDY 1 – REPOWER SHOALHAVEN: REPOWER ONE PROJECT

**Project Overview**

The Repower One project involves construction and operation of a Behind the Meter (BTM) solar power system on the roof of the Shoalhaven Heads Bowling and Recreation Club (SHBRC) on the South Coast of NSW. The project was developed by Repower Shoalhaven, a local not-for-profit community energy association which were established Repower One as a company to build and operate the project. Funds required to construct the solar power project were raised from individual investors from the community, referred to as ‘community shareholders’ and from volunteer and in-kind contributions, grants and donations.

The project has been successfully operating since October 2014 and has achieved forecast energy production estimates and paid dividends to community shareholders in line with the estimates provided in the offer information document.

**Brief History of Repower Shoalhaven**

Chris Cooper lead the development of Repower Shoalhaven following the success of Kangaroo Valley which involved a project to install solar panels on the roof of Kangaroo Valley Ambulance Station and funding for this project was sourced from donations from the local community, allowing the project to be completed rapidly and easily for a quick win.

Repower Shoalhaven was established in May 2013 when Chris Cooper organised a community event to gain support for the development of local CE projects and it was attended by 180 people. The success of the event lead to the development of a committee within a week of the event.

The timeline for development of the concept through to commercial operation of the Repower One project is summarised to the right:

Repower Shoalhaven is a not-for-profit organisation established to develop community renewable energy projects for the benefit of local people, groups and businesses. One of Repower Shoalhaven’s goals was to develop a financing model for community solar and then to deploy it in the Shoalhaven community. Repower One is the first deployment of this model and since then Repower Shoalhaven has implemented Repower Two, and Repower Three is in development.

Repower Shoalhaven is run by volunteers and, since the commencement of the Repower One project, some part-time staff have been employed.

*The importance of strong leadership.*

Having a leader who is committed and able to spend significant volunteer time at the early stages of the project to drive the project was essential to the success of the organisation and its projects.

*The need to convert community support into momentum.*

Moving quickly when there is strong community support ensures positive momentum is established from the beginning of the project.

*The importance of building the group’s knowledge and reputation.*

Delivering a ‘quick win’ donation-based project at Kangaroo Valley built knowledge and expertise with the group and raised the profile and reputation of Repower Shoalhaven in their region.

**Funding Model Overview**

The Repower One project was the culmination of an initiative within Repower Shoalhaven to develop and implement a model for community financing of renewable energy projects. The development of this model spanned the concept, prefeasibility and feasibility project development stages whereas the implementation of the model (Repower One) spanned the feasibility and final funding stages.

The Repower One solar installation is 20% owned by Shoalhaven Heads Bowling and Recreation Club with the remaining 80% financed and owned by 19 community shareholders.

At the final funding stage, a total of $119,800 was raised from community shareholders who are the investors in a project entity. The project entity (also known as a special purpose vehicle or SPV) was incorporated as a private company with the name of Repower One Pty Ltd. The critical funding for the concept, prefeasibility and feasibility stages came from volunteer and in-kind time, donations and a grant.

The development funding comprised $37,000 in grants and donations and many hours of in-kind time which, at assessed at $50 per hour, amounted to around $90,000 in value.

Funding Model Evolution

A lot was learnt in the process of developing Repower One and the funding model has now been refined. For example, in Repower Two, a high-net worth community investor agreed to underwrite the project by agreeing to fund up to a certain percentage of the required funding if there was a shortfall in the funds raised through the general funding offer. While the number of investors was still capped at 20, this meant Repower Shoalhaven were able to reduce the minimum share size from $6000 in Repower One to $500, thus opening up participation to community members with less disposable income.

**Repower Solar One**

- Local Funding $119,800
- Number of investors 20
- Expected minimum return 6.6%
- Located in Shoalhaven Heads, NSW
- 99kW solar system

**MAY 2013**

- Repower Shoalhaven established

**FEBRUARY 2014**

- Kangaroo Valley small solar project completed

**FEBRUARY 2014**

- Repower One concept originated, indirect donation received for legal work

**JUNE 2014**

- Grant received from NSW Government

**AUGUST 2014**

- Community fund raising conducted, project commenced construction

**LATE AUGUST 2014**

- Project commenced operation

**KEY LESSONS AND TIPS**

- The importance of strong leadership.
- Having a leader who is committed and able to spend significant volunteer time at the early stages of the project to drive the project was essential to the success of the organisation and its projects.
- The need to convert community support into momentum.
- Moving quickly when there is strong community support ensures positive momentum is established from the beginning of the project.
- The importance of building the group’s knowledge and reputation.
- Delivering a ‘quick win’ donation-based project at Kangaroo Valley built knowledge and expertise within the group and raised the profile and reputation of Repower Shoalhaven in their region.
Repower One, Australia’s first community investor-owned solar power system at Shoalhaven Heads Bowling and Recreation Club. 99kW, operating since August 2014.

Photos courtesy of Embark.
KEY LESSONS AND TIPS

- Focus on the bottleneck only.
  Repower Shoalhaven realised that, while it was important to have a long-term goal and plan that everybody was able to understand, it was vital to draw the volunteer’s focus to the most immediate challenge that needed to be addressed. By doing this, volunteers are kept focused and given the satisfaction of regular ‘wins’.

- Keep the group action orientated and focused on key deliverables and outcomes. Often there can be great debate about the policy and regulatory requirements but this is often not useful in the success of delivering the project. It is important to have a strong chairman to ensure that the key issues are discussed and volunteers’ time is valued and used efficiently.

- Request pro-bono or discounted rates from professionals. A lead organiser with entrepreneurial skills is a good starting point. Where volunteers with the key skills required cannot be found, consider requesting pro-bono or discounted rates from professionals ‘in the field’.

- Get a good accountant. Repower Shoalhaven identified financial literacy and accounting skills as being the most critical skills required for developing their project.

Grants and donations

Grants and donations were received by Repower Shoalhaven at various stages, to help cover the costs of establishing and maintaining an incorporated association, and the project development costs and examples of these are provided below:

- Member fees, one-off donations and fundraising events, such as sponsored movie nights, raised approximately $12,000 for the organisation.
- A $10,000 sponsorship from the NSW Government, specifically provided for the purpose of paying financial, legal and other contractors.
- The group benefitted indirectly from a $15,000 donation from the McKinnon Family Foundation. The donation was used to develop the legal templates designed and used specifically for the Repower One project.

KEY LESSONS AND TIPS

- Leverage your supporter base. A large supporter base, once developed, can be leveraged for significant funding contributions.

