C4CE COALITION FOR COMMUNITY ENERGY

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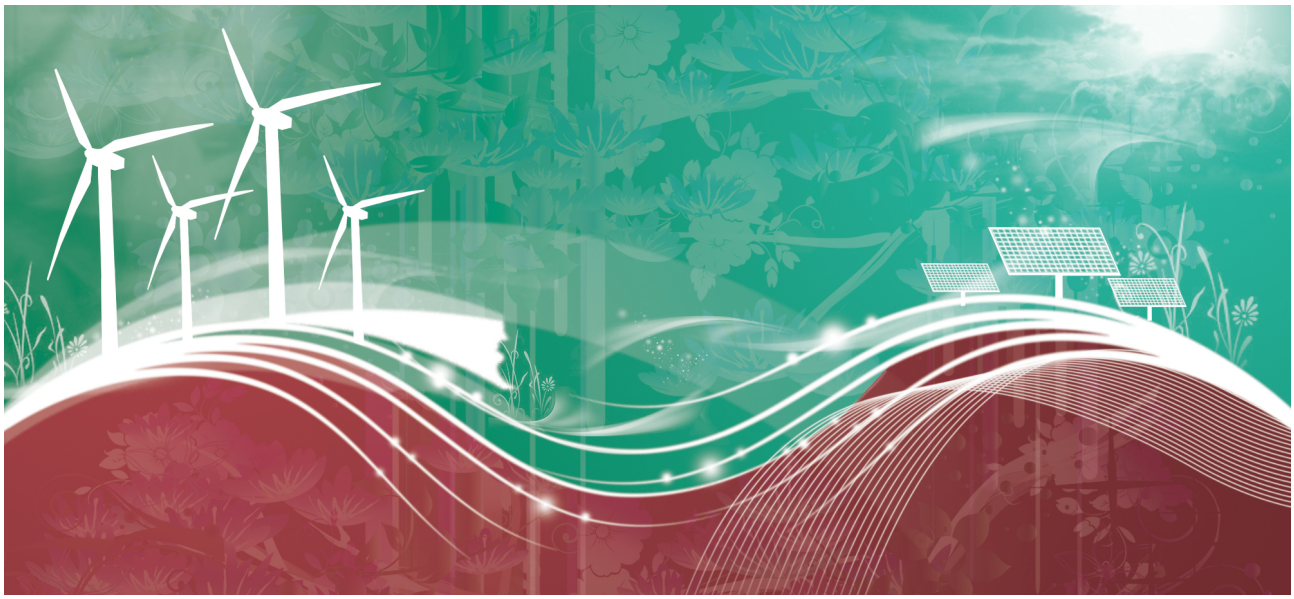
Renewables for All: Increasing Customer Access to New Energy Technologies

Queensland DISCUSSION PAPER

AUTHORS:

Franziska Mey
Nicky Ison
Luke Reade
Angela Reeve



1. Introduction

Australian and global energy systems are undergoing a rapid transformation. The introduction of low-cost solar photovoltaics (PV), battery storage, energy control and management systems and energy efficiency measures provide an unprecedented opportunity for energy consumers to participate in the energy system.

However, access to this level of participation through new clean energy technologies is restricted for a number of customer segments, specifically:

- Low to moderate income households,
- Renters,
- Apartment dwellers and
- People who live in shaded or heritage listed buildings.

A range of barriers exist for these customer segments, which if left unaddressed will exacerbate inequality. However, this inequality should not be used as a reason to stifle clean energy innovation, but rather a driver for greater innovation.

Around the world, social enterprises, charities, companies and governments are establishing new business models and policy settings and programs that increase access to new energy technologies such as solar PV and battery storage to those customer segments that are currently not able to access them.

Discussion Question:
1. Are there any other customer segments that should be considered in this project?

1.1 About the project

The *Renewables for All* advocacy project is a strategic initiative of the Coalition for Community Energy[1], led by the Community Power Agency, auspiced by Starfish Initiatives with Queensland partner Energetic Communities. This project was funded by Energy Consumers Australia (www.energyconsumersaustralia.com.au) as part of its grants process for consumer advocacy projects and research projects for the benefit of consumers of electricity and natural gas. The views expressed in this document do not necessarily reflect the views of Energy Consumers Australia.

The project will work with state policy makers and key stakeholders to help create the policies that will increase access to new clean energy technologies to the identified customer segments. For the purpose of this Discussion Paper new clean energy technologies are defined as solar photovoltaics (PV), energy storage, energy control and management systems and energy efficiency measures. It should be noted that solar PV is a particular focus of the business models identified.

The project will be conducted in NSW, Victoria, Queensland, South Australia and the ACT.

This discussion paper will inform a stakeholder workshop in October and lead to policy briefs that will be used in advocacy with state policy makers. As such, discussion questions are interspersed throughout this document to stimulate debate between key stakeholders on the future direction for clean energy technology access in Queensland.

[1] This Discussion Paper does not necessarily represent the views of all C4CE Members.

1.2 Queensland Context

The Queensland government recently announced a target of 50% renewable energy by 2030. While support for low-income households is not currently specifically targeted through policy, the State Government's election manifesto *A Solar Future: Powering Queensland's Renewable Energy Industries*, sets out a number of election commitments, including an independent public review (by the Queensland Productivity Commission (QPC)) into a fair price for solar energy exported to the electricity grid by Queensland households. The QPC is also currently holding a parallel Public Inquiry into Electricity Prices. The first lists "a fair price for exported solar energy" and the second lists "fairness and equity" and "minimising impacts on vulnerable customers" in their terms of reference.

