Behind the Meter Solar PV Funding Guidebook

FRONTIER IMPACT GROUP

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Advice to users of the guide

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SECTION B

SECTION C

SECTION D

Thank you to the following entities that were interviewed and/or provided insight into the guidebook.

Project Steering Committee

Financial Stakeholders

CF Project Developers

- City of Greater Bendigo
- Clear Sky Solar
- CORENA
- Demark Community Wind
- Farming the Sun
- Geelong Sustainability Group
- Hepburn Wind
- Lismore Community Solar
- Mitchell Environmental Group (BEAM)
- Moreland Energy Foundation
- Mount Alexander Sustainability Group
- Pingala
- Repower Shoalhaven
- Solar Share
- Sydney Renewables
- The People's Solar
- Yarra Community Solar
- Yarra Energy Foundation

FOREWORD

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. The 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

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

A

Solar panels at Llsmore Workers Club, Lismore NSW
Photo courtesy of Farming the Sun

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.

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.

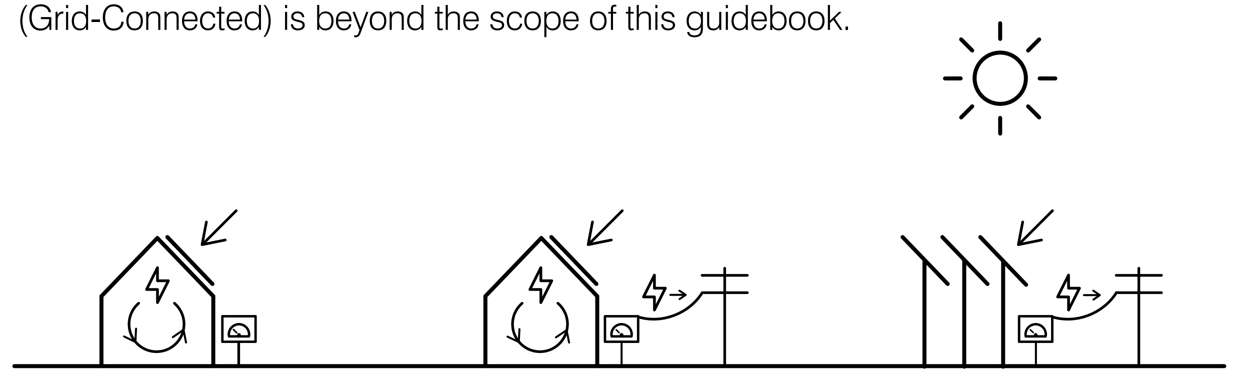
CE projects are considered to be ones that involve the community undertaking a number of the following activities:

- Initiating
- Developing
- Operating
- Owning and/or
- Benefiting 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 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.



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.

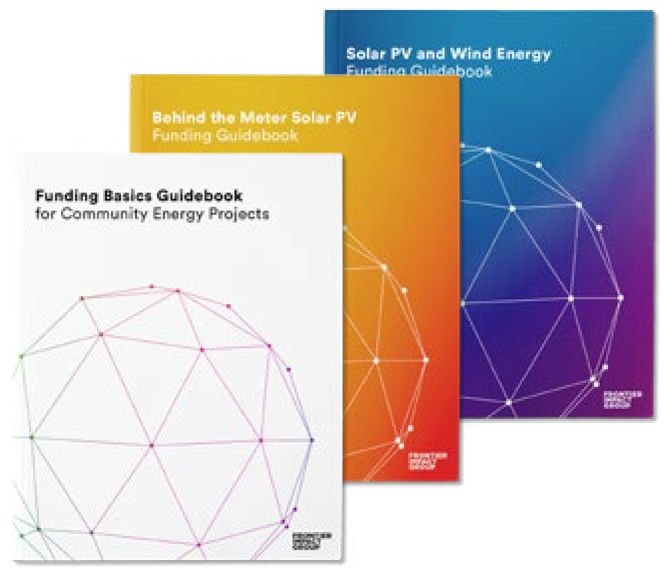
Grid-Connected

- 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.

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'.

Generally the Behind the Meter PV solar guidebook consists of three core elements.

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

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 firmed 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.

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

However, the project elements cannot be considered in isolation of each other. 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., LGCs 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:

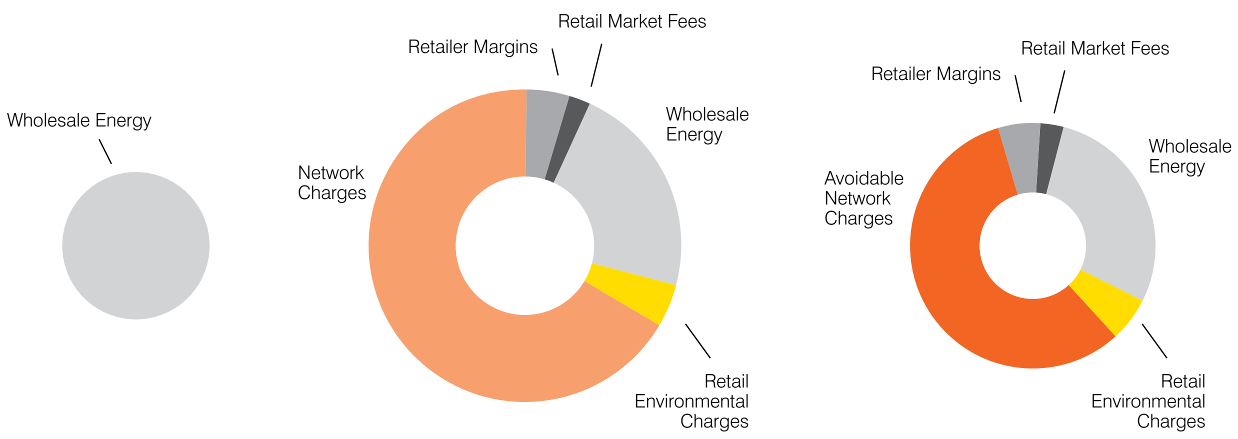
- Retailer energy charges
- Retailer environmental charges
- Retailer market fee (AEMO) charges
- Network energy charges.

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 Chargers

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.

TIP

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

FUNDING BEHIND THE METER SOLAR PV PROJECTS

The Funding Basics Guidebook for CE projects covers a broad range of funding mechanisms available to develop and install CE projects. As many of these mechanisms will be more suited to larger scale projects, this Guidebook concentrates on those funding types and sources which are most applicable to Behind the Meter solar PV projects.

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.

The following sources of funding are currently considered to be the most applicable for Behind the Meter projects:

