

Solar PV for low income households

Directions paper - building the business case for action

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Solar Rates business case Phase 2 – Directions paper

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Executive Summary

This directions paper sets out the findings and key issues that need to be accounted for in scaling up a low income solar program in Victoria. In simple terms, the program would seek to replicate the welfare outcomes of the Darebin Solar Saver scheme in other Victorian Council areas, using new ways to secure finance that are best suited to installing solar PV systems on low income households.

This project follows on from Phase 1 of the business case prepared by Moreland Energy Foundation Ltd (MEFL), which amongst other goals, examined necessary conditions for a household to benefit from such a program, and provided a preliminary exploration of financing models, enabling legislation, and delivery approaches.¹ The main objectives of the current project are to:

- Inform Council advocacy relating to the Review of the Local Government Act and assist legislators in their redrafting of the Act's provisions relating to the use of Council charges
- Assist Councils and other partners to design and establish a 'shared service' to deliver large scale solar rates programs within Victoria
- Assist the state government and other stakeholders to set up a default fund and/or other means to grant lenders confidence and catalyse uptake of PV systems on low income homes

The directions paper sets out initial findings along these themes, ahead of developing a business case final report which will present more targeted recommendations to assist EAGA and its partners.

Problem statement and scale

A government-supported program that assists low income households to access finance for installing solar panels is substantiated on the basis of an existing and acknowledged welfare problem, that current government measures are inadequate in addressing:

While the retail gas and electricity market generally functions to supply energy to households relatively efficiently, some lower income households face price risks and risks of disconnection that present a significant societal welfare cost that requires intervention. Existing retail-focused government interventions (energy concessions; hardship provisions) are inefficient and ineffective for low income households that are able to use onsite solar energy for their daytime energy needs.

While existing government measures are sub-optimal in addressing this problem, research and consultation (refer to Appendix 1) indicate a strong alignment with and recognition of this problem in Victorian Government welfare and energy priorities; local government operations and activities relating to vulnerable households and climate change action; and the public good and social licence of the retail finance sector. In effect, acting on this problem aligns with and is mandated through these acknowledged priorities, roles, and terms of legitimacy.

Given this problem, a determination of its scale and significance finds that it is material to wellbeing of a sizeable population of less-advantaged Victorians, with impacts carried to the state budget.

It is conservatively proposed that at least 52,000 low income households are impacted today by not having the means to invest in onsite solar PV systems. By 2021, this figure is at least 56,600.

¹ Report is available from <https://eaga.com.au/projects/solar-rates/> [Accessed 8 June 2016].

This figure was determined from a consideration of the number of home-owning pension households, who may be able to install a PV system if not impeded by access to financial capital.

Financing mechanisms

While being disproportionately impacted by retail energy costs, low income households carry unique characteristics that affect their ability to stem these costs through onsite solar investment. Low income households need both an ability to access credit (i.e. loans) and for the cash impact of that credit to not outweigh the benefit of having lower demand for energy from the grid.

Modelling in the Phase 1 report identified that a loan to install solar panels on low income homes with higher daytime energy uses would need to have an interest rate of no more than 5 % p.a., and would need a minimum term of ten years to be cash positive over the lifetime of the loan. However, as these terms may still expose the household to adverse outcomes due to unforeseen events within the timeframe of the loan, it would be suitable for 5 % to be seen as the upper bound, and a program should seek to deliver interest rates to low income homes that are as low as possible within sustainable and responsible tolerances, and with risks apportioned fairly.

An exploration of mechanisms to achieve these loan conditions is set out in this paper, and covers:

- Minimal (indirect) intervention with normal private lending, largely restricted to sharing overheads and leveraging state and/or local government involvement in a formal program
- Establishment of a state government default fund, to allow private lenders recourse to compensation in the event of defaulted payments
- Lending via Council rates with funding provided from within its cash reserves
- Lending via Council rates with third party finance (either to the home or via the Council's books)
- Government funds directly applied as loans, separate or as a supplement to private sources.

Our exploration presents some general findings that inform the practicality of using different methods to finance loans within a scalable low income solar program (see table overleaf).

The interest rate on offer greatly impacts potential uptake and the household benefits. Because some mechanisms inherently offer lower interest rates than others, and this will impact recruitment and participant satisfaction, each lending product's rate is a dominant factor to get right.

A scaled program depends on the longer term buy-in from lenders who are required to lend responsibly, and on meeting the concerns of the governments that play a central role. But there are potential tensions between what each of these sectors assert is needed to secure their participation. A low income solar program may need compromise, and a willingness of leaders from each sector to be flexible and move beyond their stated tolerances.

Of the financing models set out, legislative change is needed to enable Environmental Upgrade Agreements (EUAs, or similar) for residential properties, and/or to make special rates mechanisms less onerous for Councils to apply. While other mechanisms don't rely on changes to law, the evidence that they can scale to low income household demand and opportunity is less certain.

Finally, there is the opportunity for the state government to provide funds at discounted interest rates either by lending to Councils, or by provision of funds that are directly used in loan products together with funds sourced at private interest rates. This approach may be coupled with some of the other financing methods as a means to dilute the interest rates applied via private lending.

Interest	Mechanism & roles of lead partners	Scaling considerations	Outstanding risk holders	Legislative provisions
Towards 0 %	Special rates using public reserves Government lends to resident without private lending, and collected via Council rates –interest to cover overheads and/or government risk from default.	Scale constrained due to impact on each Council budget and Council appetite to draw on reserves (unless a state fund is involved), plus overheads caused by special rates mechanism obligations.	Risk held by public lender but diminished due to use of rates to collect debt; some risk held by household but likely to be offset by energy savings.	Requires use of existing special rates mechanism as the means to retrieve public debt. Option to revise administrative impost (public gazetting and sign off).
2.5 % - 3 %	Special rates backed by private lender Council lends to resident, backed by private lending and collected via rates.	Scaling possibly hampered by Council desire to extend its reliance on debt and bear overheads that come with current special rates mechanism obligations.	Risk held by Council but diminished due to use of rates to collect debt. Risk held by household but likely to be offset by energy savings.	
3 % and above	Residential EUAs (or equivalent) Banks lend directly to residents; repayments collected via rates. Councils not liable for household debt but may support via promotion, engagement and recruitment.	Constrained by willingness of lenders to bear contracting costs and residual risk of lending to household. Also hampered by households' desire to enter into debt with private lender at the proposed interest rates.	Assume that interest rate offered accounts for the risk posed to lender due to Council being non-liable in the event that the homeowner defaults. Risk held by household as rate of interest which may imperil outcomes.	Requires amended EUA legislation, which only applies to non-residential properties. Will need to pare down process and paperwork in line with size of residential transaction.
3 % - 5 %	Public default fund Banks lend directly to and collect repayments from residents, but can call on default fund to offset losses due to default.	Potentially constrained by lenders' overheads in using the fund. Potentially hampered by households' desire to enter into debt with lender. Constrained by size of default fund.	State government (i.e. public) holds residual risk to the extent that the default fund fully or partly compensates private lender. Some risk may be held by households	It is understood that legal provisions regarding state public funds do not prohibit this use (although reforms to administering funds may be required).
5 % for stand-alone finance 4 % to 5 % mortgage	Indirect intervention Banks lend to and collect from residents, and are able to offer lower rates through strict approvals, shared operations, forgoing profit. Bank may roll into existing mortgage.	Potentially limited by households' willingness to enter into debt with private lender at the proposed rates, which leave them only marginally better off. Benefits limited to mostly high consuming households	Some risk held by households as the proposed interest rate is at the margin for cash positive returns for the households. Risk held by lender, but this can be set within tolerances.	This approach is not dependent on a particular legislation to proceed.