Recent tariff changes have adversely affected low-income, solar, pensioner, single occupant and energy efficient households through increased fixed tariffs (Tariff 11) – i.e. a greater part of the consumers' bill now has a fixed charge, no matter how much electricity they use. However, the variable charge component has decreased, so high energy users may see an advantage (cost reduction) of energy efficiency and solar power.

The voluntary FiT offered by the six electricity retailers in South East Queensland range from 6 – 12c/kWh. Ergon Energy (and Origin Energy for Queensland customers connected to the NSW electricity grid) must be paid 6.3486 c/kWh for solar energy fed into the grid. Distribution companies have a "no export" condition for many systems under 30kW. This in combination with the end of a generous feed in tariff means that solar generated power is best used on site and not exported, and sized below the base load of the site. This means using power as it generated, or storing it.

Some remote Indigenous Communities rely on card operated pre-paid meters. These customers frequently go without electricity and are excluded from accessing energy concessions and rebates, particularly those in social housing. Some of these customers may find it difficult to pay bills if grid connected. Others currently find it difficult to afford credit, or to access it at convenient times. There are some instances where appropriate solar hot water or PV solutions are being constrained through inadequate finance and/or poor education and communication on the use of SHW. Ergon also runs stand-alone power systems in 33 indigenous communities in remote areas of the Torres Strait, Cape York and Gulf of Carpentaria, Palm Island and Western Queensland.

Other areas of Queensland, such as in Far North Queensland (Daintree World Heritage Area), are without grid connection. These communities currently rely on diesel generators. A policy of no grid development has been repealed in 2012, leaving an opportunity for a community-owned grid or mini-grids; indeed Ergon Energy is currently exploring possibilities around micro-grid as part of their Effective Market Reform team.

There are likely a number of other relevant initiatives and policy processes in Queensland that are unknown to the authors; the workshop process is intended as a means to ensure these ideas and initiatives are incorporated into the Renewables for All advocacy if appropriate.

While the Queensland Government is making progress in the area of increasing access to new clean energy technologies, more can be done.

1.3 New policy mechanisms and business model options – overview

This discussion paper identifies a range of new mechanisms designed to increase new clean energy technology access to the identified customer segments; Table 1 provides a summary.

We note that the customer segments identified have overlaps, but for simplicity we have determined it is not practical to segment further. Also many of the mechanisms identified can be of benefit to all customer segments, including those already with access to clean energy, however policy and focus can help preferentially benefit the disadvantaged customer segments. The mechanisms and examples included are structured around two key barriers:

- Accessing the benefits of clean energy beyond the bounds of your own dwelling
- Affordability and ease of repayment – making it simple

Accessing the benefits of clean energy technology beyond the bounds of a home, is one way to address more commonly known barriers such as

- Split-incentives for where renters may benefit from a solar PV or energy efficiency installation but the landowner does not share the incentive; and
- The difficulties of engaging with the body corporate for apartment dwellers.

Affordability and ease of repayment is focussed on providing cost effective and easy methods to finance clean energy technologies and energy efficiency to assist people without easy access to cost effective finance.

Table 1: Summary of Mechanisms

Business Model	Customer Segment	Status in Queensland
Access to clean energy beyond one's premises		
Solar gardens whereby energy from a central 'off site' shared solar installation is sent directly to homes	Apartment, renters, inappropriate roof, some low-income	Not possible without virtual net metering/peer-to-peer energy provisions
Community-owned renewable energy	Apartment, renters, inappropriate roof	Possible and projects in development
Tax incentives	Apartment, renters, inappropriate roof, some low-income	Not possible without changes to the tax code.
Access to clean energy on one's premises – Affordability and ease of repayment		
Power Purchase Agreements /equipment loans/ equipment Leases	Moderate-income homeowners	Possible and products available
Rent-based repayment whereby energy upgrades are financed and repaid through rent payments	Low-income community housing tenants	Housing providers due to funding restrictions and their remit for equity currently prevents them from undertaking such schemes.
Rates-based repayment whereby energy upgrades are financed and repaid through rates payments	Moderate-income homeowners, potentially renters and apartment dwellers	Requires a simple legislative change to Local Government Act and City of Brisbane Act.

On-bill financing whereby energy upgrades are financed and repaid through energy bill payments	Low-income, potentially renters	Likely not possible without changes to electricity tariff categories, approval from QCA and/or clarity around the National Electricity Retail Law.

Discussion Question:

2. Are there any other key barriers and business models that should be considered in this project?

3. What do you think should be priorities for the Queensland Government in increasing social access to the benefits of clean energy technologies?

1.4 Discussion Paper Structure

The Discussion Paper is structured as follows:

Section 1 presents the background and objectives of the Renewables for All project and provides a brief overview of the status quo of policy support for clean energy in Queensland. At the end of this section the different options are shortly summarised.

Section 2 focuses on the chances of individuals and community groups to access clean energy beyond their own premises. This section firstly introduces major challenges for disadvantaged groups to participate in renewable energy deployment. To address those challenges, three different innovative solutions – community owned renewable energy project, solar gardens and tax breaks – are presented. Each option includes benefits, limitations and project examples from around the world.

Section 3 looks at options for access to clean energy on a house/apartment. Low-income households are a particular focus, with examples for affordable and simple payment solutions outlined such as: loan/ lease arrangement or repayments through rent, rates and utility bills. The options are explained by presenting information about benefits, limitations and specific project examples.

In all sections the Queensland context is considered and references to existing examples and policy interventions suggested.

Appendix A provides links to more information about and examples of each of the mechanisms identified

2. Access to clean energy beyond one's premises

As mentioned in Section 1, groups such as low income households, renters and homeowners with unsuitable rooftops find it hard to participate in the energy transition. As such, in the last five years different innovative business models have emerged that seek to enable the access of clean energy solutions for a larger segment of customers by reaching beyond the bounds of a property.