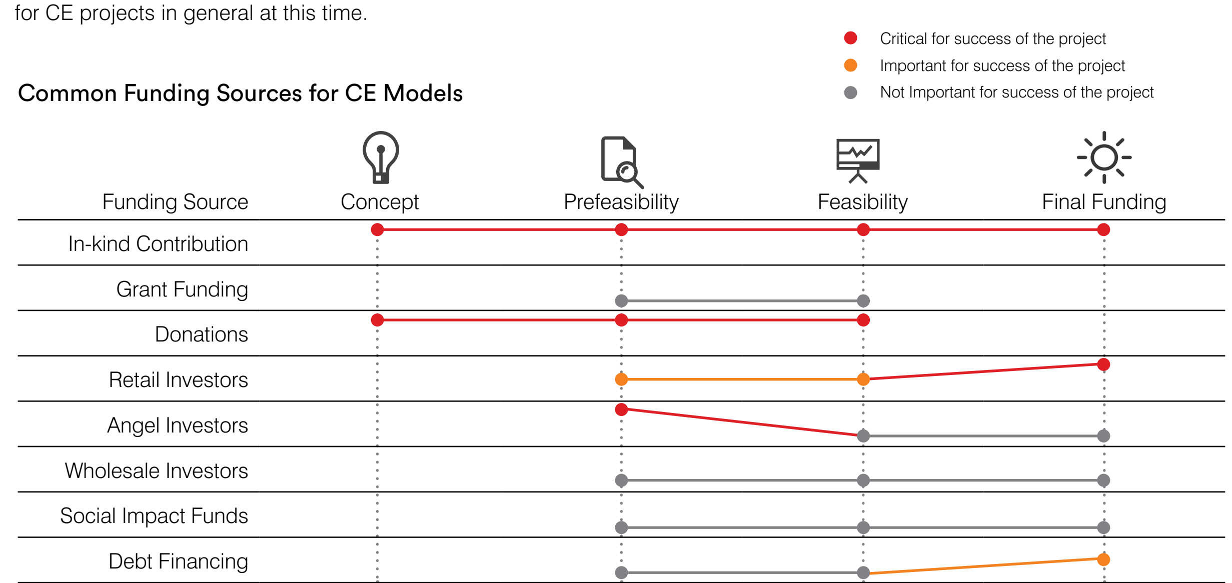
- In-kind contributions (volunteer labour primarily)
- Donations (from the community including individuals and businesses)
- Retail and wholesale community investors (sometimes in the form of angel investors from the community)

The use of debt funding is generally a secondary option for funding of CE Behind the Meter projects and would usually only be considered where a project is unable to achieve sufficient funding from community investors.

The Funding Basics Guidebook should be referenced for more specific details on each of these funding mechanisms, what each means and how to go about procuring each.

The case studies in Appendix D to this guidebook demonstrate in a practical sense how Behind the Meter projects can be funded.

Common Funding Sources for CE Models



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Solar panels being installed at John Fawkner College, Fawkner VIC
Photo courtesy of Moreland Energy Foundation

Broken Hill solar power plant, Broken Hill NSW
Photo courtesy of ARENA

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 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):

- A **Cover Worksheet** for the project name and date of preparation of the model
- A **Contents Page** to allow easy navigation between worksheets
- 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
- 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.
- An **Investment Return Summary** worksheet which provides a summary of the financial viability of the project including sensitivity analysis
- A **Profit and Loss** worksheet that sets out a financial Profit and Loss Statement for the project
- A **Balance Sheet** worksheet that sets out a financial Balance Sheet Statement for the project
- 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.

1.1.3 Interpreting the Results – Investment Return Summary Worksheet

The investment return summary worksheet incorporates a number of metrics used to evaluate projects. A description and the interpretation of each is set out below:

Financial Term	Description	Interpretation	Use
Equity Investment	The amount invested in the project as equity by shareholders and other equity providers	This is taken directly from the input assumptions worksheet	This provides the amount of capital to be provided by investors in the project
Debt Financing	The amount of debt used to finance the project	This is taken directly from the input assumptions worksheet	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
Debt (gearing) Ratio	The ratio of debt to the total cost of the project	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%	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
Discount Rate (after tax)	The discount rate used in discounted cash flow analysis	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%	The discount rate is used as a benchmark for the investor to see if their return expectations are to be met by the project If the Net Present Value (NPV) – see below for explanation on NPV– of the project after tax cash flows is positive for the discount rate selected then the project meets or exceeds the investor's benchmark
Modelling Period (years)	The period over which the project cash flows are to be evaluated	This is taken directly from the input assumptions worksheet	This is the period over which the project's cash flows will be assessed for the purpose of calculating the various investment/debt measures
NPV ($'000) (at nominated discount rate)	The sum of all net cash flows to investors discounted annually at the discount rate	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	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
Payback (years)	The number of years before the project returns the initial equity investment (disregarding any return on investment or profit requirements)	The number of years before the project dividend returns to the investor equal the initial equity investment	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

Financial Term	Description	Interpretation	Use
ROI (%)	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. Average annual ROI can provide a better measure by dividing the basic ROI by the number of years over which the ROI is achieved
IRR Post-tax on Equity (%)	This is Internal Rate of Return. 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
IRR Pre-tax on Equity (%)	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
Debt Service Cover Ratio - DSCR (minimum value)	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

1.1.4 Applying Sensitivity Analysis

On the Investment Return Summary Worksheet there are three columns used for sensitivity analysis:

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 for the Sensitivity Adjusted Values 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.

1.1.5 Sensitivity Inputs

The sensitivities used in each input should reflect the uncertainty associated with each input. When the value of each input is being assessed users should be able to get a feel for the levels of sensitivity being modelled. Where professional advice is being used for specific inputs the advisors should be able to provide relevant sensitivities for consideration.

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 prefeasibility 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

PROJECT ELEMENTS

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

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The type of renewable energy project under consideration.	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.	Detailed price estimates obtained from one or two potential suppliers having investigated manufacturers and their technology adequately and having the site inspected.	Firm prices available from one or two experienced suppliers. Technology verification undertaken and available for validation by others if necessary.

2 Project Scale

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

3 Community Engagement

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
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.	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.	Project communicated to relevant community stakeholders espousing project benefits. All key stakeholder issues addressed and factored into overall project considerations. Advanced development of capital raising from community investors.	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.

4 Business Structure

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The type of business (legal/ tax/financial) structure used to develop and operate the project.	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.	Final business structure decided and ready to be established. Project governance working and addressing all governance issues.	Final business structure in place. Project governance structure aligned with business structure and in place.

5 Project Development Resourcing

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The resources required to develop the required elements of a project from concept through to Final Funding and prior to implementation.	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..	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.	Skills identified and budget cost estimate to progress from Final Funding through to construction and commissioning determined.

6 Site Selection and Acquisition

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Assessing, selecting and gaining access to a good host site for a Behind the Meter solar PV CE project.	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.	Narrowed down to one or two or host sites with relatively firm cost estimates and detailed site assessment and access details either negotiated or under negotiation.	Host site selected and access to site secured through lease or other secure site access mechanism. Site suitability assessed and confirmed.

7 Resource Assessment

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the amount of energy (kWh/MWh) that a project can produce annually over its life.	Initial calculation based on solar calculators. More detailed calculations can be provided by solar providers based on manufacturer information and local conditions.	Verified resource availability based on professional solar design(s) with sensitivity analysis included.	Verified resource availability based on final professional solar design. Detailed sensitivity analysis included.

8 Construction

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the costs to obtain equipment, install it and commission the project to operational stage.	Cost allowances for project construction estimated broadly. A potential solar PV supplier can usually provide budget costs very readily.	Detailed cost estimates obtained from reputable solar installer contractors.	Solar Installer Contractor identified and cost estimated based on comprehensive and detailed firm quote.

9 Network Connections

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the technical requirements and financial costs of connecting the project Behind the Meter in relation to network connections.	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.	Specific cost estimates (CAPEX and OPEX) based on one or two sites.	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.

10 Permitting

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Obtaining all necessary regulatory, licensing and planning approvals to allow a project to be built and operated.	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.	Permitting commenced and detailed cost estimates available.	Permits in place or available subject to final funding. Compliance activities post-operation scheduled and budget allowed for them.

11 Operational Resourcing

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

12 Project Funding

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The funding required to develop a project from concept through to the commencement of the Operations phase.	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.	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.	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 is required.

13 Power Sales

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Commercial agreements to achieve contracted sales revenues.	Identify and roughly quantify potential revenue sources. These may come from host site PPAs, LGCs if >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.	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.	Power sales agreement secured with host site owner and any other revenue source agreements (export electricity and LGCs) negotiated and ready for execution.