- Choose a host site that has a positive profile in the community. This helps with fundraising via its membership and/or customer base.

- Think outside the box in relation to grants.
  - Not all government funding is provided via published grant rounds so it is important to be aware of Government objectives and processes.
  - Demonstrating good governance is important when applying for grants.
  - Donation funders such as philanthropists are often interested in contributing funds to the development of resources, particularly when they can be used many times over by multiple groups.

CASE STUDY 1 – REPOWER SHOALHAVEN: REPOWER ONE PROJECT

SECTION D

Types and Sources of Funding

The types and sources of funding used for the project through each of the project development phases is summarised in the table below:

<table>
<thead>
<tr>
<th>CONCEPT</th>
<th>PREFEASIBILITY</th>
<th>FEASIBILITY</th>
<th>FINAL FUNDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner Investments</td>
<td>In-kind</td>
<td>Equity from community investors</td>
<td>In-kind</td>
</tr>
<tr>
<td>Community Investors</td>
<td>Donations</td>
<td>Donations</td>
<td>Donations</td>
</tr>
<tr>
<td>Grants &amp; Donations</td>
<td>In-kind</td>
<td>Donations*</td>
<td>Donations</td>
</tr>
<tr>
<td>Total (cash)</td>
<td>$185,750</td>
<td>Total (including in-kind)</td>
<td>$275,750</td>
</tr>
</tbody>
</table>

Funding Contribution Breakdown

In-kind

Volunteer effort was the (in-kind) funding workhorse that contributed to the completion of the project across all the project development stages. Hundreds of hours were committed to get the organisation and the project up and running. Much of this time was spent in early stage fundraising, working with advisors on financial and legal aspects of the project (including developing a financial model and various legal documents), negotiating a site, developing a risk management plan, administration and project management.

The in-kind support was facilitated by being able to leverage the significant public support and goodwill demonstrated and embodied in the turnout of 180 people at the initial event held in May 2013. By rapidly converting this public support into a committee and subsequent incorporation into an association, Repower Shoalhaven was able to inspire volunteers to join and contribute their efforts to realise a shared vision.

Securing skilled volunteers and maintaining public support and interest was not easy. People needed to be inspired and excited and see how they could contribute to realising a shared vision, and the wider support base needed to be regularly updated as to progress.

Individuals with key skills had a large impact on the success of the project. Chris Cooper has strong entrepreneurial skills and, as the lead organiser, was able to pull other talented individuals into the project. Solar installers, book keepers, business people and accountants all contributed vital professional skills to the project. Importantly, not all the skills were contributed on a purely voluntary basis. The accountant, for example, works on a 50% fee discount which has saved approximately $4,000 over the course of Repower Shoalhaven’s first two projects.

Funding Amounts from Each Source

- Owner Investments: $25,750
- Community Investors: $13,750
- Grants & Donations: $19,000
- Total (cash): $185,750
- Total (including in-kind): $275,750

* In-kind contributions valued at $50 per hour
Retail and Wholesale Investors from the Local Community (Community Investors)

Financing an energy project using investment funds from community members was the goal of the initiative that delivered the Repower One project. The project construction was successfully funded using 100% community investment funds. These investors were all members of the Repower Shoalhaven Association and were invited to participate in the project via direct invitation. The project depends on the “20/12” small-scale offering exemption ruling. This ruling allows private companies to offer investments to individuals with whom they have a direct relationship. There are limits to this ruling, such as shares being issued to no more than 20 investors and a maximum of $2 million in funds being raised, in any 12 month period. An offer information document was provided to prospective investors but this didn’t need to be lodged with ASIC which resulted in reduced costs.

Community investors contributed $119,800 to the project over the course of a financing campaign that was fully subscribed in just 10 days. Repower Shoalhaven used a combination of emails and newsletters to their members, website updates and social media activity to achieve this result.

The following table summarises the community investor contributions:

Funding raised: $119,800 from 19 community investors

Under what conditions and why did they invest?

Investors had clear information provided in an offer information document. This included, among other items:

- An expected minimum rate of return of 6.5% based on a long-term fixed price power purchase agreement
- A minimum investment amount of $6,000.

Investors were interested in the financial opportunity but were equally motivated by the ethical nature of the project and its ability to be replicated.

What was done to secure community investors?

- Building a large base of members and offering a competitive rate of return
- The 20/12 exemption rule meant that Repower One was limited to only offering investments to individuals with whom they had a direct relationship. It was beneficial that a large membership existed from which the community investors were drawn
- Repower Shoalhaven were aware of the anti-avoidance provisions associated with the application of the 20/12 exemption rule and structured their offering to comply with these provisions
- The rate of return in equity was set at a minimum of 6.5% (internal rate of return). It took just 10 days for the share offer to be fully subscribed by retail and wholesale investors from the local community.

What needed to be in place in order for investment to be possible?

Repower Shoalhaven delivered the 15 project elements referenced in the Funding Basics Guidebook and detailed in this Behind the Meter Guidebook and the following section shows how they applied it.

**KEY LESSONS AND TIPS**

- Build trust. People need to have trust to invest. Repower Shoalhaven were able to build this up over time through good corporate governance and a democratic decision-making process whereby members could vote on key aspect of the project development.
- Inspire and motivate – tell the story. Repower Shoalhaven have shown it is as important to appeal to people’s emotions as it is to their intellect. See the resource links for an article by Chris Cooper that demonstrates the importance of leadership and key messages.

D.CS1 Resource Links

For further information see: frontierimpact.com.au/external-resources
Business Structure

The business structure that underpins a funding model is essential to the success of raising funds for the project. There needs to be a strong governance structure to operate that ensures costs are managed to secure the required level of returns for the community investors.

The Repower One project is a special purpose vehicle (SPV), an incorporated private company and is the legal entity that is collectively owned by the community shareholders and enters into various legal agreements required to support the operation of the project. The relationships and legal agreements between the different participants are summarised in the figure below.

The shareholders in Repower One Pty Ltd have one vote per share. Repower Shoalhaven, as the project administrator, has a single share in the SPV (Repower One Pty Ltd) with special voting powers. Repower Shoalhaven has two board directors responsible for the day-to-day running of the project.

A volunteer shareholder director is elected from the shareholders to serve as an independent contact point for shareholders. The shareholder director can remove Repower Shoalhaven as the administrator at any time.

Repower One Pty Ltd collects investments and owns the solar equipment. Repower Shoalhaven provides services as well as acting as the governing body for the SPV (Repower One) and is paid an administration fee for its services. These services include selling the electricity to the host site and administration for the SPV. Dividends are paid to the shareholders annually and a general meeting is held each year.