These customer segments face a number of challenges: For **low income households** the main barrier is the lack of financial means that are required to afford the capital intensive costs of e.g. a solar PV or solar hot water system. This is further aggravated by the fact that such households are often not considered creditworthy and are therefore not able to access debt finance or if they can, only with higher interest rates. The financial risks that banks or other lenders (e.g. solar retailers) associate with these households decreases the actual financial viability for conducing renewable energy or energy efficiency measures and leave them stranded.

Tenants of apartments or houses may be interested in decreasing their electricity bills by establishing energy efficiency or renewable energy solutions on the premise. Yet, a dynamic referred to as the 'split incentive' leaves both the tenant and the landlord reluctant to invest in efficient or renewable technologies, since neither will fully reap the economic benefits: on the one hand the landlords aren't driven to invest in capital intensive building or apartment upgrades as the electricity cost savings will accrue to the tenants only; on the other hand, tenants can be unwilling to buy e.g. solar power systems because their lease doesn't go long enough (i.e. more than 15-15 years) to reap the financial benefits. This challenge is further amplified by the usual lack of adequate processes between landlord and tenant to negotiate and decide on building or apartment upgrades.

Thirdly **Homeowners** who are equipped with adequate funding can be constrained by technical barriers arising from e.g. unfavourable and shaded roofs or restrictions due to heritage listing. Restrictions are also likely if these households live in communal or strata dwellings. The shared property rights (with the strata management companies) add a complexity regarding responsibilities (for costs), decision making and sharing the benefits that makes it unattractive to undertake solar system installations. Further, a lack of capacity (e.g. education, resources, information) could detain all households to make well-informed decisions for an efficient deployment of new technologies.

Under the term 'community energy' a diverse spectrum of innovative solutions that help different customer segments access new energy technologies have emerged. This section specifically focuses on the solutions that allow customers to reap the benefits of renewable energy beyond the bounds of their home. Typically this works through the establishment of a central grid-connected renewable energy facility, backed by a business model that offers energy consumers the opportunity to invest, purchase or just lease electricity generation. A central renewable energy facility has the added benefit of ensuring there is optimal access to available renewable energy resources and the highest and most cost effective power output can be generated.

Furthermore community energy models provide a broad range of financing, ownership as well as engagement options and help households from the lower to the upper end of the income scale to benefit from clean energy. Benefits such as reduced electricity bills or a return on investment will directly flow on to the participating household and help to increase the acceptance of renewable energy as well as energy literacy.

2.1 Community-owned renewable energy

Who is it for?

People who would like to invest in renewable energy but can't do so on their own property (due to renting, unsuitable roof or living in an apartment).

What is it and how does it work?

Community-owned renewable energy projects (CORE) are developed across a range of technologies (e.g. solar PV and wind power). CORE projects are usually initiated by a small group of locals and offer community members but also the wider public the opportunity to engage and invest typically between $100 to $20,000 (though in some cases more) in a renewable energy project. As an ethical investment opportunity the projects typically yield a 4-10% dividend and as such can be quite attractive.

In Australia CORE is the most common approach for community participation in new energy technologies beyond household scale with more than 20 CORE projects currently operating. Hosts for such projects are usually community halls, leisure centres, commercial building as well as farmland or other unused plots of land.

What are the benefits?

Community-owned renewable energy projects offer both economic and social benefits. People can invest into medium scale renewable energy project and receive a return on investment from favourable interest rates. Furthermore those projects offer an option to participate in community activities and help to increase energy literacy and knowledge about renewable energy.

What are the Limitations?

People who can invest in renewable energy for their own home save energy and money, and (naturally) do not pay tax on the money they save. Participants in a community owned renewable project which sells energy to the grid are however taxed on the money that their share of the community owned project earns them. These limitations can be addressed by the mechanisms outlined in Section 2.2 and Section 2.3.

Example:

Repower Shoalhaven One – is a small-scale community-owned solar array on the Shoalhaven Heads bowling club on the South Coast of NSW. The Repower Shoalhaven model uses a proprietary limited company Special Purpose Vehicle (SPV) legal structure to enable up to 50 community members to co-invest in a project (though no more than 20 per year). For the first project 20% of the system was financed and owned by Shoalhaven Heads Bowling and Recreation Club, with the remaining 80% financed and owned by community shareholders. Other CORE projects in Australia include Clearskys Solar Investments, Denmark Community Wind and Hepburn Wind.

Status in Queensland and Policy support needed:

The Queensland Government has only recently been made aware of potential business models for improving access to renewable energy investments and installation. Queensland community energy groups are talking to the state government through the Department of Energy and Water Supply (DEWS), inviting the government to join other states in providing support for growing the community energy sector. There are over 70 groups developing community energy in Australia; at least 7 of these are in Queensland. Currently, Queensland groups are predominantly investigating community solar. Examples include:

- *Energetic Communities* who is looking at solar on a food manufacturing site
- *Sunshine Coast Community Solar* are looking at several sites and
- A Cairns based group is looking at community owned grids and solar.

Several significant barriers, in particular the lack of early stage funding, currently stall their progress. The more progressed of the Queensland community energy groups are currently establishing legal and governance structures, developing business models, engaging potential site owners and attempting to secure small amounts of funding.

Many models of community energy involve the sale of electricity, for example behind the meter to a host site. The Queensland Electricity Act 1994 and its Electricity Regulation 2006 may require community energy groups trying to apply one of these models to obtain a license to generate, distribute and retail electricity from the Regulator (the Director-General of the Department of Energy and Water Supply (DEWS)). If these licenses are granted, each community energy organisation would be required to pay annual license fees. While separate fees may be created for community energy groups the fees are $300 for generation (up to 50 MW), $15,887 for transmission and $11,914 for Retail, while a *Special Approval* is $317. As Community Energy projects may not come under the *Special Approva*l, these licensing fees would make a typical community energy project uneconomic. Public policy is not served by this requirement and it is an unintended consequence of the legislation. Subdivision 2 of the Act provides the Minster with the ability to grant exemptions from these licensing requirements.