Shared services for a scaled up low income solar program

The key driver for establishing a ‘shared service’ is to reduce the resourcing impost on individual Councils looking to help low income households access solar PV on ‘cash positive’ terms. On the back of Darebin Solar Savers program, a range of overheads are needed for the roll-out of a similar scheme. To deliver at scale, there is merit in exploring a shared service to alleviate the need for each Council to separately invest in building resources and capability. As these schemes are new, there are unknowns and potential complexities which need to be worked through.

The key characteristics and capabilities of a low income solar shared service vehicle

Scaled to state coverage

The shared service should have the potential to scale to state coverage but also the flexibility to respond to and provide aggregated services for combinations of Councils and partners whose ambition, budgets and timing align. Leading Councils need to be supported to embark in groupings that suit, and others supported to learn about the costs and benefits and options to follow on.

Adequate timeline for implementation

A longer term commitment is suitable given the ten year terms of the mechanisms proposed in this paper. State programs are often aligned with election cycles and their emphases change accordingly, so a shared service will need to ride out these cycles to offer confident delivery.

Driving continuous improvement on financing terms and interest rate

Any shared service needs to be focused on the core purpose of delivering best possible financing terms on behalf of low income households. Taking an adaptive benchmarking approach through implementation helps drive the societal efficiency of the scheme over time.

Support for recruitment of low income households

The communication and engagement overhead in recruiting low income households is a key area for economies of scale and cost savings to Councils. The design and branding of related material will need to satisfy the stakeholders and partners, and resonate with prospective households.

Technical expertise

There are a range of services that need to be enabled through involvement of household energy (Solar PV) expertise. In broad terms these areas of activity include screening potential rooftops; system sizing and design; component selection and installation; commissioning and maintenance. A distinction needs to be made between oversight and reporting versus on-the-ground delivery.

Group procurement

The ability to organise and procure on behalf of a group of Councils (or private residents, depending on design of the scheme, e.g. bulk buy schemes) is a key function of the shared service.

Ability to integrate other services

In time the opportunity to provide engagement, financing or other links to related improvements to low income households can be explored and integrated. Provided the service is not replicating but leveraging opportunities provided through other government and private channels, an expanded intervention should still pass the governments public benefits test.

1. Introduction

Directions paper towards a business case

This directions paper sets out the findings and key issues revealed to date, that need to be accounted for in undertaking a business case on behalf of the Eastern Alliance for Greenhouse Action (EAGA) and the Northern Alliance for Greenhouse Action (NAGA). This paper has been developed via gathering background information relevant to the problem at hand, and casting the issues, opportunities and constraints in light of directions set out by EAGA and NAGA.

This business case is for establishing a scaled up low income solar program as set out in the project brief, akin to rolling out the Darebin Solar Saver scheme in other Victorian Council areas and using innovative mechanisms to secure suitable finance for low income households to install solar.

Key objectives of the project are to:

- Assist the state government and other stakeholders to set up a default fund (as needed) that provides investor confidence and catalyses investment in PV systems for low income households
- Inform Council advocacy relating to the Review of the Local Government Act and assist legislators in their redrafting of the Act's provisions relating to the use of Council charges
- Assist Councils and other partners to design and establish a 'shared service' to deliver large scale solar rates programs within Victoria

In order to deliver on these objectives, the project focuses its scope on three areas below, to which the background paper substantially progresses the understanding of the key issues and will test the strengths and drawbacks of different models to scale up a program across the state.

These areas are:

1. Quantitative and qualitative determination of the scope and structure of a default fund and the identification of the associated operational and administrative requirements
2. A review and assessment of the necessary legislative reform to support rates based initiatives, with particular regard for the use of rates and charges and treatment of debt
3. Identification of the most cost effective and efficient 'shared services' model to deliver large scale solar rates programs within Victoria

The paper begins by setting out the problem justifying the need for this program, and provides a first attempt to scale the problem and inform views of its significance. Following on, options to deliver finance with the terms needed to ensure that the household will benefit are set out, including a discussion of legislation and the roles of lenders and state and local government. The opportunity to scale the program in response to need is recognised as a critical factor. Finally, the paper presents options to share services to enable operational efficiency in delivering the program at scale.

We now seek direction on relative priority from the alliances and its stakeholders, to ensure a focused and value-driven approach to the business case final report. Key areas for resolution are:

- Finer grained preferences and openness to different models of financing solar PV systems, given the roles required of Councils and other parties, risk tolerances, the status of enabling legislation, and their bearing on the welfare outcomes of low income households in Victoria.
- Willingness of different parties to contribute to and work within bounds established to deliver the program, entailing both shared services and individual roles and responsibilities across the sectors essential for the program to work.

2. What's the problem? What's the scale?

This section of the paper articulates and seeks agreement on a problem statement for low income home access to rooftop solar PV. The scale of the problem in Victoria is then defined. Agreement on the problem and scale is central to a shared business case for intervention, encouraging potential partners and stakeholders to invest time and resources into offering and driving solutions.

Proposed problem statement

While the retail gas and electricity markets generally function to supply energy to households relatively efficiently, some lower income households face price risks and risks of disconnection that present a significant societal welfare cost that requires intervention. Existing retail-focused government interventions (energy concessions; hardship provisions) are inefficient and ineffective for low income households that are able to use onsite solar energy for their daytime energy needs.

Electricity price impacts on low income households

In 2015, the Victorian Government requested the ESC to review provisions to protect low income consumers from undue hardship caused by energy prices and the risk of disconnection. The ESC observed in its final report:²

'Access to energy underpins the wellbeing of all Victorians. Electricity and gas have long been considered essential for the energy services they provide. In particular, heating, lighting, cooking and refrigeration are widely regarded as universal standards of modern life. Loss of access to these services would expose individuals to social and economic costs, for example, through increased risk to health and lower workforce participation. To the extent that these increase the demands on public services, such as health and welfare systems, there is a broader economic cost...

'[T]oday access to electricity in particular has a far more extensive impact as it underpins social and economic participation... With increasing dependence on electronic communication, a loss of access to electricity has far greater social and economic consequences today than it did a decade ago.' (ESC 2016)

The public welfare drivers in ensuring universal and affordable access to energy and electricity are clear: it underpins social and economic participation and fulfilment, and enables normal 'every day' needs and services to be addressed. Loss of this access presents a wider societal cost through social isolation, foregone participation, and a greater burden on health and welfare support.

These concerns mirror some of the welfare issues raised in the Phase 1 report³, including the health risks and associated pressures on health and welfare systems caused by voluntary and involuntary reductions in the use of thermal comfort appliances (i.e. heating and cooling). This impact is expected to be of particular concern for low income pensioners during extreme heat and cold waves, exacerbated by a changing climate.

The role of the ESC and the hardship provisions confirm that electricity services should be reasonably available to all Victorians as a wider welfare concern. Yet in some instances, pricing and related risks of disconnection are significant factors to justify further intervention.

² See *Supporting Customers, Avoiding Labels* (ESC, 22 March 2016).

³ See <https://eaga.com.au/wp-content/uploads/MEFL-EAGA-Solar-Rates-Final-Report-2016-01-19.pdf>

From a low income household perspective, options are needed to more efficiently and effectively alleviate retail electricity costs (including future price rises), and the related incidence of cost and welfare impacts relating to:

- Disconnection from electricity services, and the associated loss in social and economic participation, and impacts on health and personal development
- Voluntary reduction in discretionary electricity uses, especially heating and cooling, which can impair health for low income individuals (particularly age and health/disability pensioners)
- Budget pressure and inability to buy other necessities, such as food, health services, shelter, etc.