Once the term of the project has concluded and the investors have had their money returned to them, ownership of the solar equipment is transferred over to the recreation club at no charge under the conditions set out in the power purchase agreement.
Project Element Development and Management Approaches

The table below sets out how Repower Shoalhaven has managed the 15 project elements set out in this Behind the Meter Guidebook together with the lessons they learnt and the challenges they faced along the way.

**Note:** The information in this section of the case study is compiled in relation to both the Repower One project and Repower Shoalhaven's second project (Repower Two – 2 x 15kW) with several lessons having been learnt between the two projects.

### Project Element 1 Technology Choice

<table>
<thead>
<tr>
<th>Required Status when Seeking Final Funding</th>
<th>Repower Shoalhaven's Approach</th>
</tr>
</thead>
</table>
| Firm prices sourced from two experienced suppliers. Technology verification undertaken and available for validation by others if necessary | Repower Shoalhaven has so far conducted two separate capital raising (Repower 1 and Repower 2) for three separate solar arrays on the rooftop of local organisations. In the first project, the solar manufacturer approached Repower Shoalhaven to use Repower Shoalhaven’s ‘bolt-on’ community financing to assist them in winning the project. Intensive due diligence was conducted on the installer, the technology used and the solar contract conditions. The same due diligence is now applied to new installers who wish to work with Repower Shoalhaven. Repower Shoalhaven selected solar module technology based on:  
  - Tier One (BNEF list) – refer to link resources.  
  - Having a third party warranty insurance provider (PowerGuard)  
  - Having multiple layers of security in the supply chain (i.e., imported by a large wholesaler separate to the installer and a manufacturer who has honoured warranty claims in the past)  
  - The installer verifying that previously installed modules are performing at least to expectation.  
  - The warranty of all products was set to last at least the length of the contract term, including 10 years inverter warranty and 15 years frame and racking warranty  
  - All projects were installed with remote monitoring capability with automated email alerts should any part of the system fail. Ongoing support and fast incident response time was important to Repower Shoalhaven when selecting an installer  
  - After each project was installed, an independent solar professional conducted an inspection to check for any issues. Some minor issues were found and rectified |

### Lessons Learnt and Challenges Faced

- Look out for minor details in the solar contract and negotiate for improved wording if need be  
- Repower Shoalhaven had to clarify the wording on the 10 year inverter warranty start date (it was unclear whether it was six months from the date of shipment or the date of installation). Given the 10 year project term for the first two projects, an inverter failure in the final months would be detrimental to investor returns if it was outside of warranty.  
- The incident response time was tested (and passed) when the customer notified of a flapping awning over the Repower One inverter set-up, after a storm. The installer was notified immediately and had someone on site to fasten the awning in a matter of hours

### Project Element 2 Project Scale

<table>
<thead>
<tr>
<th>Required Status When Seeking Final Funding</th>
<th>Repower Shoalhaven's Approach</th>
</tr>
</thead>
</table>
| Project scale determined and set | Finding the project ‘sweet spot’ is important. Sizing the solar array to be no more than 100kW was important as it ensured Repower Shoalhaven were able to take advantage of the up-front “deemed” value of STCs. If they crossed over the 100kW threshold, they would have had to generate LGCs over time, creating more administrative effort and investor uncertainty  
  - Smaller systems (below 20kW) did not offer economic benefits to the host site, investors or Repower Shoalhaven. It was decided that smaller sites would be grouped in the future into the one investment tranche. This way, the smaller sites which would not be viable on their own would be able to access an affordable rate, and at the same time would spread investor risk via diversification |

### Lessons Learnt and Challenges Faced

- Bundling multiple projects requires the timing to line up those projects  
- Enables replicability and efficiency of resources

**Note:** The information in this section of the case study is compiled in relation to both the Repower One project and Repower Shoalhaven's second project (Repower Two – 2 x 15kW) with several lessons having been learnt between the two projects.
### Project Element 3: Community Engagement

**Required Status when Seeking Final Funding**
- Clearly demonstrable support with all key issues addressed.
- All business case and legal documentation in place to enable community investor capital raising and demonstrable investor support fully quantified.

**Repower Shoalhaven’s Approach**
Repower Shoalhaven is a community member-based association. They are supported by almost 200 financial members, who pay an annual fee of $20, and over 400 email subscribers. They encourage all members to attend community meetings in which they discuss and vote on all processes/sites/outcomes. They hold multiple special events each year in order to engage their members such as:
- Annual movie night fundraiser
- Speaker night at local vineyard
- Future day (member engagement workshop)
- Christmas gatherings
- Project celebrations (to launch first two projects)
- Strategy workshops
- Special working group meetings.

As well as this they send out a monthly member’s newsletter and maintain a basic webpage and Facebook page. In 2015 they added the member login feature allowing investors to check on their project’s performance and download relevant financial documents.

**Lessons Learnt and Challenges Faced**
- Bundling multiple projects requires the timing to line up those projects
- Enables replicability and efficiency of resources

---

### Project Element 4: Business Structure

**Required Status when Seeking Final Funding**
- Final business structure in place.
- Project governance structure aligned with business structure.

**Repower Shoalhaven’s Approach**
Repower Shoalhaven’s project model has involved the customer (the host) signing a PPA with the owner (the SPV) to purchase electricity at a given rate for 10 years, after which the ownership of the system transfers to the customer.

To conduct its investment project, Repower Shoalhaven set up a Pty Ltd Special Purpose Vehicle (SPV) which owns the solar equipment and distributes returns back to shareholders. Repower Shoalhaven is nominated as the default project administrator by the shareholders, however it can be replaced at any time. At the project set-up phase, Repower Shoalhaven (as the project developer) was responsible for the preparation of:
- Legal documents (PPA, shareholder agreement, company constitution, administration agreement)
- Information memorandum
- Setting up the shareholder administrator
- Registering share certificates
- Bank account setup and management
- PPSR registration of each asset
- Marketing communications to members.

Once established, Repower Shoalhaven (as project administrator) was responsible for the following tasks:
- Output monitoring
- Billing and repayment collection
- Shareholder communications
- Shareholder register upkeep
- Banking and financial management
- Annual financial reporting
- Day-to-day business operations
- Emergency maintenance issues
- Processing of shareholder returns
- Running of Annual General Meeting
- Convening of any emergency shareholders meetings.
Lessons Learnt and Challenges Faced

Challenge was to find a business structure with the following suitable components:

- Economically viable
- Streamlined but allowing democratic voting
- ASIC compliance issues particularly in relation to the 20/12 exemption rule
- Minimises tax burden.