The National Community Energy Strategy outlines the barriers facing CORE projects and identifies strategies to address them; the key barriers identified include:

- The investor limit imposed by the Corporations Act that makes equity based-crowd funding very difficult. If a project exceeds 20 investors in a year, which is highly likely for community projects, there are high compliance obligations and costs (e.g. regarding public offerings and advertising), greater legal complexity (e.g. needing an Australian Financial Service License), as well as uncertainty and liability risks for issuers (Australian Government, 2015; C4CE, 2015). Changes to the Corporations Act are required that allow for exemptions for CORE projects or extend the investor threshold to for example 100 investors.

- Funding and business model support for larger CORE projects (>100kWs). Currently, there are replicable models for community-owned solar projects less than 100kWs. However, larger projects, particularly those of a scale of Hepburn Wind or Denmark Community Wind require upfront funding support or contracts for difference/reverse auctions to de-risk the project and prove the business model.

- Accessibility of appropriate host-sites for community-owned solar projects. The current CORE business model that stacks up, is a ~100kW solar array on a commercial building, where the building purchases the power for approximately 10 years. However, there are a number of specific characteristics needed to be a good host site for a community-owned solar project; help from the state government in the form of a host-site register would greatly expedite CORE projects in Queensland.

For more information see Appendix A.

2.2 Solar gardens - Community-owned renewable energy direct to your house

Who is it for?

People who would like to invest in renewable energy but can't do so on their own property (due to renting, unsuitable/limited roof or living in an apartment)

What is it and how does it work?

Solar Gardens (also known as Shared Solar or Community Solar) help electricity customers receive further benefit from being involved in community owned solar by receiving credits on their electricity bills earnt through shared ownership in a centrally located Solar PV project.

In the United States Solar Gardens can be up to 50MW in size and can be owned or leased (through a service contract) by individual community members. A minimum of 5 separate owners are required to qualify as a solar garden in the US.

Solar Gardens have become to the most prevalent community solar program in the US in the last four years. According to the Solar Electric Power Association (SEPA, 2014) they represented 96% of all active and planned community solar capacity with a cumulative capacity of 40 MW. As of August 2014, SEPA listed 57 community solar programmes spanning 22 states (other sources provide even higher numbers). While this is still relatively small sector, solar gardens in the US are predicted to increase in capacity seven-fold by 2020 (Honeyman, 2015).

What are the benefits?

The main benefits of this model are:

- Installation size not limited by electricity demand
- Avoids need to run physical cabling to customer's connection point in their home apartment or rented property.
- Solar PV accessible for all
- Easier purchasing local renewable energy electricity
- Capital constrained customers can buy renewable energy without high upfront costs
- The fact that the return on investment is returned as a credit against an electricity bill means that participants are not taxed, just like people who put solar on their own roof.

Examples:

MN Community Solar is the first community solar garden (CSG) developer in Minnesota. The organisation has partnered with Xcel Energy, an energy utility and retailer who purchases the energy generated by the community solar arrays in the region. With their model, customers don't own the solar panels but subscribe via a service contract to the community solar garden receiving credits on their electricity bill for up to 25 years. The MN Community Solar has already helped to installed community solar gardens on the rooftops of warehouses, a library and a church as well as standalone systems erected on brownfield. Read more: http://www.mncommunitysolar.com/

Clean Energy Collective is a developer for shared solar providing services to communities throughout the US. The strength of the Clean Energy Collective model is that it minimises the financial barriers to entry through allowing customers to purchase just a single operating panel if they like. This models works by Clean Energy Collective building centrally located community solar project in partnership with the local/ regional utility, developing a custom community solar proposal and offering panels to purchase. After customers have bought

their panels, they will receive credits directly to their bills. Read more: http://cleanenergycollective.com

Status in Queensland and policy support needed:

There are no solar gardens currently in Queensland. In the US this model is enabled by a special legislation for peer-to-peer electricity usage (virtual net metering) - an arrangement where the geographic limitations between the location of the electricity consumer relative to the generator are reduced. It allows electricity be 'sold' or 'transferred' from generator to the consumer via the consumers' billing account. That is electricity generated at the central solar facility is then credited against the owner/leasor/investor's electricity bill.

In July 2015 the US federal government has announced the Clean Power Plan, which includes ambitious targets to triple the amount of rooftop solar installed on low-income housing, as well as to boost the development of community solar projects such as Solar Gardens. The plan entails a National Community Solar Partnership with commitments of philanthropic and impact investors, states, and cities to invest $520 million to advance community solar and scale up solar and energy efficiency for low- and moderate- income households. It also provides clearer guidelines on how local housing authorities can access federal funds to finance PV installations.

One of the questions to resolve should this model be implemented is the value of the electricity credited. Is it wholesale electricity price (4-8c/kWh) or retail electricity price (18-30c/kWh) or some-middle range?

In Australia this form of peer-to-peer electricity usage is constrained by the energy market. While not directly disallowed, there are no incentives for energy market actors to put in place peer-to-peer energy retailing. As such, it is likely that a regulatory reform and rule change are required to expressly allow peer to peer metering and enable the creation of 2nd tier retailers (Solar Garden developers) to facilitate the model.