Upfront capital, a barrier to investing in solar PV

While being disproportionately impacted by retail energy costs, low income households carry unique characteristics that affect their ability to stem these costs through onsite solar investment. The USA-based⁴ *Low Income Solar Policy Guide* identifies the following barriers⁵:

- Cost and finance, including lack of options to raise adequate upfront finance
- Physical barriers and home ownership status (given many low income households are renters and/or live in multi-dwelling buildings)
- Home quality, which impacts the fitness of the building as a site for solar PV systems
- Solar PV supplier disinterest in this segment, caused by a combination of the above

Delving more deeply into the first factor listed, the guide identifies that low income households are constrained in gaining approval for finance with viable terms through a range of challenges including (variously for a given household) poor credit ratings; high debt-to-income ratio; lack of assets to offer as security; or simply an inability to service the loan within their current budget constraints. Equally, these households are less likely to have the savings accumulated to allow the cash purchase of solar PV systems. Some of these factors additionally preclude low income households from securing third party PV systems (e.g. via solar leasing or power purchasing agreements).

More locally, the Community Power Agency examined the value proposition of shared ownership renewable energy projects for low income persons.⁶ In doing so, it explored the barriers for solitary onsite ownership by low income households and identified access to capital as critical:

'Low income households typically do not have disposal income available to fund a capital intensive solar power system, nor are they able to access debt finance due to their income level and, if renting, lack collateral in the form of property. The long term nature of a solar loan means that the lender takes on additional risk relative to a short term unsecured loan. Even if the lender was willing to lend to such a low-income household, the interest rate would reflect the increased risk and therefore render the solar investment uneconomic.'

Together, these resources serve as a strong evidence base for the position that securing capital to enable the purchase of onsite solar PV systems is indeed a barrier for low income households.

⁴ To date, our review of literature has found limited resources based in Victoria or Australia, which is perhaps symptomatic of the policy debate being less developed here than in some other societies.

⁵ Sourced from: http://www.lowincomesolar.org/wp-content/uploads/2016/03/Low-Income-Solar-Policy-Guide_3.11.16.pdf [Accessed 4 May 2016].

⁶ See Cooper, C., Ison, N., Mey, F. (2015), *Low-income Community Solar – Options Assessment*, Report to the South Coast Health and Sustainability Alliance.

State government alignment with problem statement

The state government request for ESC to review provisions protecting low income consumers from undue hardship caused by energy prices and the risk of disconnection (noted above) demonstrate a level of alignment to the problem statement.

However, the current government interventions solely rely on direct interaction with retail market mechanisms:

- The DHS electricity and gas concessions grant relief to eligible consumers (pensioner card, health care card, and Veterans' Affairs gold card holders) using a discount of 17.5 % off their electricity bills, after taking account of retailer discounts, solar credits, and Commonwealth subsidies.
- The ESC hardship provisions provide directions and actions to regulate how electricity and gas retailers treat their consumers at risk of disconnection.

Given transformations and price trends in the retail energy market and the ongoing falling costs of solar panels and related technologies, there is a case for the state government to widen the array of instruments used to address the welfare impacts of energy costs on low income homes. Further, instruments that carry a climate change mitigation or renewable energy investment dimension⁷ overlap with stated and emerging policy interests of the state government, and should be recognised for this co-benefit and policy delivery dividend (see box below).

State government developments in renewable energy and climate change

State government is working towards a comprehensive commitment to renewable energy policy through its Renewable Energy Action Plan (in development). While the action plan is yet to be released, the government has recently announced the plan to install a 40 % Victorian Renewable Energy Target (VRET), to be achieved by 2025.

The Victorian Government has also indicated an intention to better enable access to renewable energy for vulnerable households. In Chapters 4 and 5 of the Renewable Energy Roadmap, the Victorian Government states that it will consider mechanisms for low-income households to use clean energy products including solar PV systems. So in short, the government appears generally open to innovations that foster participation from those that are today excluded from sharing the direct benefits of renewable energy. With the right support, this participation could materially contribute to the proposed VRET scheme.

While state climate change policy is also still in development, the Victorian Government has committed to zero emissions across the state by 2050. Again, there is the case to ensure that this zero emissions pathway takes account of the role of and effects on low income households, particularly as prevailing expertise suggests that as more energy users migrate to onsite low-emissions energy, those that are left wholly dependent on grid-based retail energy may be exposed to spiralling costs (the so called 'electricity death spiral'). Principles of environmental justice and equitable climate change mitigation /adaptation dictate that the impacts on and contributions from low income households need to be actively accounted for.

⁷ The Renewable Energy Roadmap is available at:

<http://www.energyandresources.vic.gov.au/energy/sustainable-energy/victorias-renewable-energy-roadmap> [accessed 21 April 2016].

In its broadest terms, the directions set out in the roadmap and other state commitments indicate that there is a strong alignment of outcomes between the use of solar energy as a means to ameliorate cost burdens and risks to low income homes, and the initiatives pursued through the (in development) Renewable Energy Action Plan.

Local government alignment with problem statement

From the perspective of local government, there are precedents that legitimate a role for Councils regarding energy costs, wider costs of living, and renewable energy on low income homes in the context of climate change within their communities.

- Many Victorian Councils view climate change adaptation and mitigation of sufficient importance to justify membership within a greenhouse alliance. This membership funds and resources climate change-related planning, action and representation on behalf of Councils at the regional scale (enable initiatives not possible at individual Council level). This relates to a scaled up low income solar program both in terms of the promotion of low emissions renewable energy and the reduced exposure of vulnerable households to localised climate impacts such as heat stress. Further, some fifty-plus Victorian Councils have substantial and quantitative corporate emissions reduction targets, as tracked by the alliances and advised by EAGA, which indicates the level of commitment Councils have in this area, and the importance they attach to being local leaders.
- Local government Community Plans and Health and Wellbeing Plans place prominence on the need to support wellbeing and build resilience for vulnerable members of their community, including aged- and disability-pension citizens. In many cases, these Community Plans recognise both the need to adapt to climate change, and the impact of population aging on demand for welfare services and support.
- In the Climate Change Memorandum of Understanding executed between Councils and Victorian Government in September 2014, the impact of climate change on vulnerable social groups is recognised as an area of priority for future work. The MOU recognises that there are shared and separate responsibilities between local government and Councils in this area, although respective roles still need to be clarified.
- Local government's stake in this area is more recently demonstrated by the 22 Councils that have signed on to a pilot scale version of a Solar Rates scheme (at the time of writing), awaiting a decision on Victorian Government grant funding.

Given the above points, it may be argued that local governments, both individually and sectorally, recognise the problem of living costs and climate change impacts for low income households in their community. Should a solution to this problem involve partnership between state and local governments, this would be in accordance with how state and local government have historically worked together on this problem.

Lender alignment with problem statement

Engagement with the retail lending sector to date suggests that they individually and collectively see a need to identify options and offer products to alleviate the problem of providing private finance to low income households at favourable terms for onsite energy investment. The banks we have engaged with so far recognise that there is a problem and that their standard responsible lending approaches do not provide appropriate products and channels to useful finance.

From the perspective that lending is a service that in net terms improves private and public welfare and that this in turns supports the sector's licence to operate, an inability to offer an adequate response to the welfare problem defined here is problematic.

At the same time and for the most part, lenders' comments on potential options suggest that they view state and/or local government to participate as partners needed to help unlock suitable access to private finance, especially in building to scale. That is, lenders are willing to move into the area if they can be supported in delivering responsible loan products by intervention. At the same time, it is reasonable that they expect government to 'not overstep' its role by, for example, crowding out private lending through competing (as opposed to complementary) services.

The scale of the problem in Victoria

Given the problem as stated above, a determination of its scale and its significance to the Victorian community is set out below. The problem is material to the health and wellbeing of a sizeable population of lesser-advantaged Victorians, with impacts carried to the state budget.

The Phase 1 report⁸ was presented in terms of Victoria's 'low income households' that could benefit from a Solar Rates or related scheme, and cites the ABS definition of low income as having a weekly income of or below \$600. In Victoria, this represents 420,000 households.