The business model must follow the rules of the ASIC’s small scale offering requirements, namely:

- Shares may be issued to no more than 20 retail investors in any rolling 12 month period
- No more than $2 million in funds raised in any 12 month period
- Restrictions on advertising (it is a closed offer to a subset of interested parties, and not open for public promotion).

Skills identified and budget cost estimate determined to construct the project

Financial literacy and accounting skills were quickly identified as being key and a discounted fee was negotiated to acquire this skillset

Sound legal documents (share offers, shareholder agreements, PPAs, site leases) are required to be put in place to ensure that the project is able to move forward on a commercial basis. Repower Shoalhaven was able to secure donation funding to put in place the required legal documentation platform.

Good financial advice is essential to the development of a successful project

Repower Shoalhaven is willing to provide access to legal agreements utilised in their projects to assist other projects to leverage of the advice received by Repower Shoalhaven.

The delays in getting potential host site meter data via either utility request or installation of data loggers can slow the project down, losing important sales cycle momentum with the potential client.

Repower Shoalhaven has partnered with a solar contractor who utilises sophisticated modelling software to determine the technical business case for each of their clients. The client can purchase this service from Repower Shoalhaven at a price well below the market rate for a solar assessment. This assessment determines the:

- Optimum system size
- Forecast generation per month and year
- Level of self-consumption vs export
- Generation occurring at each tariff
- Peak load reduction (if applicable).

This data is presented to the client and also feeds into Repower Shoalhaven’s financial model and client proposal.
### Project Element 8 Construction

**Required Status when Seeking Final Funding**
Solar installer contractor identified and cost estimated based on comprehensive and detailed firm quote

**Repower Shoalhaven’s Approach**
Once it is clear Repower Shoalhaven will raise the capital for their project, they notify the solar contractor to book in the sites for installation. The contractor requests network approval for the site. The solar contract is signed and a 10% deposit is made before work commences.

**Lessons Learnt and Challenges Faced**
Between the initial quote and signing the construction contract, there is a small risk that the capital, installation and STC prices may change. Therefore, seek a fixed price contract with a clearly defined expiry date from the contractor.

### Project Element 9 Network Connection

**Required Status When Seeking Final Funding**
Firm cost quotations for any CAPEX and OPEX assumptions associated with network connections. A network connection agreement may also be required.

**Repower Shoalhaven’s Approach**
Network connection is outsourced to the solar contractor. For systems less than 100kW there were no unexpected costs or delays to network approvals in Repower Shoalhaven’s installation area.

**Lessons Learnt and Challenges Faced**
The solar contractor managed all requirements.

### Project Element 10 Permitting

**Required Status when Seeking Final Funding**
Permits in place or available subject to final funding. Compliance activities post-operation scheduled and budget allowed for them.

**Repower Shoalhaven’s Approach**
For rooftop systems, generally no planning approval is required in NSW, assuming the building is not heritage listed.

**Lessons Learnt and Challenges Faced**
The solar contractor managed all requirements associated with Repower One.

### Project Element 11 Operational resourcing

**Required Status when Seeking Final Funding**
Detailed and verifiable operational costs to support ongoing operation of the project.

**Repower Shoalhaven’s Approach**
Our annual operational budgets, per SPV, are as follows:
- $700 accounting
- $100 ASIC compliance
- $100 banking
- $210 contingency (set aside)
- $165 office registration
- Repower Shoalhaven administration fee (7-10% of revenue). See ‘Business Structure’ for itemised list of responsibilities associated with this fee
- $500 set aside for winding up the entity (final year).

**Lessons Learnt and Challenges Faced**
Insurance costs were included in the PPA as being payable by the Recreation Club as part of their broader building insurance. This saved the project costs. The key solar equipment is covered by warranties from Tier 1 supplier.
## Challenges Faced

The project capital is raised via shareholder equity. Electricity sales are classified as company revenue. The annual administration costs identified in ‘Operational resourcing’, plus depreciation are classified as costs. The company must pay tax at the legislated company tax rate.

Investors receive their income back over the course of the contract term. It is returned in three forms of cash:
- Capital return
- Dividend
- Franking credit.

Repower Shoalhaven’s first project had a forecast cash return on the initial investment of between 6.5% and 7.8% per annum, internal rate of return.

Repower Shoalhaven has a private underwriter on hand to make up for any shortfall in finance, should they not reach their funding target by the set financing date. This underwriter will only invest if they deem the project safe to do so.

## Lessons Learnt and Challenges Faced

The chosen method of capital-raising can at times be confusing for prospective investors to understand due to the impact of depreciation on the accounting treatment of shareholder capital. In light of this Repower Shoalhaven is exploring a new project structure in 2016 whereby capital is raised via shareholder debentures as opposed to equity. This also provides other advantages in relation to tax, streamlining the financial auditing process and reducing complexity associated with franking credits.

Repower Shoalhaven has developed a detailed project risk management document which serves as a guide for mitigating risk through good project design and responding to risk events.

The model has been reviewed by multiple accountants and members with technical expertise to ensure it is accurate.

### Project Element 13: Power Sales

#### Required Status When Seeking Final Funding

Power sales agreement secured with host site owner and any other revenue source agreements (export electricity and LGCs) negotiated and ready for execution.

#### Repower Shoalhaven’s Approach

Repower Shoalhaven has developed a Power Purchase Agreement template, initially with assistance from The Difference Incubator, and later refined with Repower Shoalhaven’s legal team at Clearpoint Counsel.

#### Lessons Learnt and Challenges Faced

- Whilst there are many benefits to a PPA from the perspective of a business customer, the long term nature of a PPA contract (10-15 years) can be a barrier to a customer signing up and also create an element of counterparty risk to the investor (for certain projects).
- Repower Shoalhaven are working on diversifying their financial offering to include a community loan agreement to offer to certain clients (4-6 years) as opposed to a PPA so that the Repower Shoalhaven project generates a return from loan repayments as opposed to PPA revenue.
- In response to barriers identified in the field, Repower Shoalhaven has amended the front page of the PPA by including a form which allows customers to easily transfer the PPA contract to a new tenant. This provides additional certainty for business owners on the ease of transferability, something which Repower Shoalhaven has identified as a barrier for some customers signing the PPA.

### Project Element 14: Financial Modelling

#### Required Status When Seeking Final Funding

Detailed financial model provided (to the satisfaction of financiers and/or investors) incorporating sensitivity modelling.