Currently, a consortium of different stakeholders including the Institute for Sustainable Futures and a number of Councils, Networks (including Ergon Energy) and retailers are funded by the Australian Renewable Energy Agency (ARENA) to investigate the opportunities of peer-to-peer electricity usage and trial testing options to inform the development of alternative charging methods for local energy projects and potential changes to electricity market rules. One of these trials will be conduced in Queensland. Additionally, a rule-change has been submitted by the City of Sydney, the Property Council and the Total Environment Centre to help clarify the value of local energy generation and thus what the credit on a consumers bill should be if such a business model were to be enabled (Local Generation Network Credit Rule Change).

State governments can also put in place legislation to compel networks or retailers to credit certain eligible customers who participate in a solar gardens scheme at a certain rate. One option would be that customers who cannot put solar on their own roof could be eligible for full-retail electricity rate, while those customers who can put solar on their roof, would be credited at a lower rate, thereby increasing equity of access. There may be an opportunity to look at how these types of support could be aligned with any low-income rebates for electricity costs.

For more information see Appendix A.

2.3 Tax Breaks

Who is it for?

People who would like to invest in renewable energy but can't do so on their own property (due to renting, unsuitable roof or living in an apartment).

What is it and how does it work?

Tax breaks are a policy mechanism that has been enacted in a number of countries to promote the development of renewable energy and specifically community renewable energy. These are targeted entitlement programs that allow a reduction or exemption of the projects' or shareholders' contributions to the public treasury either from the income or other tax obligations such as property tax. In theory, governments make use of tax incentives as flexible tools that can be gradually increased or decreased according to the market development of a specific technology or business sectors.

Specific options include:

- Production tax credits which address operating production costs and investment tax credits focus on initial investment costs,
- Tax credits or exemptions for the use of renewable energy electricity, and
- Tax reductions and exemptions may also cover property, sales, energy, carbon and value-added tax and act directly on the total payable tax, thereby reducing its magnitude and thus the total cost associated with development (Mitchell et al., 2011).

Both previous models examined - solar gardens and community owned renewable energy internationally, have and still do benefit from such tax exemptions. The tax exemptions particularly help to encourage the establishment of small-scale businesses by increasing their economic viability, provide a better value proposition and ultimately making them more attractive to community investors and customers. It also allows CORE projects to seek local investors and distribute the economic benefits within the community.

What are the benefits?

Tax breaks are included in this discussion paper, as households who put solar on their own roof do not have to pay tax on the subsequent savings on their electricity bills. However, if an apartment dweller or renter were to invest the equivalent amount in a Community Owner Renewable Energy (CORE) project, they would have to pay tax on the dividend returned, particularly if peer-to-peer solar gardens are not enabled, and thus the benefit is not credited against their electricity bill.

Examples:

Denmark which is known for its wind power success story was one of the first countries to introduce tax exemptions for owners of wind turbines on the portion of the wind generation that offset a household's domestic electricity consumption. A wind cooperative would then buy a wind turbine, site it to its greatest advantage, sell the electricity to the utility, and share the (tax-free) revenues among its members (Paul Gipe, 2011). The threshold of shares have changed over time, in 1996 the tax-exempt ownership threshold was increased to 9,000 kWh per year or 150% of household consumption (www.repp.org/repp_pubs/articles/issuebr14/02Denmrk.htm). This, among other support policies, has incentivized over 150,000 households to own shares in wind farms in Denmark.

In the UK a number of tax relief schemes are available to community energy projects through the Enterprise Investment Scheme (EIS), the Seed Enterprise Investment Scheme (SEIS) and the Social Investment Tax Relief (SITR) in the social enterprise sector. Tax

relief has been an important incentive for many community energy projects by encouraging people to invest in community energy schemes because they allow investors to reclaim income tax on their investment (in SITR also for debt investments) at the rate of either 30% or 50% respectively. Most taxpayers are eligible for these reliefs (up to an annual limit), and are able to reclaim from HMRC, or offset against tax payable, a proportion of the capital they have invested in qualifying schemes.

In Colorado/ USA solar gardens are classified as locally assessed properties for the purpose of property taxation. Since January 2015, projects that are attributed to residential subscribers, governmental subscribers, or organizations (that already have been granted property tax-exempt status) are exempts from property tax to the percentage of the electricity capacity of the community solar garden. In general solar garden projects such as Clean Energy Collective take advantage of those rebates and tax credits incorporating them into their products and passing on savings to their members.

Status in Queensland and policy support needed:

In Australia, special tax incentives can be granted at the local (property), state (income) or national (income, GST) level. In May 2015, the Abbott-Truss Coalition Government announced a tax break for small business providing a temporary increase to the instant asset write-off, allowing small businesses to claim back purchases of up to $20,000. This applies to businesses with an annual turnover under $2 million for the next two years.

While this small business package is valuable, it will cease in 2 years with no guarantee for extension. In order to offer long-term support for CORE projects and other community investment models, the introduction of tax incentives for investors should be considered to help increases both the viability of the project as well as the rate of return issued to investors.

States collect only a small share of the overall tax revenue (18%), the majority of which is collected through payroll tax. In Queensland, only employers who pay over $1.1M in annual wages have to pay payroll tax. As such, the key role state governments can play is to advocate to the federal government to provide tax exemptions or other tax incentives for CORE projects.

For more information see Appendix A.

Discussion Question

4. Do you think the business models which enable customers to benefit from new energy technologies beyond their premises are worth pursuing in Queesland?
5. Which public policy model is most appropriate and beneficial for the Queensland context?