Using the constraints of the problem definition as set out above, the report and its analysis tools identify low income pensioners as a well-characterised demographic that, while not necessarily spanning the full number of households that relate to the problem statement, may work as a lower bound to the scale of the problem. Using 2011 consensus data:

- There were 405,000 pensioner households⁹ identified in Victoria (in 2011), and these are likely to have higher daytime energy demands as they generally contain at least one member who is no longer in full employment or education.
- Of those pensioner households, 257,000 households were owner occupied. This represents 11 per cent of all Victorian households.

We propose that these figures, adjusted for population growth, set a lower bound for the scale of the problem. Thus in future years and using *Victoria in Future 2015* data¹⁰ (not corrected for population aging) as a basis for projections, there are now approximately 281,000 owner-occupied pensioner households in 2016, and will be 306,000 households by 2021.

Estimating low income households' uptake of onsite energy

For instructive purposes, it might be assumed that low income owner-occupied households would exhibit a similar uptake of residential solar systems as the rest of the owner-occupying population in Victoria, in the absence of particular barriers to uptake.¹¹

⁸ See page 11 of <https://eaga.com.au/wp-content/uploads/MEFL-EAGA-Solar-Rates-Final-Report-2016-01-19.pdf>

⁹ Not to be confused with the 420,000 *low income households* stated earlier in this section.

¹⁰ Refer to <http://www.dtpli.vic.gov.au/data-and-research/population/census-2011/victoria-in-future-2015> [accessed 21 April 2016].

¹¹ For the purposes of simplification, other factors such as prevalence on daytime occupancy, building suitability, incentive to reduce energy bills are put aside here. However, these may not be trivial and further work could examine these factors in finer detail.

Considering that the general residential uptake of solar PV systems in Victoria stands at 13 per cent¹² and owner occupancy in Victoria represents 70.1 per cent of all households (2011 data),¹³ the penetration of solar PV systems into owner occupied homes is 18.5 % (assuming all systems located on owner occupied homes).

Should the current 281,000 owner-occupied pensioner households exhibit a similar uptake of onsite PV systems as a means to manage energy hardship, up to 52,000 low income pensioner households could be generating their daytime electricity onsite. By 2021, this figure is 56,600 (not accounting for the general increase in uptake rate over this time).

Given the above analysis, it is conservatively proposed that at least 52,000 low income households are impacted today through not having the means to invest in onsite solar PV systems. By 2021, this figure is at least 56,600. It is suggested that this is significant for the purposes of warranting government intervention.

¹² See AEMO, State of the Energy Market 2015, p. 60.

¹³ Source: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/1380.0.55.010?OpenDocument#STATES> [accessed 21 April 2016].

3. Low income solar finance mechanisms and their implementation

For a significant volume of less advantaged Victorian households, their ability to finance solar panels as a step to access lower energy costs is severely limited.

This stops them from using solar panels as their primary daytime source of energy, even when the lifetime cost of the system makes more economic sense than continuing to fully rely on retail energy. Low income households need both an ability to access credit (i.e. loans) and for the cash impact of that credit to not outweigh the benefit of having lower demand for energy from the grid.

3.1. Interest rates appropriate to finance solar on low income homes

Modelling during Phase 1 identified that a loan to install solar panels on low income homes with higher daytime energy uses would need to have an interest rate of no more than 5 %, and would need a minimum term of ten years to be cash positive over the lifetime of the loan. This is outside the terms usually offered to those on a low income.

Households with lower or moderate daytime energy uses would need interest rates even lower than 5 %, because a greater proportion of the energy generated may earn a lower price (based on the feed-in tariff, rather than the retail tariff) than is the case for high daytime energy users.

In this paper, a 5 % rate over ten years is treated as the threshold lending criterion, but we caution against being unduly fixated with these terms. If financial products were offered at 5 % interest over ten years, and this was the contractual basis for low income households to finance solar PV systems, the household would only be *marginally better off if their energy-using circumstances remained unchanged into the future*. But they may be at risk of being worse off due to future changes in their energy use patterns that are quite realistic (yet potentially unforeseen) for low income households.¹⁴

3.2. Role of government in securing affordable finance

For commercial lenders to responsibly provide funds to residential households, their terms and repayment structure may normally need to cover:

1. Expected profits or other returns to the business and primary lenders
2. Overheads (both upfront in justifying and developing financial products, and for ongoing activities related to lending)
3. Risk free cost of capital
4. Risk premium, to cover aggregate losses due to delayed instalments or defaults that may reasonably occur when lending to a given market segment under given terms

A responsible lender will generally need to cover all of these financial elements within the returns achieved through interest charged.¹⁵ Thus, for the private sector to be able to lend to low income households that want to install PV systems, they are constrained in how low they can set their

¹⁴ For example, spouse death, family break-up, long term illness, and transfer to aged care facilities are all entirely plausible events within a ten year timeframe for low income households, that would impact daytime energy use and by extension, the value derived from a solar system through reduced occupancy or activity.

¹⁵ This is under the assumption that the loan agreement does not include other substantial fees and charges, relative to the total amount of interest incurred over the period of the loan.

interest rates in the absence of additional supporting mechanisms. That is, in most cases and circumstances, private lenders cannot responsibly lend to that market while enabling a cash positive outcome for the household.¹⁶

To deliver the desired beneficial uptake in solar may therefore involve government intervention aimed at one or more of the main lending factors that determine the interest rate, while granting confidence to lenders that their needs are met and that they can lend to that sector responsibly.

The more direct and assertive approach would be for government to substitute for the private lender on the basis that private lenders are unable to deliver the right financial solutions to poorer households. In effect, this was the course taken in the City of Darebin's Solar Savers initiative, wherein the Council funded the installation of solar panels on close to 300 low income homes through its cash reserve, with repayments enacted through adjusted rates repayments over ten years and at zero percent interest.

While it is not clear that this model is scalable across all local government areas or that displacing the private sector is efficient over the long term, it shows that a zero percent interest rate could be the lower bound cost of credit for low income homes in a solar program. But ultimately, the interest rates available to these homes will depend on the nature and ambition of government assistance and the appetite of private lenders to be part of the solution.

3.3. Continuous improvement on interest rates

There is a welfare imperative to provide incentives that allow for lending at 5 % over ten years as a bare minimum, and then to continually seek improved lending terms to drive the best credit deal on behalf of low income households. Granting confidence that the net benefits to the household unambiguously and substantially (as opposed to marginally) outweighs loan costs, should aid expansion of a program to all households that stand to benefit.

This adaptive benchmarking approach would also help drive the societal efficiency of the scheme, as the cost to put solar panels on poorer homes should be no more expensive that it needs to be. An efficient solution would source ten-year finance for these low income households at as little as 0 % and at most at 5 %, while pricing and allocating risks and costs accurately and fairly.

The discussion below sets out some potential interventions (including the case of minimal/light intervention, and the case of using public funds), based on the Phase 1 report¹⁷, on current consultations with lenders (retail bankers) and other stakeholders, and on the lending factors set out above. Where relevant, comment on scalability and the effect on participation from essential parties are provided to inform the practicality of rolling out across the state.

¹⁶ While there were some financial products tailored to low income borrowers (e.g. NILS), these products were for a shorter period than ten years and/or had a lending cap that would prevent their use to install solar.

¹⁷ While the Phase 1 report primarily identified de-risking mechanisms (i.e. addressing the fourth factor above) as the most likely path to reach the threshold lending criteria, consultation to date has also uncovered how the other needs for lenders interact with interest rate, and how they may be influenced by government intervention.

3.4. Indirect intervention

Through talking with small and medium bank representatives, it was evident that some volume of lending at or below the threshold lending criterion could occur where government is involved in sharing in and augmenting the lenders' efforts at the operational level and where expectations on profit are traded in for some other benefit. The role of government is similar to the more established solar PV bulk buying program facilitated by Councils, with a third party lending component.