14 Financial Modelling

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

15 Risk Management

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

Solar panels at Llsmore Workers Club, Lismore NSW
Photo courtesy of Farming the Sun

1

Technology Choice

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The type of renewable energy project under consideration.	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.	Detailed price estimates obtained from one or two potential suppliers having investigated manufacturers and their technology adequately and having the site inspected.	Firm prices available from one or two experienced suppliers. Technology verification undertaken and available for validation by others if necessary.

When considering your solar technology choice it is important not to just go with lowest cost option

Northern Territory Solar Energy Transformation Program, NT
Photo courtesy of ARENA

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.

At the concept stage CE developers who are not familiar with the dynamics of solar PV technologies in the current Australian market context should carry out research on the technologies and the prevailing energy market conditions surrounding each technology.

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 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:
frontierimpact.com.au/external-resources

2

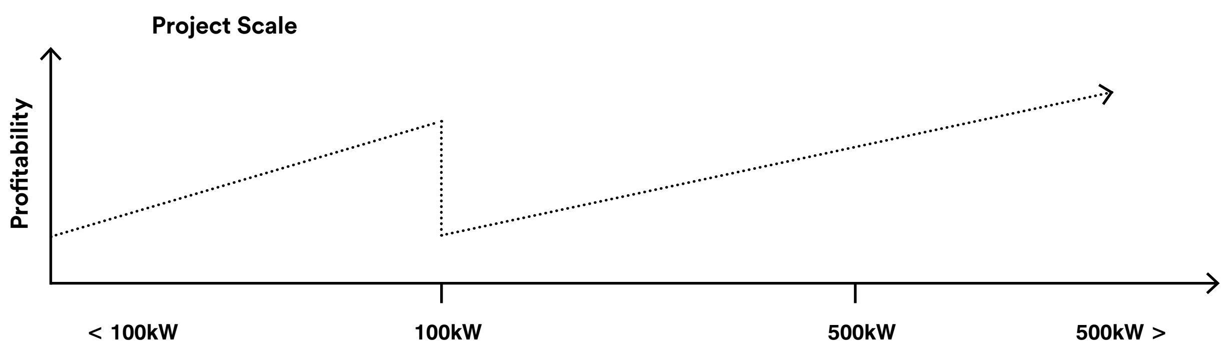
Project Scale

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

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 either feed-in tariffs or wholesale-linked prices is minimised (refer to section on Power Sales for more information).



< 100kW

- Lower upfront capital due to STCs
- Lesser network issues
- Higher opportunity to avoid export and capture avoided cost benefits

100kW - 500kW

- Higher captial costs
- Higher funding costs
- More complex and expensive network connection costs

500kW or greater

- Higher revenue base to support
  - Higher captial costs
  - Higher funding costs
  - More complex and expensive network connection costs

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 retail costs meaning that they can offer a higher revenue stream

Solar projects that are 100 kW 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 100 kW to say 500 kW may suffer from higher upfront capital costs, potentially higher operating costs and less 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 provided for the purpose 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 $1.50 to $2.50 per watt, which is equivalent to:

- $1500 to $2500 per kW or
- $1.5M to $2.5M per MW

For a 100kW project the capital cost of the solar PV elements might be in the range of $150,000 to $250,000.

Note: for projects of less than 100kW the capital cost could be reduced by the supplier or a third party buying back the STCs accredited to the installation and as such a 99kW installation might be preferable to a 100kW one (refer to section on STCs under Power Sales). The impact of the STCs on the capital cost can be significant and depending on the technology deployed and the location might reduce the capital cost by $0.40 to $0.90 per watt.

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).

Broken Hill Solar Plant, Broken Hill NSW
Photo courtesy of Jeremy Buckingham

The solar PV market is a very competitive one and there may be considerable competition from suppliers of solar PV equipment so it should be relatively easy to obtain budget quotes from suppliers within a short timeframe. The lowest cost solution may not be the optimum choice and consideration should be given to the factors referenced above and the factors discussed in the Resource Assessment section of this guidebook.

At the concept and prefeasibility stages of a Behind the Meter solar PV project, budget costs can be readily obtained by asking for indicative quotes on a per kW basis. Once the scale has been determined a tender or competitive quotation process for the supply and installation of solar equipment can be readily undertaken for use in feasibility analysis with subsequent refinement typically carried out prior to the final funding phase of the project.

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.

From the perspective of Behind the Meter solar PV the scale may also be limited by the host site's electricity profile – the scale should be such that the project does not export too much power to the grid (refer to Section 3 on Why Behind the Meter). Analysis of the host site's electricity profile will be required to determine the optimum scale from this single perspective. As described in the section on Power Sales the project will export electricity beyond the host site meter if the power output is greater than the host site's electricity usage and any such export power will likely be subject to a lower priced revenue regime. Ideally the scale of the project should be such that the revenue stream is optimised against the capital cost of the project, i.e., the financial returns for the project are maximised. The financial template allows for separate revenue streams for the host site energy usage and any exported electricity so that this optimisation can be undertaken through sensitivity analysis.

2.3 Resource Links

The link below provides examples of approaches undertaken to source competitive pricing.
frontierimpact.com.au/external-resources

3

Community Engagement

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
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.	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.	Project communicated to relevant community stakeholders espousing project benefits. All key stakeholder issues addressed and factored into overall project considerations. Advanced development of capital raising from community investors.	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.

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.

Photo courtesy of Farming the Sun

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.

3.2 Resource Links

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

4

Business Structure

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The type of business (legal/tax/financial) structure used to develop and operate the project.	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.	Final business structure decided and ready to be established. Project governance working and addressing all governance issues.	Final business structure in place. Project governance structure aligned with business structure and in place.

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.

Solar panels at Geelong Primary School, Geelong VIC
Photo courtesy of Geelong Sustainability Group

Business Structure	Fundraising Disclosure	Challenges	Benefits
Co-operative 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 e.g. Pingala Association	N/A	• No equity investment permitted	• Low cost to establish and operate
Company limited by guarantee e.g. Moreland Energy Foundation, Yarra Energy Foundation	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

Business Structure	Fundraising Disclosure	Challenges	Benefits
Private company (Pty Ltd) e.g. Repower Shoalhaven	Private companies (proprietary limited which have no more than 50 non-employee shareholders) can raise funds from existing shareholders and employees of the company or a subsidiary and from the general public if the fundraising does not require a disclosure document (relies on an exemption)	• A private company can only raise equity from existing shareholders, its employees or certain classes of investors. These classes include (a) those that fall within the 20/12 exemption and (b) wholesale investors • If the 20/12 exemption is applied then: • Max. of 20 investors and $2 million each 12 months • Personal investor offers only • If an exemption does not apply then the private company would have to convert to a public company before being able to raise funds by issuing a disclosure document • Crowdfunding for equity not allowed currently	• Relatively easy to set up
Public company (Ltd, unlisted) e.g. SolarShare, Sydney Renewable Power Company	<$10 million: Offer information statement >$10 million: Prospectus	• Significant offer document compliance costs • Crowdfunding for equity currently not allowed • Additional reporting requirements	• Unlimited number of shareholders
Unit Trust or Discretionary Trust e.g. ClearSky Solar Investments	Information Memorandum OR Managed Investment scheme	• 20/12 exemption applies or • Financial Services Licence required • Crowdfunding for equity not allowed currently	• Tax treatment of profits and capital returns

Adapted from The Guide to Community-Owned Renewable Energy for Victorians (table developed by Ison and McIntosh), 2015.

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.