3. Access to clean energy at one's premises - addressing affordability and ease of repayment

One of the key barriers to uptake of new energy technologies by many of the identified customer segments (particularly low-income customers and renters) is the high up-front cost. To overcome this issue a range of organisations are developing finance products that enable the customer to pay back the cost over a period of time. There are two key elements to new-technology finance:

1. How the finance product is structured. The main three options are a:
    a. Lease,
    b. Power Purchase Agreement (PPA) or
    c. Loan.
2. How the finance repayment is collected over time. The main options are:
    a. A stand-alone contract and special repayment mechanism
    b. Rent, particularly by community/social housing providers
    c. Via their Council rates
    d. Via their electricity bill – through a retailers
    e. Regulated utility bill e.g. through an electricity network or a water utility bill.

Repayment mechanisms are important in making new energy technologies easy for customers. Further, some of these repayment mechanisms address additional barriers such as landlord-tenant split incentives, as discussed below.

One of the key challenges associated with a pre-financing approach to new energy technologies for households is that while a customer is often ahead from day one, they will pay more for the technology over the life of the system that if they had paid upfront. The main reasons for this are the cost of capital and finance program costs. If a household pays upfront they use their own funds – there are no financing costs. If financing is used, often the organisation/individual that puts up the finance will expect a return on their investment, and when dealing with low-income households there may be a risk premium. The exception to this is if a low or zero interest financing is possible, for example the No Interest Loan Scheme (NILS). This loan scheme provides individuals and families on low incomes with access to fair and affordable credits ranging from $300 - $1,200 with a 12-18 month repayment period. However, there will still be the cost of setting up the financing and repayment mechanisms that will need to be repaid by the customer over time. This is extra cost is the unavoidable trade-off with increased access, unless such programs are subsidised by government, which is also a possibility.

3.1 Financing - Loan/lease/PPA

Who is it for?

Moderate-income homeowners, who find the upfront capital cost of new energy technologies prohibitive are the people most likely to benefit from standard solar/energy loans, leases and PPAs. This segment typically have a reasonable credit rating and are able to put their home up as security for the finance. For these mechanisms to start to benefit low-income households and renters they need to be coupled with one of the repayment mechanisms outlined below.

What are they and how do they work?

Energy consumers can secure finance for clean-energy upgrades to their home, as identified above, there are three main approaches taken – a loan, a lease and a PPA.

A loan works like a standard loan or mortgage, with finance provided to cover the new energy technologies either by a bank or an energy company at a certain level of interest over a certain period.

A lease works by a solar or energy company installing solar on a customers roof and the customer pays a fixed amount each month/quarter over a certain period. While lease schemes have no up-front payments, they come with an interest component, where the lessee needs to be sure their cost reductions are greater than the interest payments. The energy company remains the owner of the equipment in a similar way that some companies offer lease/rentals on whitegoods. Electricity generated can be used by the customer and any electricity exported is credited on the customers electricity bill at the export rate as set by the energy retailer (currently FiT rates are low for most jurisdictions and retailers).

A PPA works by a solar or energy company installing solar on a customers roof and the customer pays a specified amount to the company for every kWh of electricity generated, typically lower than retail electricity rate.

The key distinction between these three finance mechanisms is that with a loan the household owns the technology from day one, whereas for a lease and a PPA an energy company owns the technology, with households either gifted the technology after a certain period as well as having the option to buy the technology outright at any time. The other main difference is that loan finance can cover a range of new energy technologies – solar PV, energy efficiency upgrades etc, while PPAs and leases are specific to solar PV.

What are the benefits?

Solar loans, leases and PPAs allow home owners to upgrade their property with clean energy technologies and energy efficiency measures with no upfront cost. The savings they make on reduced electricity purchased from the grid, are used to pay for the finance costs.

Status in Queensland and policy support needed:

Currently there are a range of clean energy/solar loan, lease and PPA products available in Queensland. There is no specific policy support required to enable these financing mechanisms in Queensland.

3.2 Repayment through Rent

Who is it for?

Low income households and their landlords.

What is it and how does it work?

Repayment through rent refers to a model that specifically applies to community/social housing providers that would collect repayment for renewable energy or energy efficiency upgrades through their tenants' rent. As such community housing providers as landlords are in a great position to help their low-income households to access new clean energy technologies and enable cost savings through reduced electricity bills. The advantage of this model is that community housing providers have well-established processes and administrative procedures (e.g. rent collection) that would allow for efficiently collecting of repayments from tenants. Additionally they have a good understanding of the needs of their tenants which will help to communicate such changes.

Community housing providers that are willing to go the extra mile for their tenants have different options to finance renewable energy or energy efficiency upgrades:

- Self-funded, all costs are covered by the community housing provider, which collects the repayments from the tenants;
- Collaboration with a community energy organisation, which finances, installs and manages the solar assets on the low-income households' roofs and in return the community housing provider pays the lease until the end of the contract period.
- Other options include financing provided through a third party financier or solar retailers

What are the benefits?

- Low income households can access clean energy technologies in a way that provides certainty to the landlord who is buying the technology
- Rent carries a low risk of default
- No ongoing adjustments to legal documentation, and therefore no complications when the tenant moves out.
- Less stakeholders involved with this model than with other repayment models.
- Helps to overcome the landlord/tenant problem (see 'split incentive' in Section 2) to an extent as the cost pass-through can be agreed upon mutually by landlord and tenant

Example:

In Germany landlords can pass along the costs of a building upgrade (e.g. solar heating or insulation) to their tenants through the "Modernisierungsumlage", which is basically a leasing rate or modernisation allocation. This leasing rate is regulated in the civil code law §559 BGB and represents a special form of rental increase, which should incentivise the landlords to modernise their building stock and reclaim some of the costs in form of a rental repayment. In order to protect the tenant, the regulation only allows for an annual rental increase of 11% of the costs associated with the refurbishment (that means for refurbishment costs of 1000 Euro a rental increase of 9.17 Euro per month is permitted). Hereby a modernisation can apply to a single house but also to multiple apartments, in the latter case the landlord has to distribute the costs equally across all tenants. The landlord

is furthermore obligated to disclose (in writing) the rental increase including a detailed calculation of the costs and the new rent.