#### Repower Shoalhaven’s Approach

Repower Shoalhaven developed its own financial model to allow up to 10 projects to be modelled together as a single investment, each with differing term lengths and other prices.

The model has been reviewed by multiple accountants and members with technical expertise to ensure it is accurate.

#### Lessons Learnt and Challenges Faced

- This model has been developed with accountants input and review. It is worthwhile getting professional assistance when developing such a sophisticated model, particularly to navigate trickier aspects such as depreciation and taxation.

### Project Element 15: Risk

#### Required Status When Seeking Final Funding

Detailed risk management plan prepared.

#### Repower Shoalhaven’s Approach

Repower Shoalhaven has developed a detailed project risk management document which serves as a guide for mitigating good project design and responding to risk events.

#### Lessons Learnt and Challenges Faced

- This is reviewed at each new investment project prior to the release of the share offer document.

---

### Project Element 12: Project Funding

#### Required Status when Seeking Final Funding

Equity commitment demonstrated (from community investors and/or other equity providers) and funding requirements clearly communicated in formal application process.

#### Repower Shoalhaven’s Approach

The chosen method of capital-raising can at times be confusing for prospective investors to understand due to the impact of depreciation on the accounting treatment of shareholder capital. In light of this Repower Shoalhaven is exploring a new project structure in 2016 whereby capital is raised via shareholder debentures as opposed to equity. This also provides other advantages in relation to tax, streamlining the financial auditing process and reducing complexity associated with franking credits.

### Lessons Learnt and Challenges Faced

The model has been reviewed by multiple accountants and members with technical expertise to ensure it is accurate.

### Project Element 12: Project Funding

#### Required Status when Seeking Final Funding

Grants significantly utilised prior to final funding with any remaining grant funding utilised in construction stage.

#### Repower Shoalhaven’s Approach

Repower Shoalhaven received $10,000 from the NSW Government Office of Environment and Heritage to use for accounting, capital, marketing materials and other elements associated with developing the business model.

A small element of interest was received on the bank account savings.

Repower Shoalhaven has a separate set of accounts for each of their project entities.

### Lessons Learnt and Challenges Faced

- This is reviewed at each new investment project prior to the release of the share offer document.
Case Study 2 – Pingala: Young Henrys Project

Young Henrys
Total Cost $38000
Local Investor Funding $18000
Expected Minimum Return 5%
Located in Newtown NSW
29kW Solar System
CASE STUDY 2 – PINGALA: YOUNG HENRY’S PROJECT

The Sydney-based Pingala group has adapted the Repower Shoalhaven model to create a new model that uses a co-operative structure to develop projects (rather than private companies) and generates its revenues by leasing the solar installation to the host site.

In summary the Pingala group modified the Repower Shoalhaven model for the Young Henrys project in the following ways for the reasons outlined:

<table>
<thead>
<tr>
<th>Key Differences</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishes a distributing co-operative legal structure instead of creating separate private companies for each project.</td>
<td>• The distributing co-operative model allows a larger number of shareholders through a lower-cost fundraising process than a company or trust structure (see Funding Basics Guidebook).</td>
</tr>
<tr>
<td>Uses a leasing approach rather than a PPA. Pingala will purchase the solar PV system and lease the solar PV system to the host site. Ownership is transferred to the host site at the end of the project term.</td>
<td>• The return for shareholders under a Power Purchase Agreement is based on amount of energy generated so the shareholders are directly impacted by the generation output risk of the project. A lease agreement provides less risk for the shareholders as revenues are not dependent on generation output and as such there is a fixed cash flow revenue stream available to provide a return on shareholders’ funds. • Under a PPA arrangement Pingala would likely have to obtain a retail licence exemption to onsell the power to Young Henrys and using a lease avoids this requirement. Note: Pingala has not ruled out using PPA or other structures in the future.</td>
</tr>
<tr>
<td>Explores crowdfunding as a possible mechanism in sourcing equity funds (subject to final legal advice)</td>
<td>• Under a co-operative structure, Pingala is considering being able to streamline the raising of equity using an approach similar to an equity crowdfunding mechanism (see below and Funding Basics Guidebook)</td>
</tr>
</tbody>
</table>

Young Henrys, Newtown NSW

Project Overview

The Pingala project (Pingala) has installed a 29kW solar system on the roof of Young Henrys, a micro-brewery located in the inner-Sydney suburb of Newtown. The project has been funded by local community investors together with grant funds (noting that the grant funds are not essential for the project to be financially viable).
Brief History of Pingala

On 13 March 2013, a community forum was held at the Redfern Town Hall, which was organised by Pingala’s founder and current convenor, April Crawford-Smith. Attendees at that event were invited to a workshop facilitated by the Community Power Agency on 17 March 2013 at Redfern Oval. Out of the workshop was organised by Pingala’s founder and current convenor, April Crawford-Smith. Attendees at that event were invited to a workshop facilitated by the Community Power Agency on 17 March 2013 at Redfern Oval. Out of the workshop, Pingala was born, with 20 attendees making the commitment to form a new community energy group in Sydney.

Pingala has a vision for a fairer energy system and this drive for equality and fairness has influenced choices when determining the funding model and business structures to use for their CE projects. A key value proposition for members of the Pingala Co-operative is the ability to support local businesses who are doing the right thing for the environment and their community. Pingala plans to develop CE solar farms on the roofs of businesses and this is being done in a way that connects the business with their vision by inviting them to become investors in the solar infrastructure. A key value proposition for host sites is the ability to create a set of community energy champions who are invested in the future success of their business.

The timeline below sets out key steps in the evolution of Pingala and the Young Henrys Project:

**CASE STUDY 2 – PINGALA: YOUNG HENRYS PROJECT**

**SECTION D**

### Funding Model Overview

The current project has delivered a 29kW solar PV system installed on the roof of Young Henrys brewery in Newtown. The Pingala Co-operative is leasing the installation to the brewery operator. Under the lease agreement co-operative members will effectively receive lease payments that are not dependent on the solar generation output resulting in a fixed cash flow revenue stream to provide a return on shareholder’s funds. At the end of the term of the lease the ownership of the solar system will be transferred to Young Henrys.

Pingala’s initial funding was derived primarily from two grants from the City of Sydney. The first grant was used to promote Pingala and build their base of supporters. The second grant was principally provided to assist with costs associated with the development of legal and financial advice and templates and also included some funds ($20,000) to contribute to project development costs for the Young Henrys project. It is important to note that the grant funding was not required to make the project commercially viable but the grant has made it much easier for Pingala to establish their overall development framework more quickly than they could have hoped to. The contribution of grant funds to the Young Henrys project will help to reduce the risks for the investors in Pingala’s first project and will be used to assist in the development of future projects.