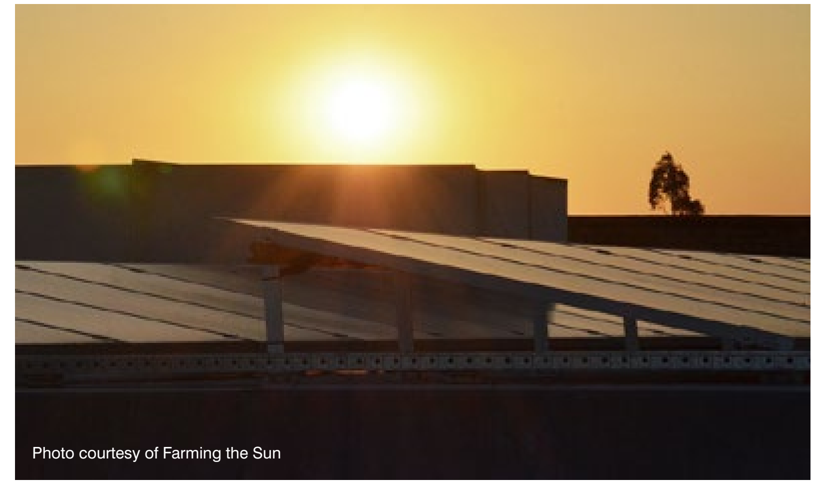


Photo courtesy of Farming the Sun

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(s) setup and operating costs during the project development phase of the project and from a financial modelling perspective. These costs should be included under the Other Project Development Costs section of the financial template and may be capitalised* as part of the overall project although financial advice should be sought on this aspect, as there are tax implications associated with this.
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 depreciation life of the project.

4.4 Resource Links

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

5

Project Development Resourcing

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The resources required to develop the required elements of a project from concept through to Final Funding and prior to implementation.	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.	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.	Skills identified and budget cost estimate to progress from Final Funding through to construction and commissioning determined.

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 nearer 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.

Photo courtesy of Embark

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 accounting and tax elements in particular and could range from zero where voluntary professional services are accessible to much higher figures (>$50,000) for large-scale solar projects
- Legal Costs – this item covers legal costs associated with items such as establishing business structures and can range as per financial advice costs. Where possible use template legal agreements, but please note that given that each CE project is slightly different the template will have to be adapted or reviewed by a lawyer (though this may be less expensive than developing an agreement from scratch)
- 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 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 analysis. 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 phase
  - Insurance Costs – Insurance costs associated with the business structure during the project development phase. 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

6

Site Selection and Acquisition

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Assessing, selecting and gaining access to a good host site for a Behind the Meter solar PV CE project.	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.	Narrowed down to one or two or host sites with relatively firm cost estimates and detailed site assessment and access details either negotiated or under negotiation.	Host site selected and access to site secured through lease or other secure site access mechanism. Site suitability assessed and confirmed.

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 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.
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 one year 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 timeframe in years over which the Host Site economic evaluation will be undertaken (usually the same as for the project)

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.

6.3 Resource Links

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

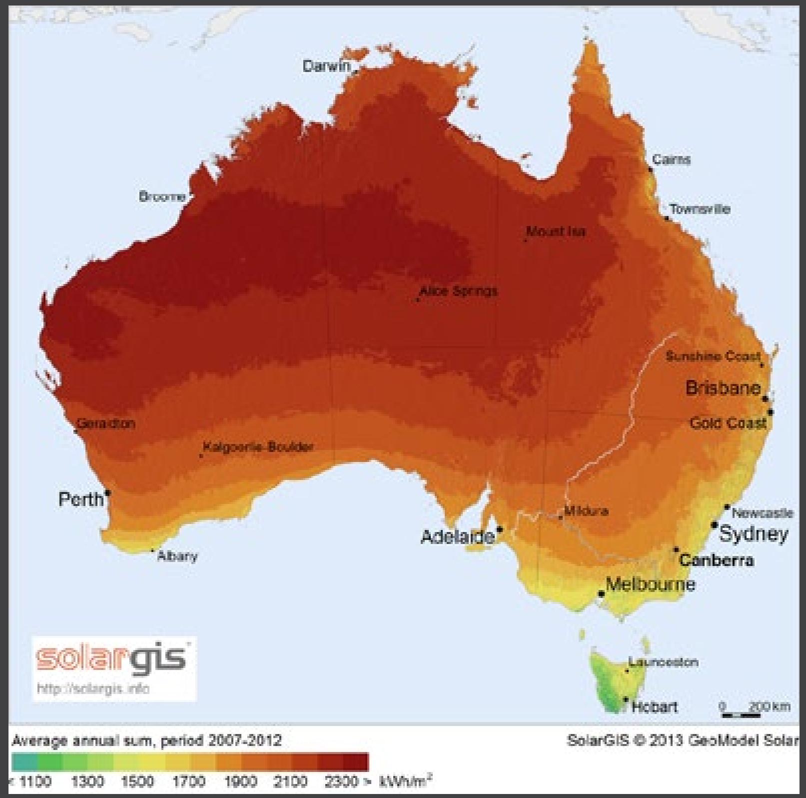
7

Resource Assessment

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the amount of energy (kWh/MWh) that a project can produce annually over its life.	Initial calculation based on solar calculators. More detailed calculations can be provided by solar providers based on manufacturer information and local conditions.	Verified resource availability based on final professional solar design(s) with sensitivity analysis.	Verified resource availability based on final professional solar design. Detailed sensitivity analysis.

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.



Global Horizontal Irradiation, Australia

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.

7.3 Financial Modelling of Solar Resources

The toolkit includes the following modelling factors that need to be input to allow an assessment of the power that will be produced from a solar installation (see table).

At the feasibility and final funding stages of the project professional solar designers can provide detailed data on the above aspects as part of a tender or quotation process to firm up Construction costs.

7.4 Resource Links

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

TIP

Consider shading losses and potential for development near the site that may cause shading in the future.

Doomadgee Solar Project, Doomadge QLD
Photo courtesy of ARENA

Modeling Factor	Description
Annual Solar Generation	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.
Average solar output per day	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.
Solar panel output derating	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.
Available peak power per unit area	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).
Available Site Area for installation of solar PV cells	This is the available roof (or land area) suited for the installation of solar panels.
Inverter Efficiency	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.
Other solar losses	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%.

8

Construction

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the costs to obtain equipment, install it and commission the project to operational stage.	Cost allowances for project construction estimated broadly. A potential solar PV supplier can usually provide budget costs very readily.	Detailed cost estimates obtained from reputable solar installer contractors.	Solar Installer Contractor identified and cost estimated based on comprehensive and detailed firm quote.

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 "de-risks" 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 roof 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

9

Network Connections

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the technical requirements and financial costs of connecting the project Behind the Meter in relation to network connections.	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.	Specific cost estimates (CAPEX and OPEX) based on one or two sites.	Firm cost quotations available for CAPEX and OPEX assumptions clearly outlined and able to be validated. An agreed network connection agreement may be required.

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 site 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 any embedded generation proponent with 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 5 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
- Network charges – These refer to 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 installations and those with significant export in particular, in order to estimate costs enquiries need to be made of 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

10

Permitting

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Determining the technical requirements and financial costs of connecting the project Behind the Meter in relation to network connections.	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.	Permitting commenced and detailed cost estimates available.	Permits in place or available subject to final funding. Compliance activities post operation scheduled and budget allowed for them.

Planning approvals shoud 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.

In some states exemptions are automatically granted for small scale installations but you should check this on a state by state basis and the rules surrounding such exemptions.

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

TIP

Approvals for Heritage buildings can be difficult so early engagement with Council is important, expect longer approval timelines.

11

Operational Resourcing

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

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.

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.

- 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.

12

Project Funding

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
The funding required to develop a project from concept through to the commencement of the Operations phase.	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.	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.	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.