Modernisations or building upgrades usually comprise measures such as improvements of heating system, façade insulation, solar water heating, double windows or replacement with modern insulated glass and water or energy meters. However those measure can only justified a rental increase if they provide primary energy or water cost savings for the tenant.

A special case are solar PV systems. In Germany solar PV systems are usually connected to the grid to benefit from the (small but still reasonable – 12.34 cent/kW for 10kW system) Feed in Tariff. In this case the tenant won't directly benefit from a decreased electricity bill and the installation costs can't be issued as modernisation costs.

The **Turnstyle Community Hub** in Highgate Hill, Queensland is another example of how landlords and tenants can mutually benefit from solar PV. The PV system was organised and funded by Turnstyle, but is owned by the landlord. Funds were provided through donations and loans from members of the Turnstyle Bulk Buyers Cooperative and the Turnstyle residents. The tenants negotiated and signed a written agreement with the landlord, allowing them to continue to rent the property for a five-year period – the estimated payback period on the solar array. If the tenants leave before the five years is up, the landlord will refund the portion of the system cost that hasn't been recovered by that time. If they leave after the five-year period, the system is gifted the landlord. The model does however rely on the 44c/kWh tariff.

Status in Queensland and Policy support needed:

The authors are not aware of any operating examples of rent-based repayment projects in Australia. Currently, many low-income housing providers are not able to pass on rent increases. This may be due to government funding conditions or rent increase restrictions. In such cases, a separate 'utility charge' similar to a water charge could be recovered by the landlord. Such a charge is expected to be permitted under funding and regulatory rules; however, it is less preferable (relative to rent) as it is an additional bill and therefore higher administrative costs and higher default rates are expected.

It should be noted that as with many of these repayment options, solar and energy efficiency provision is not core-business for the key organisation (in this case social housing providers) and as such there may be other cultural and institutional barriers to implementation.

For more information see Appendix A.

3.3 Repayment through Council Rates

Who is it for?

General home-owners and low-income homeowners and potentially renters and landlords.

What is it and how does it work?

Repayment through rates or rates-based financing for clean energy is where finance for new energy technologies is mediated through the Local Government; with the repayment occurring through a special charge or rate levied on the property and paid by the occupant through normal rate repayments.

What are the benefits?

One of the benefits of this approach is that because the repayment it tied to a local government rate, it becomes a statutory requirement for the property against which it is leveraged. As local government debt gets first recall at point of sale, it becomes a much lower risk venture for financiers, thus lowering the cost of capital. Furthermore, because the rate is tied to the property it overcomes longer payback periods associated with more capital-intensive clean energy technologies and upgrades. However, one of the challenges is setting up the scheme by local government – it is not core business and thus requires determination and support to work through the complexity of setting up a rates-based finance scheme.

Examples:

Darebin Solar Savers is a program developed by Darebin City Council. The program in its first year saw the installation of solar PV on 300 low-income households in the City of Darebin. The cost to these households as free up-front, with repayment occurring over 10 years through a special rate/charge, the solar PV system was scaled to ensure households were better-off (through lower electricity bills) from day one. The Council partnered with Moreland Energy Foundation and Energy Matters (now Sun Edison) to deliver the program. Only pensioners who owned their home and were eligible for the existing rates discount were eligible for the scheme. Darebin Council used its own capital reserves to finance the project at a 0% interest rate due to the fact that it was both a climate and social justice program.

Environmental Upgrade Agreements (EUAs) for commercial buildings have been available in both NSW and Victoria for a number of years. EUAs enable commercial buildings owners to finance a range of environmental upgrades including energy efficiency and solar PV installation through a rate repayment scheme. The main difference with EUAs and the Darebin Solar Savers model other than target audience, is that in EUAs finance comes from a commercial lender and is thus not on the books of a council.

Status in Queensland and Policy support needed:

While it is possible in Victoria, currently, rates-based financing for residential clean energy is not allowed under Queensland Local Government legislation. As such, a simple legislative change to the Local Government Act, is required to support renters and building owners to access rates-based financing. The Queensland Department of Energy and Water Supply (DEWS) are currently looking into these options. In addition, there are a range of other ways policy can support the uptake of rates-based financing for example, creating a program that would support local governments to implement rates-based financing.

For more information see Appendix A.

3.4 Repayment through Bills

Who is it for?

General homeowners, low-income homeowners and possibly renters and their landlords.

What is it and how does it work?

Repayment through bills allows a homeowner or resident to invest in a clean energy upgrade for their home for no money upfront, finance is provided via the utility (energy or water) company who collects repayments via the utility bill.

The main difference between the utility and the electricity retailer on-bill-models is that utility is a regulated monopoly and do not face the same competition requirements which potentially prevent an electricity retailer from conducting on-bill financing. Furthermore the utility repayment is tied to the water or electricity meter identification number, and therefore the finance could be easily passed on to the following household if the occupants move out. This helps to overcome the split incentive between landlord and tenant.

Repayment through bills refers to a mechanism where either a monopolistic utility or an electricity retailer collects repayments via special charges on water or electricity bills. The utility could be an electricity distribution network service provider (DNSP) such Ergon and Energex, or a water utility such as Queensland Urban Utilities. The electricity retailer or water utility places a special charge on the household's electricity or water bill, before being channelled back to the financier and avoiding additional billing fees.

What are the benefits?