The actual Solar PV project (approximately $40,000) is funded roughly 50% by grant funds and 50% via equity from community shareholders in the Pingala Co-operative.

### KEY LESSONS AND TIPS

- **Invest in a campaign to attract supporters.** To be successful it is important to gain supporters. Pingala was able to achieve this through a publicity campaign that was funded by City of Sydney.
- **Converting community support into momentum.** Pingala was able to move quickly to leverage the public support following its first event at the town hall by quickly organising a follow up event with an independent workshop facilitator to build a shared vision and a coherent plan for Pingala’s first steps.
- **Discuss grant applications with grant providers prior to submission.** Pingala’s original intent was to secure a larger funding commitment from City of Sydney. They learnt through discussions with the City of Sydney grant manager that the application amount and scope needed to be remodelled to ensure the application was successful.
- **Fundraising -**

  - **Grant received for publicity and community engagement**
  - **Commenced discussions with Young Henrys**
  - **Commenced development of co-operative solar project model**
  - **Finalised legal agreements and financial modelling using grant funds**
  - **Signed agreements and community fundraising**

### Funding Model Evolution

Pingala has developed a funding model based on equity investment from co-operative members. This model is an adaptation of the models used by Repower Shoalhaven and ClearSky Investments which are utilising Special Purpose Vehicles established as Private Companies or Trusts respectively.

Pingala has replaced the per-project SPV (the Pty Ltd Company or the Trust) with a multi-project investment entity (incorporated as a Distributing Co-operative). The Pingala model enables an unlimited number of community investors to invest in multiple projects. This is not possible for company and trust structures wishing to keep their fundraising costs down using the 2012 exemption rule (see Funding Basics Guidebook).

### KEY LESSONS AND TIPS

- **Form follows function.** Choose a legal form that best suits your needs as an organisation. Pingala chose a legal structure that enabled a large number of investors to participate and multiple projects to be replicated at an expected lower cost of administration.
- **Don’t duplicate.** Learn from the best CE models already available. Use their learnings and resources and adapt them.
The types and sources of funding used for the project through each of the project development phases are summarised in the table adjacent.

Types and Sources of Funding

<table>
<thead>
<tr>
<th>CONCEPT</th>
<th>PREFEASIBILITY</th>
<th>FEASIBILITY</th>
<th>FINAL FUNDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-kind</td>
<td>In-kind</td>
<td>In-kind</td>
<td>In-kind</td>
</tr>
<tr>
<td>Donations</td>
<td>Donations</td>
<td>Donations</td>
<td>Equity</td>
</tr>
<tr>
<td>Grants</td>
<td></td>
<td></td>
<td>Co-operative</td>
</tr>
</tbody>
</table>

Funding Contribution Breakdown

In-kind

Pingala has relied on considerable local volunteer contributions as well as the goodwill of other CE groups to develop its business model to an advanced state. Pingala’s founders were able to establish a core group of committed volunteers through an initial meeting and workshop. The group is known as the Action Team and the 20 people involved have remained relatively unchanged during the three years the project has been running. Leadership by a few core individuals has been critical for the successful progress of the project. Pingala’s convenor, April Crawford-Smith, and project secretary, Tom Nockolds, have devoted considerable time to the project. There is a second tier of dedicated and passionate volunteers, who bring commitment and essential skills to the project.

Donations

Grants

In-kind Contributions*

---

KEY LESSONS AND TIPS

- Establish shared commitment. Developing a project using volunteer efforts may take considerable time. A team which has built a shared culture of trust and commitment will be able to operate for the long duration required without falling apart or losing interest.
- Accept contributions from all volunteers. Some individuals have key skills but have little time and others have plenty of time on their hands, but are perhaps lacking the skills required. Ensuring that everyone’s contributions are valued is an important part of a successful collective volunteer organisation which has longevity.
- Speak to other CE groups. Pingala learnt from other CE models, CE organisations are generally community-oriented and willing to share information and support other CE project developments.

Pingala Funding

- Total (including in-kind) $115,000
- Total (cash) $74,000
- Donations $20,000
- Equity Cooperative Members $20,000
- Grants $40,000
- In-kind Contributions* $14,000

---

CASE STUDY 2 - PINGALA: YOUNG HENRYS PROJECT

Young Henrys Project

Grants and donations

Pingala has received two grants from the City of Sydney that assisted in the success of the project to date. Initially Pingala had hoped for a large grant to develop their business model and ended up changing their plans as the City of Sydney advised them to scale down their application to the critical first step which involved a publicity campaign to promote Pingala. As a result, Pingala was awarded $10,000. This was a good suggestion as it meant Pingala focused initially on developing a strong publicity campaign which proved critical in building a strong supporter base for the organisation. As a result, Pingala now claims to be one of the most strongly-supported community energy organisations in Australia with its large membership and newsletter readership, strong social media following and a large group of volunteers.

The second grant was for $44,000 and was used for the development of legal and financial templates as well as providing funds for the first project which will also benefit future projects.

---

KEY LESSONS AND TIPS

- Be flexible and adaptable. There’s no point submitting a grant application that will not be successful. It is important to develop relationships with grant funders and listen to their advice.
- Role of grants – They can be useful for the development of new business models but cannot be relied upon, as they are often not available. CE projects should rely on equity, in-kind support and donations to be successful.
- Access to legal and financial templates - CE developers can access financial templates that have been developed by Pingala which will reduce duplication of effort and costs for other CE developers.
Equity funding

The Pingala equity funding model is similar to a crowdfunding model as follows:

- Members of the public will be invited to become members in the Pingala Co-operative by purchasing shares to fund the Young Henrys project. The minimum shareholding will be set as low as possible, balancing the requirements for low entry costs and the ongoing annual costs to manage each shareholder. While a disclosure document is required (setting out certain information about the shares being offered) the requirements are well below the threshold which applies for prospectuses in a traditional equity raising.

- It is currently proposed to set the minimum shareholding at $500 as Pingala wishes to engage a large number of investors from within the community even if this has an impact on the administration costs. The ability to fund the administration costs for handling a larger number of investors still needs to be tested. The co-operative will target an annual return to members of between 6% and 8%, which can be in the form of a dividend, rebate or bonus shares.

- The equity offered will be in the ongoing Pingala Co-operative which proposes to develop a series of further projects after Young Henrys under the single co-operative banner.