TIP

Community equity Crowd Funding models are growing as a financial tool. See our case study starting on page 128.

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

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 adviser 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

13

Power Sales

Project Element	Concept/Prefeasibility	Feasibility	Final Funding
Commercial agreements to achieve contracted sales revenues.	Identify and roughly quantify potential revenue sources. These may come from host site PPAs, LGCs if >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.	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.	Power sales agreement secured with host site owner and any other revenue source agreements (export electricity and LGCs) negotiated and ready for execution.

Revenue from Behind the Meter Solar 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.

CE projects are no different to any other energy generation projects in that it costs money to purchase, install, operate and maintain generation equipment and the projects need revenues to offset those costs. The prime source of revenue is the purchase of generation output. In addition to revenue from electricity generation output, eligible renewable energy projects will be able to produce certificates in the form of either Small-scale Technology Certificates (STCs) or Large Generation Certificates (LGCs). Both of these certificate types are tradable in the energy market and are a potential revenue source for projects although STCs are usually not a direct revenue source but rather reflected as a capital cost reduction.

For grid-exporting 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.

13.1 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 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.

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!

Avoidable charges might include:

- Retailer energy charges (at a flat rate and/or peak/off peak/shoulder rates)
- Retailer environmental charges
- Retailer market fee (AEMO) charges
- Network energy charges (at a flat rate and/or peak/off peak/shoulder rates).

The general difference between wholesale charges, retail charges and avoidable retail charges is illustrated in the chart on page 91:

13.3 STC Revenue

Under the Federal Government's 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) (note 1MWh = 1000kWh) 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).

SunSHIFT demonstration commercial deployment
Photo courtesy of ARENA

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 timings)
- 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)

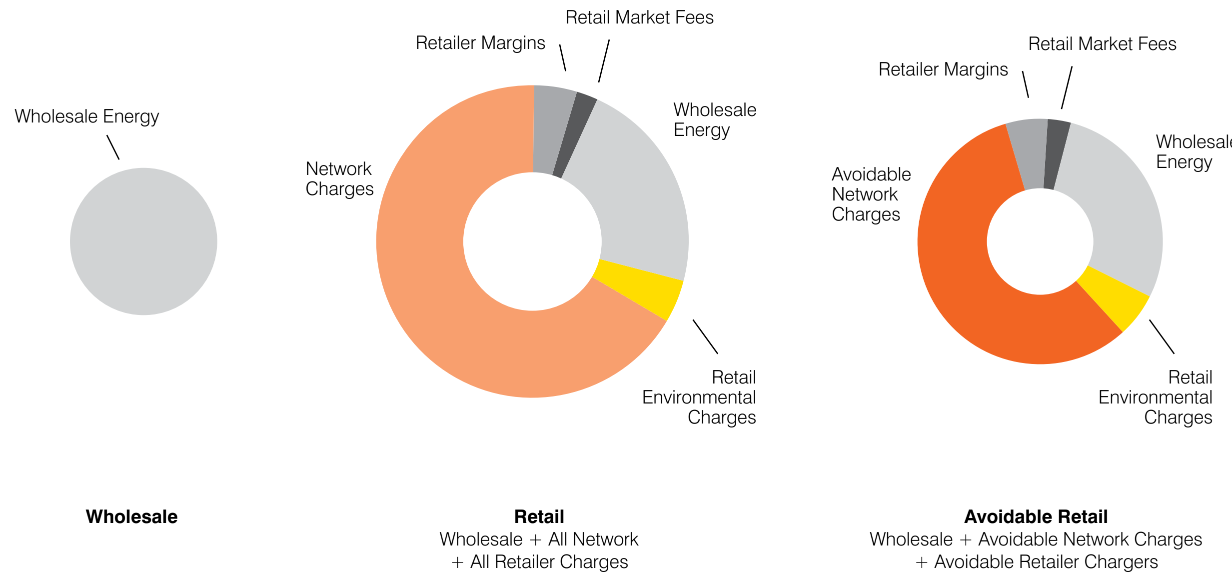
An example relating to Behind the Meter PPAs and combined PPA and associated development and leasing agreement can be found online.

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.

Note: Be aware that lease agreements may have significant GST implications that may impact cashflows early in the project. You should get tax advice on this aspect.

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. Prevailing market prices for STCs can be readily sourced online through the use of a simple search on 'STC price'
- 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 loan/lease – 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

TIP

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

14

Financial Modelling

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

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 enables you to focus on key areas that you will need to cover prior to deciding whether or not the project is likely to be viable and whether or not to invest more resources into the project. You can then use the information gathered at this stage to start to consider if you might be eligible for grants or other financial assistance measures that may make the project viable.

Section B in this guidebook explains the elements of this template, how to populate the template and how to interpret the results of this template.

14.2 Feasibility/Final Funding Modelling

As a CE project progresses further along the development path the costs and revenue assumptions will become more accurate. The financial model template can assist you to gather the information required to support a funding decision.

Certain funding providers (such as banks) may require detailed information to ensure that the project is going to be viable and able to meet the debt servicing obligations that would arise with successful debt funding. The costs and revenue streams will need to have been firmed up significantly at this point. In addition, significant sensitivity analysis needs to be done to ensure that the project can be viable under adverse forecast scenarios. The financial model template allows for an early assessment of potential issues 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 seen 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 riskiness 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.
- Accounting Depreciation Method: The financial template supports linear (straight line or prime cost) depreciation and diminishing value depreciation. For accounting linear depreciation is commonly used where the capital base is depreciated by the same amount each year. So if the asset cost $100,000 and the accounting deprecation period is 10 years the asset base would be depreciated by $100,000 / 10 = $10,000 per year
- Tax Depreciation Period: This is the period over which capital can be depreciated for taxation purposes. The period would typically be the life of the solar project but tax accounting advice should be sought.
- Tax Depreciation Type: The financial template supports linear (straight line or prime cost) depreciation and diminishing value (reducing value) depreciation. For tax depreciation the diminishing value approach is often used. This approach allows for more rapid depreciation in the early years of the project and less in later years.
- Diminishing Value Multiplier: This value is the numerator in the diminishing value formula and is usually 200%. For more information refer to resource links.
- Taxation Concessions for Small Business Apply: Currently tax concessions related to depreciation apply for small businesses. If these apply to the project then enter YES otherwise NO. If YES is entered then the depreciation rates under the next 2 items are applied rather than the taxation depreciation values specified above.
- Tax Depreciation Rate 1st Year: This is the taxation depreciation rate in the first year under small business taxation concessions and at the time of writing was 30%.
- Tax Depreciation Rate after 1st Year: This is the taxation depreciation rate after the first year under small business taxation concessions and at the time of writing was 15%.
- Is Asset to be disposed of at the end of the modelling period? If the solar installation is to be decommissioned or handed over to the host site at the end of the project then enter YES otherwise NO.
- Asset disposal value if transferred to 3rd party at end of modelling period: The value at which the solar installation will be handed over to the host site or the value at the end of the life of the project.
- Working Capital balance required: The level of working capital funds to be maintained by the project. Can be $0 or greater.
- Interest on working capital: The interest rate applicable to working capital maintained in a financial institution
- Are dividends to be paid to investors to be franked? If YES the dividends to be paid to investors are taxed under the business structure tax rates prior to distribution. If NO dividends are paid before tax?
- Are investors to be paid a fixed or variable dividend amount? If FIXED the model will fix the dividend to be paid each year to investors. If variable the model will utilise the percentage of profits to be distributed to investors (see following page)

- 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


Moree Solar Farm, Moree NSW
Photo courtesy of ARENA

15

Risk Management

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

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:

Bendigo Library solar install, Bendigo VIC
Photo courtesy of the City of Greater Bendigo

The table below shows some of the risks that need to be addressed and mitigated.