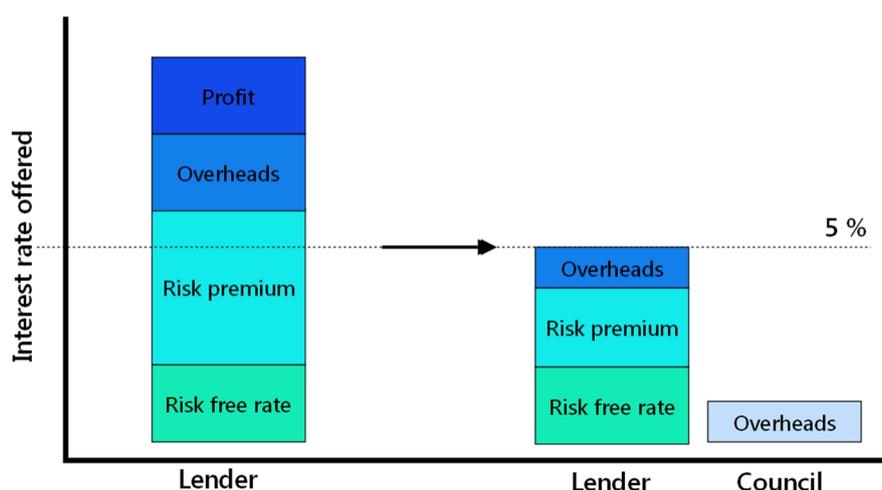


Figure 1: Indirect intervention – profit is foregone, Council shares overheads and absorbs this cost.

This model was identified as possible through one of two mechanisms explained below. As a general observation, it is not clear that these mechanisms can deliver a scale of lending matched to the potential demand from all low income households that are suitable and eligible for solar loans, yet they may provide lessons and an opportunity to test working relationships at the pilot scale.

Replace profit with other goals while forming operating partnerships

In limited situations, a bank may be able to forgo profit and tolerate the risk of default without adequate coverage through interest rates, if government is able to help soften some of the other outlays associated with lending to low income households while fostering participation.

This arrangement was considered possible if other business goals, such as developing networks, building reputation or expanding channels to new customers were sufficiently attractive in place of profit. Further, government bodies (such as local government) could share in some operating costs such as recruitment and engagement, and build profile, credibility and legitimacy into the partnership under the banner of a formal government program. In effect, the lender and government partner according to compatible interests and capabilities.

At least one lender whom we spoke to viewed that this strategy could work at the pilot scale and would actively test it in a limited program, given that a pilot would also align with their position in the market and their inability to compete directly through normal marketing channels such as television and newspaper advertising.

If, at the same time, the lender adopted particularly cautious eligibility criteria to borrowers, then it could significantly limit its net losses in being involved in a program for low income borrowers while contributing to broader customer engagement goals.

On the surface, an approach that relies on business goals other than profit and on stricter approval requirements is appealing. However, it is not clear that this would be reliable over the larger scale or the longer term:

- While a bank may tolerate a small scale of losses through being involved in a pilot, it is not clear that the tolerances would still fit for a program that aspired to assist installing solar on up to 50,000 low income household rooftops, even if multiple lenders were involved.
- If the lender sought to manage these tolerances by pervasively applying tighter lending rules, this may misalign with the risk profile of the target households, such that only a few of them would be approved for finance. This practice may run as a direct obstruction to the desire to scale up a low income solar program.
- It is not clear that a reliance on goals other than profit would provide a confident basis for lender participation over the longer term – marketing, sustainability and other business priorities all shift over time, as do the preferred strategies for attending to them.

At present, it is not clear that these dynamics interact positively with the objective of scaling up a low income solar program. For now, we suggest this approach may be useful in testing and demonstrating the potential of a scheme at the pilot scale, with limited lessons that can then be applied to a larger scale underpinned by a more reliable mechanism to secure finance.

Niche finance with lower expectations on private returns

Engagement with bank representatives identified that there may be sources of finance that will forsake private returns for social returns, and can accept lower interest rates if the loans unlock social or environmental gains. Several impact investment sources were mentioned:

- Charitable foundations (e.g. bank foundations) – non-profit organisations charged with lending and other products and services to generate social goods
- Public and private ancillary funds – funding vehicles established to facilitate investment and donations for charitable activities
- High net worth individuals and angel investors – individuals who have a desire to provide finance for positive social outcomes, and are willing to forgo market returns to do so.

Retail banks are able to facilitate engagement with these sources of finance and devise products that assist capital flows to support welfare programs. But again, there may be overheads in engagement, developing products, and selling and promoting these financial products that the bank may ultimately need to wear or to recover via interest rates. Similar to the approach above, there may be a case for government partnering in delivery if it confers legitimacy and uptake (for both households and holders of investment funds) while spreading banks' costs.

At present, it is not clear whether these niche sources of funding are attracted to a low income solar program or similar; whether they can provide capital at the scale required and when required; and whether they can be relied upon over the longer term.

The program would potentially compete against other welfare-related activities for funding, so the opportunity cost for solar finance may be the loss of funding for some other worthy initiative.

In brief, the two mechanisms may have challenges in scaling up, and are also somewhat disadvantaged in that a loan at 5 % interest per year is currently less attractive than the variable mortgage rate (at the time of writing, as low as 4 % p.a.). Even if a home owner did not have access

to this rate by owning their home outright, a comparison may still be drawn that detracts from the 5 % offerings discussed here.

For those low income households with access to a mortgage, they would be better off if Council directed them to packaging the system into their mortgage (or exploiting pause in repayment clauses to buy the system outright), and helped them navigate the decisions and processes involved.

3.5. De-risking lenders via default funds and serving as intermediaries

The Phase 1 report recommended that EAGA explore options to adjust lenders’ exposure to risk as a key path to lower interest rates. The two de-risking methods most favoured in the Phase 1 report – establishment of a state default fund; and the use of Councils as intermediaries between lender and homeowner – were discussed at length with bank representatives and are set out in detail here.

This stage of the business case agrees that de-risking mechanisms are the most likely means to align the incentives of lenders, participating levels of government, and low income households, although there are still challenges in scaling and confirming commitment over the long term.

State government default fund

The idea behind establishing a default fund is that, in order to motivate lenders to offer an interest rate lower than they would otherwise offer for a customer’s risk profile under normal lending conditions, they need to be compensated in the event of a loss. That way, their overall risk exposure remains within the tolerances required for responsible lending.

State government is the most appropriate level of government to fund such a scheme. Local governments will not typically have the cash, will not be able to offer economies of scale in its application, and will face boundary issues. Yet state government could have sufficient funds available (including existing funds with aligned scopes of use) and through reduced energy concession costs, could directly benefit from the program’s success. State government has the most appropriate means and motivation to provide default support.

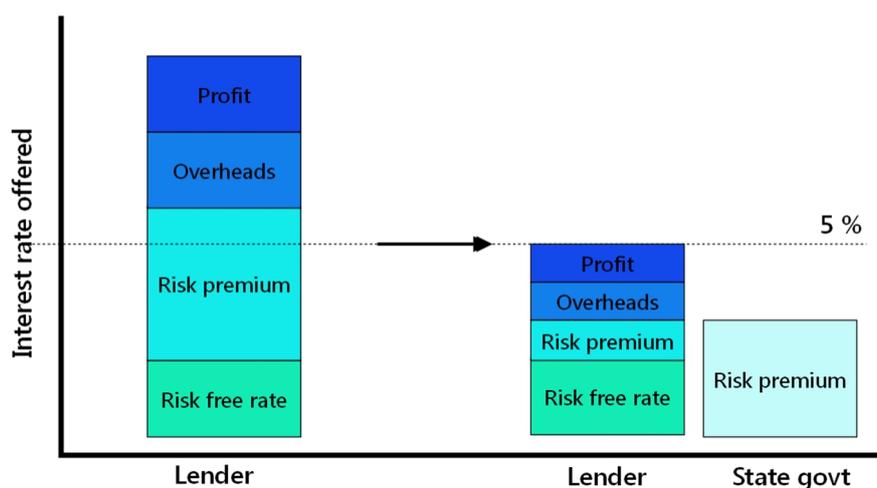


Figure 2: Lending with default fund allows lender to partly transfer risk to the state who absorbs using fund reserves.