Crowdfunding

Pingala has been considering plans to host its own crowdfunding website. The NSW Co-operatives National Law regime is such that it allows for public offers of equity in the co-operative with minimal disclosure requirements provided that offers are made to members and are restricted to persons within NSW. Co-operatives laws in other states or territories may not currently permit this same approach, but this is changing as states adopt the Co-operatives National Law framework; this may open up greater opportunities for this mechanism in the CE sector (see Funding Basics Guidebook).

Business Structure

Pingala is utilising a distributing co-operative as the project entity. This is a multi-project investment entity that is owned by its member-shareholders. The Pingala Co-operative is a completely independent organisation from the original Pingala Association. This arrangement requires a detailed services agreement between the two organisations. The structure is shown diagrammatically below:

The co-operative structure being used by Pingala is in many ways similar to a corporate structure but provides some advantages in relation to regulation and costs. As a co-operative Pingala needs to maintain member involvement and expand membership to allow it to achieve its overall community involvement and funding objectives.

When a new project is to be financed by the co-operative, shares will be issued as required to fund the project. These funds will be used to purchase solar equipment which will remain the property of the co-operative for the duration of the project. Income is derived from the customer (Young Henrys in the first instance) through a lease agreement which operates over a defined period and allows the customer to use the solar equipment in return for a recurring lease fee. This income is then used to provide a return to the member-shareholders as well as to pay the co-operative’s various operating expenses.

The major operating expenses for the project will be the annual financial services (book-keeping and accounting) and management services paid to the Pingala Association. The Association is responsible for the day-to-day running of the co-operative with duties such as shareholder management, reporting, etc. When the solar panels have been paid back, ownership is transferred to the customer for a nominal fee.

KEY LESSONS AND TIPS

- Project versus enterprise. The model is supporting membership of the Pingala Co-operative entity rather than individual projects. This is important to the Co-operative as the members see this as a longer term investment in line with the overall goals of the organisation rather than a short term return from specific projects. Funds from individual projects are reinvested into future projects.

- Equity crowdfunding for co-operatives may be allowed. This may provide a mechanism to very cost effectively raise equity from a large number of investors.

The model is designed so that the Pingala Co-operative can operate many projects at once and it is anticipated that the cost of operating the co-operative with multiple projects will be lower than the cost of operating multiple SPVs. The lower costs are important given there are a number of legal nuances associated with community energy and the broader energy market in Australia and this has assisted in reducing time and effort in project development. Now that Pingala has established their initial capital raising they intend to publish a number of documents in relation to their approach with respect to legal, financial and operational aspects of the co-operative and the Young Henrys project. Developers should seek legal advice when considering co-operative structures for their projects as there are a number of legal nuances associated with the operation of a co-operative and in seeking funding through members of the co-operative.

Pingala is navigating these regulatory challenges with the assistance of their legal and financial advisors who were paid in-part with funding provided by the City of Sydney Environmental Innovation Grant. Pingala managed to find advisors who were already knowledgeable on issues associated with community energy and the broader energy market in Australia and this has assisted in reducing time and effort in project development. Now that Pingala has established their initial capital raising they are planning to publish a number of documents in relation to their approach with respect to legal, financial and operational aspects of the co-operative and the Young Henrys project. Developers should seek legal advice when considering co-operative structures for their projects as there are a number of legal nuances associated with the operation of a co-operative and in seeking funding through members of the co-operative.

KEY LESSONS AND TIPS

- Find advisors with the right experience and knowledge. Make sure you reference check advisors and ensure that they have relevant experience in the CE sector.

- A multi-project entity has its own benefits when compared with an SPV. An SPV can provide very low setup and administration costs for a single project. However, using a co-operative structure as a multi-project entity may be cheaper once there are many projects in operation.

- Leasing reduces performance risk to investors. The investors are paid a fixed amount from the lease arrangement regardless of how much energy is generated.

- A co-operative structure allows for many investors. A co-operative is not subject to limitations on investors as those under the 20/12 exemption rule and Pingala is aiming towards having hundreds or possibly thousands of investors in its future portfolio of projects.
Attending markets and fairs helps build the base of Pingala supporters.

Pingala ‘Action Team’

Far left: Oscar - Young Henrys and Pingala volunteers
All photos courtesy of Pingala
## Project Element Development and Management Approaches

The table below sets out how Pingala has managed the 15 project elements set out in this Behind the Meter Guidebook together with the lessons they learnt and the challenges they faced along the way:

<table>
<thead>
<tr>
<th>Project Element</th>
<th>1 Technology Choice</th>
<th>2 Project Scale</th>
<th>3 Community Engagement</th>
<th>4 Business Structure</th>
<th>5 Project Development Resourcing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Status when Seeking Final Funding</strong></td>
<td>Firm prices available from two experienced suppliers. Technology verification undertaken and available for validation by others if necessary</td>
<td>Project scale determined and set</td>
<td>All business case and legal documentation in place to enable community investor capital raising and demonstrable investor support fully quantified</td>
<td>Final business structure in place. Project governance structure aligned with business structure.</td>
<td>Skills identified and budget cost estimate determined to construct the project</td>
</tr>
</tbody>
</table>
| Pingala’s Approach | Pingala has worked closely with a single installer on the Young Henrys project. Technology is based on a Tier 1 solar PV supplier with warranties to match at least the expected term of ownership of the project (10 years). | The project size is limited to around 29kW based on the available roof area at the site and the desire to keep <30kW for ease of network connection approvals. At this size the project revenues were not enormous but sufficient to support a low operating cost model. | While Pingala has around 40 active members across a diverse range of people it also draws from the support of a number of volunteers who are not members of Pingala. It also has a large newsletter recipient audience. A grant was provided by the City of Sydney that enable Pingala to develop a strong publicity campaign which was crucial in successfully gathering support from the community. | The Pingala Association is an incorporated association that was set up in this form as it provided a low cost operating structure with minimal legal fees to establish. The Pingala Co-operative was established as a Distributing Co-operative distributing profits to its member shareholders. Funds are raised through the sale of membership shares and the structure provides a mechanism to publicly invite investors to participate in the ownership of the Co-operative. Some of the advantages of this structure is:  
- Allowing profits to be repaid to investors  
- Not restricting the number of members (although no-one member can hold more than 20% of the shares)  
- Supporting raising capital for new projects by public invitation  
- Keeping administrative costs to a reasonable level. Pingala is maintaining the association structure to allow it to also undertake some other not-for-profit activities. | In-kind contributions and grant funding were identified early as key elements to ensure that the project proceeded through the early development phases. Additional grant funding received also paid for a share of the final funding stage. |
| **Lessons Learnt and Challenges Faced** | Need to ensure equipment has the appropriate warranties for the term of the ownership. Need to ensure the suppliers have adequate credit worthiness which is assisted with a Tier 1 solar PV supplier. | The economics for sites under 30kW are tight as there is a high fixed cost recovered against a smaller revenue outcome. | Social media and newsletters are essential forums for disseminating information on Pingala’s activities in the community. | Structure is important and needs to be aligned with the objectives of the community organisation. Factor in the cost and operating requirements for competing business structures when considering options. | Grant and in-kind contributions were important in the early stages of the project. |
### Project Element 6 Site Selection and Acquisition

**Required Status when Seeking Final Funding**
Site selected and access to site secured through purchase, lease, option or other secure site access. Site suitability assessed and confirmed.