Risk Element	Description of Risk	Potential Mitigation Approaches
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 as a result of business failure or does not pay for the energy produced	• 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:

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


D

The following represents a list of some of the successful CE projects currently operating in Australia:

CE Organisation	Operating Projects	State	Technology	Capacity installed (kW)
Investment Based Projects				
Denmark Community Windfarm Ltd	Denmark Community Windfarm Ltd	WA	Wind	1600
Hepburn Wind	Hepburn Wind	Vic	Wind	4100
Repower Shoalhaven	Repower One	NSW	Solar PV	99
	Repower Two	NSW	Solar PV	30
Clearsky Solar Investments	Terrey Hills	NSW	Solar PV	15
	Bathurst	NSW	Solar PV	60
	Wollongong	NSW	Solar PV	50
	Boggabri	NSW	Solar PV	15
	Mudgee	NSW	Solar PV	50
	Walgett	NSW	Solar PV	25
	Mildura	NSW	Solar PV	75
	Broken Hill	NSW	Solar PV	100

Donation Based Projects				
Bendigo Sustainability Group	Bendigo Library	Vic	Solar PV	30
Clean Energy for Eternity Bega	Tathra Solar Farm	NSW	Solar PV	30
Citizens Own Renewable Energy Network Australia (CORENA)	Bega	NSW	Solar PV	8
	Gawler	SA	Solar PV	10
	Beechworth	Vic	Solar PV	15
	Ravenshoe	Qld	Solar PV	6
	Nannup	WA	Solar PV	10
	Pegasus Riding for the Disabled	ACT	Solar PV	6
	Moss Vale	NSW	Solar PV	2.12
	Adelaide	SA	Solar PV	6.7
	Parkholme Community Child Care	SA	Solar PV	2
	Camden	SA	Solar PV	7.8
The People's Solar	Taradale Primary School	Vic	Solar PV	4
	St Kilda Community Housing	Vic	Solar PV	15
	Chewton Primary School	Vic	Solar PV	4
Narara Ecovillage Co-operative Ltd	Narara Ecovillage Co-operative Ltd	NSW	Solar PV	29.75
Repower Shoalhaven	Kangaroo Valley	NSW	Solar PV	9
Blue Mountains Renewable Energy Cooperative	Blue Mountains	NSW	Solar PV	4.5
Nimbin Community Solar Farm	Nimbin Community Solar Farm	NSW	Solar PV	45
Projects that Aggregate Households				
Moreland Energy Foundation Ltd (MEFL)	Darebin Solar Savers	Vic	Solar PV	600
Bendigo Sustainability Group	Bendigo	Vic	Solar PV	2500

Information courtesy of Community Power Agency

SECTION D
APPENDIX II – FINANCIAL CONTACTS D II

FINANCIAL CONTACTS

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DEFINITIONS

Angel investors: Angel investors (also referred to as seed 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 only 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 in which a CE project idea has been conceived and interested project proponents have engaged to consider how to develop the project to prefeasibility and feasibility phases

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

Debt Financing: Funding via a loan

Depreciation Method: The financial template currently supports a number of depreciation methods including Linear (straight line or prime cost depreciation) and Diminishing Value - refer to https://www.ato.gov.au/Business/Income-and-deductions-for-business/Depreciating-assets/General-depreciation-rules/Prime-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 advice

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 firming up all of project element options including establishing more certainty around project costs and revenues

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 put forward to potential funders 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 from 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 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'.

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 30kW threshold applies) installations, and those with significant export in particular, in order to estimate costs enquiries 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 enquiries 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 enquiries 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 projects, 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: Investment 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 transmission network.

Wholesale Electricity Prices: The price a project receives when exporting electricity to the grid through either the market based spot price for electricity 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 and incorporated in this guidebook are both community investment-based models that have been developed and can be replicated by other CE groups.

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

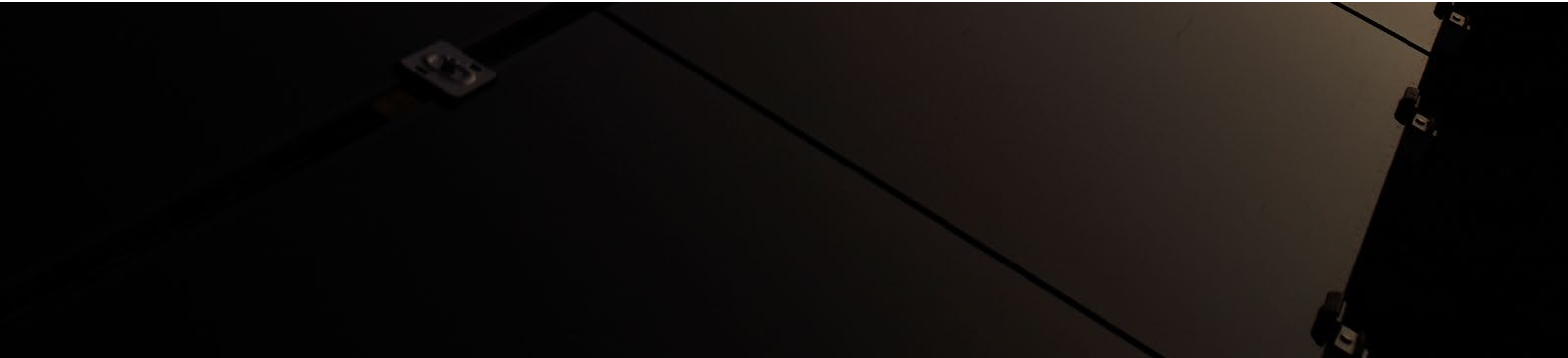
For further information see:
frontierimpact.com.au/external-resources

Broken Hill solar power plant, Broken Hill NSW
Photo courtesy of ARENA

CS1

Case Study 1 – Repower Shoalhaven: Repower One Project

Repower Solar One
Local Funding $119,800
Number of investors 20
Expeced minimim return 6.5%
Located in Shoalhaven Heads, NSW
99kW solar system



CASE STUDY 1 – REPOWER SHOALHAVEN: REPOWER ONE PROJECT

Repower Solar One
Local Funding $119,800
Number of investors 20
Expeced minimim return 6.5%
Located in Shoalhaven Heads, NSW
99kW solar system

Project Overview

The Repower One project involves construction and operation of a Behind the Meter 99kW 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 established Repower One as a company to build and operate the project. Funds required to construct the solar 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.

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.**

* *SPV represents a special purpose vehicle which is a separate private company created for each project.*

MAY 2013	FEBRUARY 2014	FEBRUARY 2014	JUNE 2014	AUGUST 2014	LATE AUGUST 2014
Repower Shoalhaven established	Kangaroo Valley small solar project completed	Repower One concept originated, indirect donation received for legal work	Grant received from NSW Government	Community fund raising conducted, project commenced construction	Project commenced operation

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, if 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 $600, thus opening up participation to community members with less disposable income.