When working through a default fund with bank representatives, there were mixed responses.

- Some lenders positively view it as an arrangement that would be necessary to secure sustained interest from banks, in the absence of other mechanisms to ameliorate risk.
- Other lenders viewed it as an unlikely complication that could invite moral hazard¹⁸ from lenders and/or borrowers. On this point, while moral hazard may be a potential concern, its materiality will rest on specific details such as level of compensation, rules for drawing on the fund, how households are recruited and approved for borrowing, and other oversight and governance aspects.
- Further to the issue of moral hazard, information gaps and asymmetries may need to be overcome for a default fund to work efficiently. As the aim of the fund is to motivate lenders to supply capital at required interest rates, its administration would need some independent capacity to review evidence, make judgements and set terms with borrowers and lenders in line with the volume and nature of risk faced by the different parties. Yet at the same time, these processes shouldn't introduce undue overheads to the default fund or to lenders given the relatively modest sums involved with each loan.
- Finally, lenders would need assurances that the default fund would be in place over the longer duration, with reliable terms of use. This may depart from state government's usual funding cycles, timeframes and practices. So unless this is dealt with, lenders may conclude that the default fund is not sufficiently reliable, and may price their risk accordingly.

While the above issues surrounding a default fund need serious consideration, they need not present an insurmountable challenge. Operational and administrative arrangements governing the fund will, however, need to cover these concerns to ensure it works as intended.

Modelling the level of compensation and size of a default fund

Established statistical methods can be used to set the scale of a default fund and the level of compensation per default event, based on the risk presented by a given segment and volume of borrowers, and the extent of protection offered to the lender via the fund.

The Expected Loss model (Frequency-Severity model) and binomial distribution equation can be applied to determine the level of compensation for a lender lending to a 'higher risk' segment, and the overall amount of compensation that the fund would need to carry for a given number of loans and a given confidence interval.

A default fund may be applied by way of the examples set out in Appendix 2, which we acknowledge as simplified and conservative in that they do not account for reduced loan amount over time and use upper figures for probabilities of default in the absence of established market data.¹⁹

¹⁸ In this case, moral hazard refers to arrangements that invite participants to abuse the rules and conventions put in place for private gain, such that the original welfare outcomes intended by those arrangements are at risk. This is closely related to perverse incentives. For example, a poorly regulated fund that fully compensated any bank losses due to default may invite lenders to adopt lower lending standards for the sake of gaining a greater share of the market, as the default risk is fully borne by society rather than the private lender.

¹⁹ In these examples, the target borrower is assumed to carry a default frequency of 2.5 % (based on discussion with Good Shepherd), although it is acknowledged that this is a conservative figure and is used in the absence of any 'real life' market data for lending to target low income pensioner households for solar PV systems.

Similarly, lenders have not revealed the highest tolerable frequency of default that they would accept to be able to lend at 5 % over ten years under normal conditions. For illustrative purposes, we use a 1 % default frequency for this number.

Use of Councils as loan intermediaries

The challenge in lending to low income households to buy solar PV systems is that these borrowers are seen as posing more risk than can be borne through the interest rates needed to secure a cash positive outcome for the household. Yet the low risk nature of Councils as borrowers and the low likelihood of defaulting on rate payments could allow Councils to work as intermediaries to lower the risk faced by private lenders, and source lower interest rates on behalf of the household.

This rates mechanism is used to enable Environmental Upgrade Agreements for commercial buildings in Victoria and elsewhere in Australia. It also underpins the popular Property-Assessed Clean Energy (PACE) programs in the United States of America and Voluntary Targeted Rates scheme to finance residential insulation in New Zealand.

To an extent, the successful Darebin Solar Savers program has some aspects that are similar to this role as intermediaries, although Darebin funded the program out of its reserves, rather than relying on third party finance. So this is more a case of public finance provision repaid via rates, rather than a risk lowering conduit to private finance.

While there are a number of variants to Council-assisted lending and a full review is outside the scope of this work, the following are common elements and their advantages:

- Council rates carry low risk as demonstrated by very low incidence of failure to pay. Further, the repayments are exempt from goods and services tax.
- Loan repayments can be tethered to the property and captured via adjusted rates over a fixed term, so that if the property changes hands, the responsibility to repay is immediately transferred to the new owner. Liability for the loan is offloaded with the property.
- As government institutions, Councils are perceived as very low risk debtors, enabling Councils to secure third party finance for their program involvement at very low interest rates (at 2.5 % to 3 % per annum), which can then be offered to the property owner either as-is or with adjustments in line with the Council's residual risk and/or program overheads.²⁰
- Should the owner declare bankruptcy, outstanding rates are treated preferentially compared to other debts. Again, this grants confidence that there are means to evade default risks.
- In cases where the property owner enters into a contract with the Council, it need not involve developing a direct relationship with a separate private lender. In effect, the program leverages the existing trust and connection between Council and owner. (Note, EUAs have a more complex contract model than this, involving the three parties.)

As a core part of this project, lenders were invited to provide comment on the use of Councils as intermediaries to lower the risks of a low income solar program. Lenders saw two distinct models:

1. Some lender risk could be diminished by calling on the Council rates process as a mechanism to lower the incidence of failure to pay – in effect, using rates to collect debt payments without placing liability on the Council to pay in the event of default (Figure 3). This is similar to the use of Environmental Upgrade Agreements in the low income residential sector.
2. Additional to 1 above, further risk is diminished if Councils acted as intermediate borrowers (Figure 4) – borrowing from private lenders to then lend to low income households. (In effect, the Darebin Solar Savers model, with external finance as a means to respond to scale

²⁰ To be clear, EUAs do not use this mechanism – the role of Council is predominantly as a risk-lowering debt collection intermediary.

of opportunity.) By holding direct liability, Councils mitigate all the private lender's risk associated with lending to low income households, but also carry that residual risk in the event that the household defaults on its (rates-mediated) repayments. This approach also reduces lender overheads as they do not contract with households at all, and instead contract with Councils or groupings of Councils.

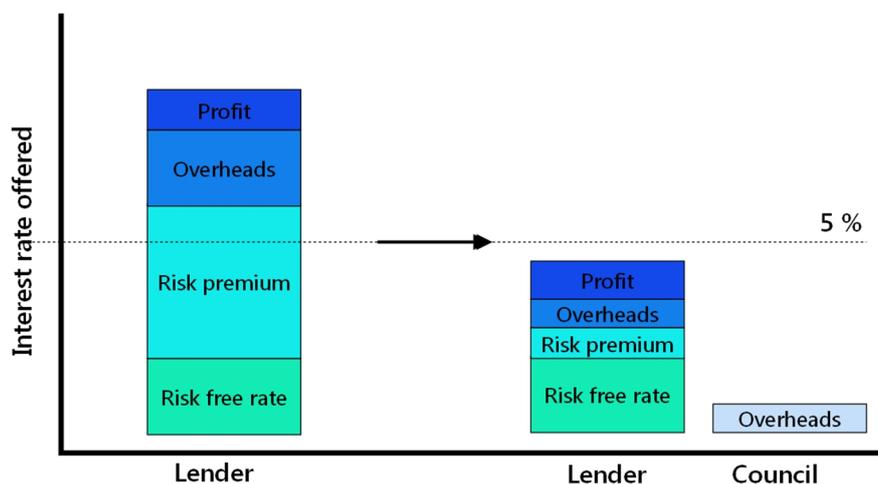


Figure 3: Council as collection intermediary (option 1 above). Risk to lender diminished by relying on Council rates for repayments, and sharing some overheads with Councils.