Although this model comes with high set-up costs and requires the billing organisation (utility or retailer) to be interested in and see a benefit in this approach, for customers it's a simple repayment mechanism for new clean energy technologies that does not require a new bill. As with the other two repayment mechanisms, customers pay for the clean energy technologies over extended terms on their monthly/quarterly utility bills whereby the electricity savings offset the costs.

In contrast the electricity retailer model is not tied to the property, but rather the dwelling occupant. As a result, although this model provides benefits to homeowners it doesn't overcome the landlord-tenant problem because it becomes very difficult to transfer the finance to the next account holder if the occupant is moving address.

Conversely, electricity retailers are in the business of billing customers for energy services, while network companies and water utilities are not.

Example:

So called on-bill programs have been used by U.S. utilities for many years. In most US jurisdictions where on-bill financing has been successfully deployed, electricity is sold by a vertically-integrated monopoly utility (i.e. there is no competition concerns because there is only one retailer).

The US National Grid has offered an on-bill program for small business customers since the 1990s. New York State passed the Power NY Act in 2011 authorizing residential on-bill loans, which is being implemented by the New York State Energy Research Authority (NYSERDA) in cooperation with New York utilities.

Status in Queensland and policy support needed:

A number of Australian electricity retailers, such as Origin Energy and AGL, do offer solar financing packages (as discussed in the lease/PPA section), but they do not currently offer solar repayments through electricity bills. This may be because solar power installation and financing deals are covered by the Australian Consumer Law, but the sale of electricity is governed by the National Energy Retail Law. The National Energy Retail Law contains strong provisions to ensure that consumers can access the price benefits of competition by switching retailer. It remains unclear whether it is allowed for an electricity retailer to sign a customer to an electricity supply contract by promising them a solar power system, financed on their bills. Even if this was possible the retailer would need to unbundle the solar power bill and the electricity bill should the customer wish to switch supplier, which may create more administrative cost than the benefit provided by on-bill financing. These legal issues would have to be resolved/worked through in order for this mechanism to be possible.

To do on-bill financing through a network or water utility, would possibly require the introduction of regulations in the Australian National Electricity Market and definitely include the creation of a new network or water tariff category, which in turn would require approval from the Queensland Competition Authority (QCA) and/or the Australian Energy Regulator (AER). Nevertheless, there are precedents for Ergon Energy to support the development of innovative renewable energy projects, for example, Ergon Energy's involvement in the Solar Cities Consortium for Townsville and establishment of a solar community on Magnetic Island. This initiative was in large part due to transmission lines reaching capacity. The relative costs of upgrading each of these sets of transmission lines compared to assisting households with energy efficiency measures and renewable energy installations underpinned Ergon Energy's substantial involvement in the Solar Cities projects.

For more information see Appendix A.

Discussion Questions

6. Do you think the business models that make it easy for customers to access new energy technologies with zero upfront cost are worth pursing in Queensland?

7. Which repayment model (if any) is most appropriate and needed in the Queensland context?

Appendix A

More information and examples about each of the presented solutions can be found under the following links:

Community Owned Renewable Energy

http://c4ce.net.au/nces

http://c4ce.net.au

http://cpagency.org.au/

www.embark.com.au

http://hepburnwind.com.au/

http://www.repower.net.au/projects.html

Solar Gardens

http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx

http://www.greentechmedia.com/research/report/us-community-solar-market-outlook-2015-2020

http://reneweconomy.com.au/2015/how-solar-power-is-learning-to-share-the-rapid-growth-of-community-solar-gardens-90567

http://www.nytimes.com/2014/06/20/business/energy-environment/buying-into-solar-power-no-roof-access-needed.html?_r=0

http://www.businessspectator.com.au/article/2015/7/20/smart-energy/sick-lowly-feed-tariffs-plan-better-rewarding-local-generators

http://thinkprogress.org/climate/2015/07/09/3674045/community-solar-gardens-grow/

http://www.solargardens.org/

http://www.cleanenergyresourceteams.org/solargardens

http://communitypowernetwork.com/

http://www.nhsolargarden.com/

www.mysunshare.com

http://cleanenergycollective.com

http://www.mncommunitysolar.com/

Examples:

http://www.nhsolargarden.com/

www.mysunshare.com

http://cleanenergycollective.com

http://www.mncommunitysolar.com/

Tax Breaks

http://communityenergyengland.org/members-area/briefings/faqs-sitr/tax/

http://www.communityenergyscotland.org.uk/news/19-mar-2015-budget-changes-on-social-investments-detail.asp?term=tax

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/414360/Budget_2015_announcements_on_Social_Investment_Tax_Relief.pdf

https://www.gov.uk/government/publications/the-enterprise-investment-scheme-introduction/enterprise-investment-scheme

https://www.gov.uk/seed-enterprise-investment-scheme-background

http://programs.dsireusa.org/system/program/detail/5500

Financing Loan/ Lease/ PPA

www.choice.com.au/home-improvement/energy-saving/solar/articles/solar-pv-system-leasing-and-power-purchasing-agreements-ppas

http://reneweconomy.com.au/2014/cefc-to-provide-120m-to-unlock-australia-rooftop-solar-finance-41906

http://nils.com.au/

Repayment through Rent

https://www.trillionfund.com/ProjectDetails.aspx?projectId=26

http://blog.abundancegeneration.com/2014/12/oakapple-berwickshire-meet-berwickshire-housing-association/

https://de.wikipedia.org/wiki/Modernisierungsumlage

Repayment through Rates

http://embark.com.au/display/public/content/Darebin+Solar+Savers+model+description

Repayment through Bills

http://www.nrdc.org/energy/on-bill-financing-programs/default.asp

http://aceee.org/sector/state-policy/toolkit/on-bill-financing

http://www.energy.gov/eere/buildings/eeclp-webinar-5-bill-financing-text-version