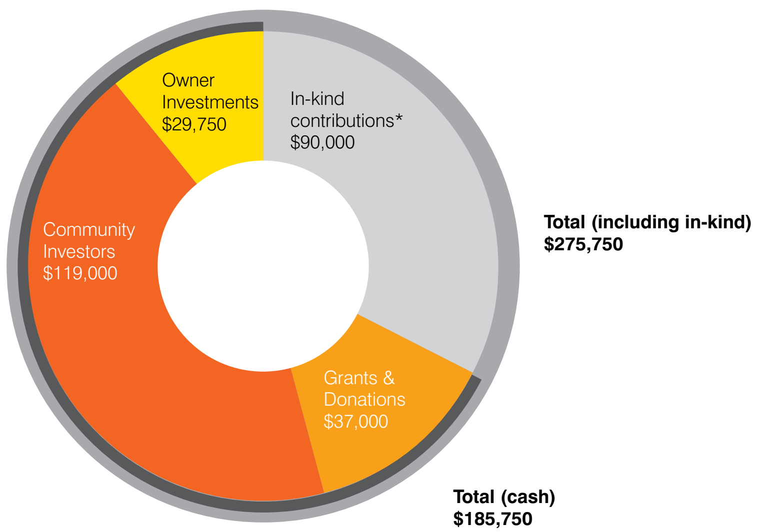
Repower One, Australia's first community investor-owned solar power system at Shoalhaven Heads Bowling and Recreation Club. 99kW, operating since August 2014. Photos courtesy of Embark.

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:

CONCEPT	PREFEASIBILITY	FEASIBILITY	FINAL FUNDING
In-kind	In-kind	In-kind	In-kind
Donations	Donations	Donations	Equity from community investors
		Grants	

Funding Amounts from Each Source



* In-kind contributions valued at $50 per hour

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 advisers 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 as 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.

KEY LESSONS AND TIPS

- **Focus on the next 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 debates 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.**

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:

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

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

Moree Solar Farm, Moree NSW
Photo courtesy of ARENA

Solar panels at Beechworth Montessori School, VIC
Photo courtesy of CORENA

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 to ensure that costs are managed to secure the required level of returns for the community investors.

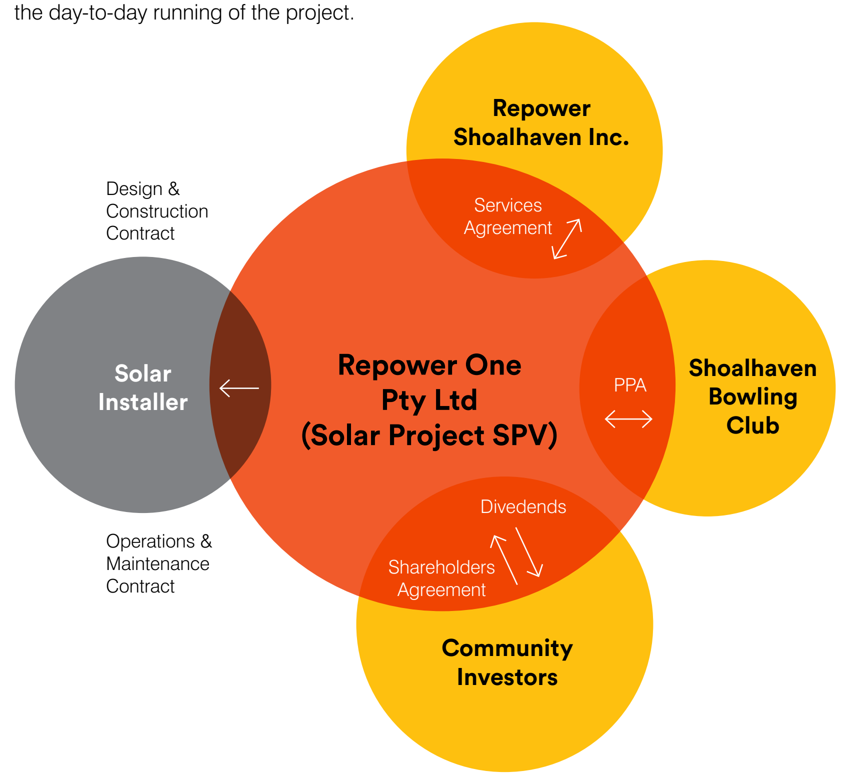
The Repower One project is a special purpose vehicle (SPV), an incorporated private company and is the legal entity that is collectively owned by the community shareholders and enters into various legal agreements required to support the operation of the project. The relationships and the legal agreements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



KEY LESSONS AND TIPS

- **Consider the use of a special purpose vehicle (SPV). There are several benefits in using an SPV as the project entity, including:**
  - **Setup and ongoing administration costs can be minimised on a per-project basis**
  - **The community organisation can be isolated from the project risks and the community investors can be isolated from the complexity of the broader, longer-term aims of the community organisation**
  - **Investor limits can be adhered to for each project (e.g., small-scale ruling with 20 investors maximum).**
- **Securing the customer is a key barrier. This can only be done with a solid financial model and supported by a strong project and customer management.**
- **Build trusting partnerships with solar companies. This will enable these third parties to generate leads for CE projects. It is important for solar PV companies to understand that the CE group is complementary and can assist in securing a project for them.**

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.

Project Element	1 Technology Choice
Required Status when Seeking Final Funding	Firm prices sourced from two experienced suppliers. Technology verification undertaken and available for validation by others if necessary
Repower Shoalhaven's Approach	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
Required Status When Seeking Final Funding	Project scale determined and set
Repower Shoalhaven's Approach	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.

Project Element	4 Business Structure...continued
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)

Project Element	5 Project Development Resourcing
Required Status when Seeking Final Funding	Skills identified and budget cost estimate determined to construct the project
Repower Shoalhaven's Approach	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
Lessons Learnt and Challenges Faced	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

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
Repower Shoalhaven's Approach	Repower Shoalhaven has partnered with a number of solar installers as providers of a 'bolt-on' community-financing offer, which enhances their service offering. This has provided plenty of leads for Repower Shoalhaven to capitalise on, however, getting 'pen to paper' still requires persistence and dedicated time from skilled volunteers or paid staff Additionally, leads have been generated through positive media coverage, presenting at solar events or via direct contact with local businesses and organisations
Lessons Learnt and Challenges Faced	Selling commercial solar in general is challenging due to the lack of priority that business owners place on solar assets. This is exacerbated by the risk-averse nature and slow decision-making pace of board-led community organisations. Working capital constraints make it difficult to employ skilled staff to make a compelling and persuasive pitch to local businesses and organisations (including follow up). Community solar can seem complex to certain clients, and therefore it takes additional time to reach a positive decision. Presenting to a large group of board members was a challenge as you are faced with alternate opinions and characteristics. The lesson learnt was to always be prepared for a wide variety of questions and to try to anticipate and address them in advance of the project.

Project Element	7 Resource Assessment
Required Status when Seeking Final Funding	Verified resource availability based on professional solar design. Detailed sensitivity analysis included
Repower Shoalhaven's Approach	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
Lessons Learnt and Challenges Faced	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

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 • $190 ASIC compliance • $100 banking • $7/kW 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.

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 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 has not been used to date. The 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.

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	

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 offer 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 accountant 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 risk through 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

CS2

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 HENRYS PROJECT

Young Henrys
Total Cost $38000
Local Investor Funding $18000
Expected Minimum Return 5%
Located in Newtown NSW
29kW Solar System

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:

Key Differences	Reasons
Establishes a distributing co-operative legal structure instead of creating separate private companies for each project.	• 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). • Allows multiple projects to be developed under one entity and creates the potential for lower administrative costs that are able to be recovered in time over a larger number of projects.
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	• 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
Explores crowdfunding as a possible mechanism in sourcing equity funds (subject to final legal advice)	• 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)

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).

Young Henrys brewery, Newtown NSW
Photo courtesy of Pingala

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 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:

MARCH 2013	JUNE 2013	SEPTEMBER 2013	SEPTEMBER 2014	APRIL 2015	JULY 2016	AUGUST 2016	AUGUST 2016	SEPTEMBER 2016
Pingala formed	Initial 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	Construction commenced	Operations estimated to commence

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 modified to ensure the application was successful.

Young Henrys brewery, Newtown NSW
Photo courtesy of Pingala

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.