**Pingala’s Approach**
Pingala selected Young Henrys after looking at a number of sites in the inner-Sydney area. One of the key selection criteria in this case was the immediate alignment of values with the host site provider who have sustainability and community engagement as part of their key operating principles.

**Lessons Learnt and Challenges Faced**
Important to have passionate host sites with the same goals as the CE group.

### Project Element 7 Resource Assessment

**Required Status when Seeking Final Funding**
Verified resource availability based on professional solar design. Detailed sensitivity analysis included.

**Pingala’s Approach**
One of Pingala’s volunteers works for a solar company and was able to utilise the solar company’s professional software to carry out a detailed design.

**Lessons Learnt and Challenges Faced**
Important to use an independent model for resource assessment. Using two different models is useful in checking the outcomes. The ATA has a good independent model which may be useful.

### Project Element 8 Construction

**Required Status when Seeking Final Funding**
Solar installer contractor identified and cost estimated based on comprehensive and detailed firm quote.

**Pingala’s Approach**
Pingala obtained a very competitive quote to supply and install the equipment at the Young Henrys site from their selected supplier.

**Lessons Learnt and Challenges Faced**
It may be better to have preferred suppliers rather than source equipment through an open tender process as you may not get the most economic overall through competitive tendering.

### Project Element 9 Network Connection

**Required Status when Seeking Final Funding**
Firm cost quotations for any CAPEX and OPEX assumptions associated with network connections. A network connection agreement may also be required.

**Pingala’s Approach**
Network connection is outsourced to the solar contractor. For systems less than 30kW there are usually no unexpected costs or delays to network approvals in Pingala’s installation area.

**Lessons Learnt and Challenges Faced**
Outsource the network component if the skills do not exist in the CE group.

### Project Element 10 Permitting

**Required Status when Seeking Final Funding**
Permits in place or available subject to final funding. Compliance activities post-operation scheduled and budget allowed for them.

**Pingala’s Approach**
For rooftop systems, generally no planning approval is required in NSW, assuming the building is not heritage listed. By using a leasing arrangement, Pingala is able to avoid the need to potentially apply for a retail licence exemption which would likely be required in the event that they sold electricity to Young Henrys under a PPA structure.

**Lessons Learnt and Challenges Faced**
Heritage listed buildings do need permits and these will delay projects. A lease arrangement may be easier than a PPA from an electricity retail licensing perspective.

### Project Element 11 Operational resourcing

**Required Status when Seeking Final Funding**
Detailed and verifiable operational costs to support ongoing operation of the project.

**Pingala’s Approach**
The Pingala Association will be supplying the administrative services for the co-operative on a low cost fee for service basis. The solar installer they have selected does not provide solar PV maintenance services and this will be outsourced to a third party. Pingala have investigated the maintenance costs and provided an allowance in its operating budgets as part of its financial modelling.

**Lessons Learnt and Challenges Faced**
It is important to gain more than one quote to ensure you obtain the best pricing.

### Project Element 12 Project Funding

**Required Status when Seeking Final Funding**
Equity commitment demonstrated (from community investors and/or other equity providers) and funding requirements clearly communicated in formal application process.

**Pingala’s Approach**
The project has developed the project on the basis of in-kind support, donations and grants. Grant funding covered 90% of the construction cost which means that the Pingala Co-operative will only need to fund 10% of the project. Additional grant funding received also paid for a share of the final funding stage. Additional grant funding received also paid for a share of the final funding stage.

**Lessons Learnt and Challenges Faced**
If you can get grant funding it may help reduce the risks for the investors in the first project.
### Project Element 12: Project Funding

**Required Status When Seeking Final Funding**: Grants significantly utilised prior to final funding with any remaining grant funding utilised in construction stage.

**Pingala’s Approach**: Pingala has received significant grant funding from the City of Sydney in order to develop the project to its current stage and partially meet the capital costs of the project. While some of the grant funding was used to meet 50% of the construction costs, the project would still be commercially viable even if 100% of the construction costs were required to be equity-funded.

**Lessons Learnt and Challenges Faced**: Early stage financing can be difficult and grants make it much easier. Even though there is a belief the Pingala project would have progressed, it would have taken much longer.

### Project Element 13: Power Sales

**Required Status When Seeking Final Funding**: Power sales agreement secured with host site owner and any other revenue source agreements (export electricity and LGCs) negotiated and ready for execution.

**Pingala’s Approach**: Pingala has negotiated a lease arrangement based around a 10-year period as the revenue source for the project. This has the advantage of removing the risk of power system performance from Pingala which would not be the case if a PPA had been negotiated. The reason for this is that a PPA is paid on the basis of cents per kWh of electricity produced while a lease arrangement reverts to a fixed monthly payment regardless of the actual generation of the system.

**Lessons Learnt and Challenges Faced**: It is important to establish lease break mechanisms within the solar leasing contract to cover the situation where the tenant at the site may leave the host site prior to the expiration of the solar lease.

### Project Element 14: Financial Modelling

**Required Status When Seeking Final Funding**: Detailed financial model provided (to the satisfaction of financiers and/or investors) incorporating sensitivity modelling.

**Pingala’s Approach**: Pingala utilised a financial model that they adapted from the Repower Shoalhaven financial model.

**Lessons Learnt and Challenges Faced**: Using an existing model as a starting point made the process much easier as opposed to trying to develop one from scratch.

### Project Element 15: Risk

**Required Status When Seeking Final Funding**: Detailed risk management plan prepared.

**Pingala’s Approach**: Pingala have developed a comprehensive risk management plan that covers both the project installation stages as well as the duration of the lease term. Existing risk management plans from other projects were referenced in developing this; however, the risk plan Pingala produced is specific to Pingala’s project and circumstances.

**Lessons Learnt and Challenges Faced**: It’s important to use a checklist that ensures risks are effectively mitigated.