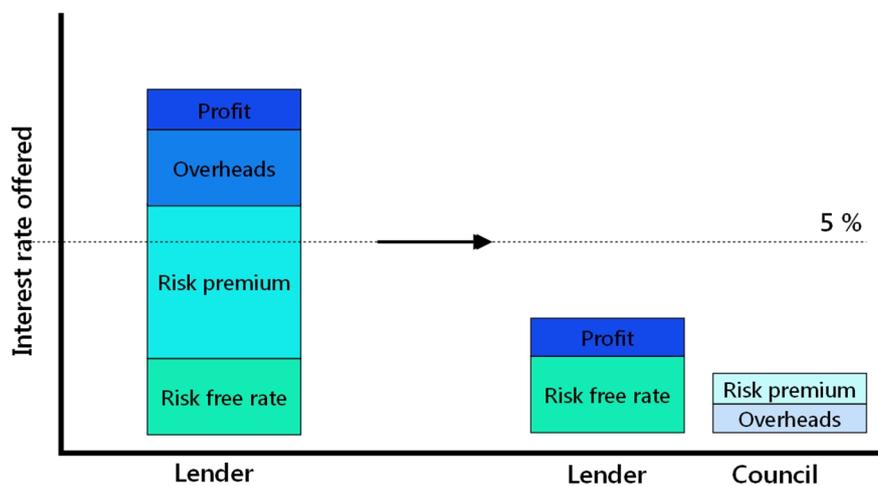


Figure 4: Council as borrowing intermediary (option 2). Risk and overheads to lender diminished by directly lending to Council. Council carries residual household debt risk and recruitment overheads.

Interplay between private lenders' and Councils' expectations regarding debt and risk

In principle, lenders were comfortable with the approaches above and could see that it may work as intended. Yet they cautioned against the idea of simply expanding EUAs (as per 1 above) to cover residential properties for the following reasons:

- The existing legislation for EUAs requires a relatively complex contracting process, requiring coordination across the premises owner, the Council, and the lender. These transaction overheads may not stack up for much smaller residential loans unless the paperwork and

processes are substantially pared back and streamlined. It would be far more attractive to lenders to contract with fewer, larger parties.

- Under EUA legislation, the lender has a direct contracting relationship with the borrowing property owner and is therefore exposed to delayed or lost payments, even if payments are collected through the rates scheme (i.e. where the Council carries no liability and serves only as a collection medium). Councils can enforce the sale of a property and ensure satisfaction in relation to outstanding rate debts. But lenders do not have confidence that a Council would enact this on a low income household. So EUAs for residential properties carry greater financial uncertainty for lenders, relative to commercial EUAs, unless another party bears the residual risk of default.

For this reason, lenders preferred option 2 (above) as a means to largely de-risk their involvement a low income solar program. A special rates mechanism (as allowed under Section 163 of the *Local Government Act 1989*) or some other device involving a direct relationship between Councils and lenders is needed. In this arrangement, lenders would contract with Councils (or some agent on behalf of Councils) rather than directly lend to the many home owners.

However, in the case of the special rates mechanism, Councils have their own uncertainties and misgivings on its use. EUAs appeal to Councils partly because they do not carry direct liability for the loan in the event that the property owner defaults. Thus, EUAs are treated as off-balance for the purposes of Council financial reporting, and are sympathetic with Council preferences to hold minimal debt. Further, there are substantial administrative overheads for the special rates mechanism as its legislation currently stands, that work as a soft yet real barrier to its application.

Strictly speaking, Councils have capacity to take on considerably more debt and can source debt at low interest rates (around 2.5 % to 3 %), but broadly have an institutional reluctance to do so. This reluctance is reflected in their individual debt policies, whose debt limits are voluntarily strict in nature and have historically followed informal state government guidance which need not apply.

While there are other details to this discussion, this is a potential point of tension between what lenders claim they need and what Councils claim they need, in order to be involved in a residential low income solar program that scale at will. Both positions need to be tested through further conversation, and potentially via demonstration at a more modest pilot scale ahead of ramping up.

Victorian legislation and Council debt preferences

At present, there are two legal paths that may immediately relate to the use of the two options to lower the private risk involved in a low income solar program:

- For option 1 above – Council as collection intermediary with no direct liability and debt treated as ‘off book’ – the existing EUA legislation is relevant *but at present **legally cannot be applied to residential properties***. EUAs also carry a high contracting burden that deters lender interest at the scale of a low income solar project (as discussed above).
- For option 2 above – Council as debt intermediary between household and lender – the special rates legislation is relevant *and **legally can be applied to residential properties***. But it is claimed that this mechanism carries a high public administration cost that may lead to Council reticence in its application.²¹

It is interesting that many Councils are sufficiently enthusiastic to participate in a limited pilot program with EAGA for low income solar, and to potentially seek amendments to state legislation to

²¹ This mechanism was used by the City of Darebin in its Darebin Solar Savers scheme, so there is a directly relevant precedent both for its application and for the claim that it carries significant process overheads.

allow the use of EUAs for residential properties, yet this commitment does not yet seem to extend to revisiting debt policies and using the existing legal provisions covering voluntary special rates.

This stance is problematic in that it may not instil confidence in the state government that Councils will mobilise to assist low income residents put solar on their homes, in the event that EUA legislation is amended to apply to residential properties.

Equally, the chances of legislative amendment – either to extend EUAs or to downscale the administrative dimensions of using voluntary special rates charges – would be stronger if Councils can show a robust commitment and preparedness to shoulder an appropriate share of risk, to convince state government that this is a serious concern and that they are ready to take action.

3.6. Public funds to supplement or substitute for private lending

In the interests of providing an alternative solution to financing solar on low income homes, government may have a basis for stepping in to provide upfront capital where private lenders are unable to provide capital with the terms required to resolve the welfare problem.

The Darebin program represents one example of this approach, as the city did not then apply to other funding bodies to supply the cash required for the program. In this case, the Council chose to apply a 0 % interest rate – effectively subsidising the households. Multiple Councils could in principle offer rates-based loans to any number of households, as per the Darebin scheme and the current proposal to conduct a pilot program. But at present and in reference to this pilot program, there appears a very mixed appetite to do this from across the Councils.

Based on informal discussions with state government officers with experience in fund usage and governance (such as the Sustainability Fund), there are no legal barriers to using state funds in this way to achieve a scaled up solution. However, this needs to be scrutinised via a closer analysis of enabling legislative and administrative rules. Similarly, the CEFC could be a funding body by setting a limited outlay into a pooled fund accessible to households and managed by a third party, although we are not aware of a precedent for their direct involvement in residential scale PV funding.

In practical terms, there is no reason why low income households need rely on public funds to the exclusion of private funds or vice versa. For example, if there were a mix of lower interest private funds and public funds to create a common pool for lending under the Solar Rates scheme, the administration body would have the flexibility to balance funds from multiple sources to offer terms to different low income household segments, according to need and capacity to pay.

For example, if the common pool carried an equal mix of private funds (demanding a 5 % interest rate) and state/local public funds (demanding, for example, a 1 % interest rate), a uniform 3 % interest rate could be applied to all borrowers drawing from that pool. Or if this is more suitable to the program's objectives, multiple financial products could be prepared and offered, depending on household circumstances and suitability. In this way, the private funds extend the volume of funds available for lending; and the public funds effectively dilute the higher interest often expected by private lenders. The distinct sources together grant flexibility to the program's lending ability.

This discussion more generally underscores the power of establishing a funding procurement model that can draw in different sources of finance as the opportunity arises – not only does this allow scaling in line with opportunity, but can also free the program to set interest rate benchmarks and source funds according to what the market and public channels can sustainably offer.