Funding Model Evolution

Pingala is 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 20/12 exemption rule (see Funding Basics Guidebook).

KEY LESSONS AND TIPS

- Form follows function. Choose a legal form that best serves 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.

Types and Sources of Funding

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

The amount of funding generated by Pingala for the Young Henrys project is shown in the two charts. The first chart shows Pingala's total funding while the second one shows the funding related specifically for Young Henrys:

The actual construction and setup cost of Young Henrys was just under $40,000 and is co-funded from co-operative members' equity and grant funds. Other costs have been funded primarily in-kind with support through the grants and donations received by Pingala. The grants are primarily associated with project development and include legal advice/templates and financial advice/templates which can be used in future projects, making development of later projects much cheaper.

CONCEPT	PREFEASIBILITY	FEASIBILITY	FINAL FUNDING
In-kind Donations Grants	In-kind Donations	In-kind Donations Grants	In-kind Equity - Co-operative Members investors

Funding Contribution Breakdown

In-kind

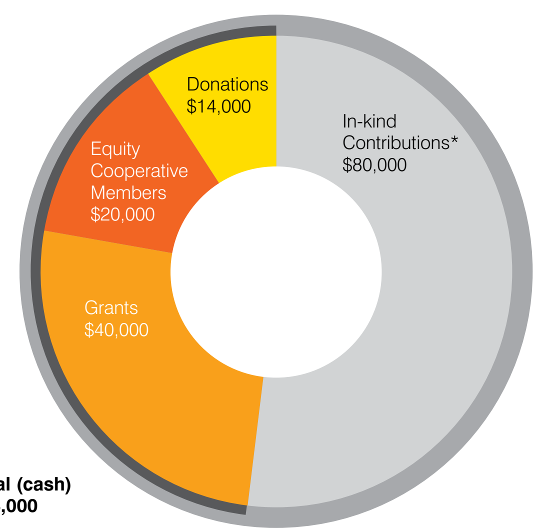
Pingala has relied on considerable local volunteer contributions as well as the goodwill of other CE groups to develop its business model to an advanced state. Pingala's founders were able to establish a core group of committed volunteers through an initial meeting and workshop. The group is known as 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.

KEY LESSONS AND TIPS

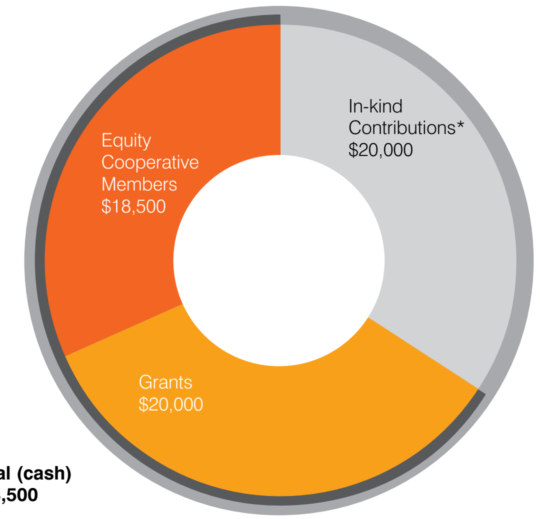
- Establish shared commitment. Developing a project using volunteer efforts may take considerable time. A team which has built a shared culture of trust and commitment will be able to operate for the long duration required without falling apart or losing interest.
- Accept contributions from all volunteers. 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 is 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 orientated and willing to share information and support other CE project developments.

Pingala Funding



* In-kind contributions valued at $50 per hour

Young Henrys Project



* In-kind contributions valued at $50 per hour

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).

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 returns 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.

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.

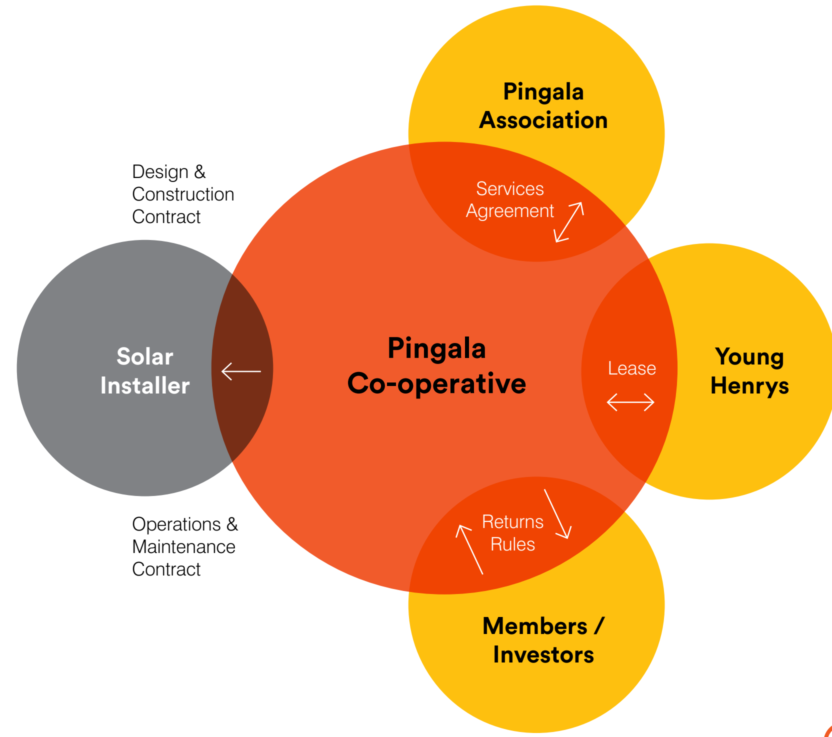
The Pingala Co-operative is a completely independent organisation from the original Pingala Association. This arrangement requires a detailed services agreement between the two organisations. The structure is shown diagrammatically following:

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.



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 low margins in the development of solar PV projects.

Share capital in a co-operative has certain attributes that Pingala has accommodated in the final implementation of their model:

- Firstly, if a shareholder ceases to be a member, then the co-operative will repay the member an amount for the share capital provided in accordance with section 128 of Co-operatives National Law
- Secondly, Co-operatives National Law restricts returns to shareholders to a 'Limited Dividend' with the rate of permitted return being defined in the regulations.

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 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.

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 such 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.

Young Henrys Tasting Room, Newtown NSW

Attending markets and fairs helps build the base of Pingala supporters.

SECTION D
CASE STUDY 2 – PINGALA: YOUNG HENRYS PROJECT

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:

Project Element	1 Technology Choice
Required Status when Seeking Final Funding	Firm prices available from two experienced suppliers. Technology verification undertaken and available for validation by others if necessary
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)
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

Project Element	2 Project Scale
Required Status when Seeking Final Funding	Project scale determined and set
Pingala's Approach	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.
Lessons Learnt and Challenges Faced	The economics for sites under 30kW are tight as there is a high fixed cost recovered against a smaller revenue outcome

Project Element	3 Community Engagement
Required Status when Seeking Final Funding	All business case and legal documentation in place to enable community investor capital raising and demonstrable investor support fully quantified
Pingala's Approach	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
Lessons Learnt and Challenges Faced	Social media and newsletters are essential forums for disseminating information on Pingala's activities in the community

Project Element	4 Business Structure
Required Status when Seeking Final Funding	Final business structure in place. Project governance structure aligned with business structure.
Pingala's Approach	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
Lessons Learnt and Challenges Faced	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.

Project Element	5 Project Development Resourcing
Required Status when Seeking Final Funding	Skills identified and budget cost estimate determined to construct the project
Repower Shoalhaven's Approach	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	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 outcome 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 50% of the construction cost which means that the Pingala Co-operative will only need to fund 50% 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

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