3.7. Concluding remarks on financing arrangements

Table 1 summarises the different types of financing models covered in this section, providing an overview of interest rates, mechanisms, factors that impede scale, outstanding risks, and their status with respect to relevant legislation. Some brief observations:

1. As the table progresses downwards, the interest rate offered to low income households increases. This has a bearing on scale and uptake, and on the benefits to homeowners. Programs at the top have a demonstrated performance of strong recruitment (and the successes of the Darebin Solar Savers round one and US Property Assess Clean Energy (PACE) schemes attest to this), while the others are less tested for low income households.
2. Scaling also depends on the buy in from lenders who are constrained to lend responsibly, and on meeting the concerns of the government levels that have a central role. There are tensions between what each of these sectors assert is needed to secure their participation, such that a low income solar program may need compromise, and a willingness of leaders from each sector to be flexible and move beyond their stated tolerances.
3. Of the financing models set out, legislative change is needed to enable EUAs (or similar) for residential properties, and/or to make special rates mechanisms less onerous for Councils to apply. While the other mechanisms don't depend on changes to law, there is less evidence that they can scale in direct response to low income household demand and opportunity.

As a further note, there is the opportunity for the state government to provide funds at discounted interest rates either by lending to Councils, or by direct provision of funds that are used in loan products in combination with funds sourced at private interest rates. This approach may have a place in a number of the finance models set out in the table, as a means to suppress interest rates.

Table 1: Summary of different financing options, and their estimated relationship to interest rate, scaling, risk and legislation.

Interest rate	Mechanism & role of Councils	Scaling considerations	Outstanding risk holders	Legislative provisions
Towards 0 %	<p>Special rates using public reserves</p> <p>Government (Council or state) lends to resident without private lending, and collected via Council rates – discretionary interest to cover overheads and/or government risk from default.</p> <p>Example: Darebin Solar Savers</p>	<p>Scale constrained due to impact on each Council budget and Council appetite to draw on reserves (unless a state fund is involved), plus overheads caused by current special rates mechanism obligations.</p>	<p>If interest charged excludes default risk:</p> <p>Risk held by public lender but diminished due to use of rates to collect debt</p> <p>If interest includes default risk:</p> <p>Risk held by household but likely to be offset by energy savings.</p>	<p>Requires use of existing special rates mechanism as the means to retrieve public debt.</p> <p>Option to revise administrative impost (public gazetting and sign off).</p>
2.5 % to 3 %	<p>Special rates backed by private lender</p> <p>Council lends to resident, backed by private lending (retail banks; bond markets), and collected via Council rates – Council can apply discretionary interest to cover overheads and default risk.</p> <p>Example: PACE schemes (USA)</p>	<p>Scaling possibly hampered by Council willingness to extend its reliance on debt and bear the overheads that come with current special rates mechanism obligations.</p>	<p>If interest excludes default risk:</p> <p>Risk held by Council but diminished due to use of rates to collect debt</p> <p>If interest includes default risk:</p> <p>Risk held by household but likely to be offset by energy savings.</p>	
3 % and above	<p>Residential EUAs (or equivalent)</p> <p>Banks lend directly to residents; repayments collected via rates.</p> <p>Councils not liable for household debt but may support via promotion, engagement and recruitment processes.</p> <p>Example: EUAs (commercial only)</p>	<p>Constrained by willingness of lenders to bear contracting costs and residual risk of lending to household.</p> <p>Also potentially hampered by households' willingness to enter into debt with private lender at the proposed interest rates.</p>	<p>Assume that interest rate offered accounts for the residual risk posed to lender due to Council being non-liable in the event that the homeowner defaults.</p> <p>Risk therefore held by household in the form of rate of interest which may start to imperil its cash positive outcomes.</p>	<p>Requires use of amended EUA legislation, which currently only applies to non-residential properties.</p> <p>Will need to streamline and pare down process and paperwork in line with modest size of residential transaction.</p>

<p>3 % to 5 %</p>	<p>Public default fund</p> <p>Banks lend directly to and collect repayments from residents, but can call on default fund to offset losses due to default.</p> <p>Councils support via promotion, engagement, recruitment and aggregation processes.</p>	<p>Hampered by willingness of lenders to bear administrative overhead of accessing the fund relative to loan size and default payment (which may be compensated by adjusting interest rate).</p> <p>Potentially limited by households' reluctance to enter into debt with private lender at the proposed interest rates.</p> <p>Constrained by size of fund government is willing to provide. Note that fund size is also proportional to compensation paid, which also affects interest rate offered by lender.</p>	<p>State government (i.e. public) holds residual risk to the extent that the default fund fully or partly compensates private lender.</p> <p>Some risk may be held by households if the interest rate approaches the threshold for cash positive outcomes in borrowing to install solar.</p>	<p>This approach is not dependent on a particular legislation to proceed.</p> <p>It is understood that legal provisions regarding state public funds do not prohibit this use (although reforms to administering funds may be required).</p>
<p>approx. 5 % for stand-alone finance</p> <p>4 % to 5 % if via mortgage</p>	<p>Indirect intervention</p> <p>Banks lend directly to and collect repayments from residents, and are able to offer discounted rates through strict approvals, shared operations, offsetting profit for other benefits, and tolerance of losses at the lower scale.</p> <p>If homeowner is a mortgagee, bank's role is to package into existing home loan.</p> <p>Councils support via promotion, engagement, recruitment and aggregation processes.</p>	<p>For stand-alone finance:</p> <p>Potentially limited by households' willingness to enter into debt with private lender at the proposed interest rates, which leave them only marginally better off.</p> <p>Inherently limited by strict eligibility approvals, acceptable loss tolerances, and absence of profit outcomes.</p>	<p>Some risk held by households as the proposed interest rate is at the margin for cash positive returns for the household – resident is highly exposed to shifts in circumstances.</p> <p>Risk also held by lender, although this is voluntary and can be set within tolerance limits before engaging in program.</p>	<p>This approach is not dependent on a particular legislation to proceed.</p>

4. Implementation at scale through shared services

This section of the paper argues the need for a shared service model to provide a cost effective and efficient vehicle to implement the necessary interventions at scale. The previous sections have outlined the problem, scale and financing avenues and options to address access to cash positive finance at terms which might be attractive to a target set of low income households (i.e. pensioners). To move to implementation, state government, Councils and key stakeholders (i.e. private lenders) need to discuss and agree on the characteristics and terms for a shared service vehicle and who invests to keep the service running efficiently and effectively over the journey.

4.1. Recap on shared services and drivers for involvement

The ‘shared service model’ approach has traditionally been developed to better enable scaled services via the local government sector, however it does not have to be constrained to bringing benefits and efficiencies to the local government sector alone. If the problems and benefits are shared between sectors (i.e. local and state government and/or other stakeholders), then the case for shared investment and involvement can be made. The Victorian Auditor-General’s Report (2014) ‘Shared Services in Local Government’ took the view that:

‘Shared services involves Councils working together and/or with other organisations to share costs and resources, and may include delivering external services to the community, such as libraries and waste collection, or providing back office functions, such as human resources and payroll, or the procurement of goods and services.’
(VAGO 2014, Page vii)

Shared service drivers for Council involvement

Work by Somerville and Gibbs²² outlined a rationale for establishing a ‘shared service’ from a Council services perspective as being linked to satisfying one or more of the following drivers: Economies of scale; Leverage capacity and capability; Improved service quality; Organisational development; and Increased strategic capacity.

For the most part these drivers have been applied to developing a ‘shared service’ arrangement for a long standing core activity or function performed by Councils, such as waste services. However, it is recognised that the role and expectation around service delivery to local communities is dynamic and the drivers can equally be applied to new and emerging areas.

Councils have not traditionally played a role in the provision of solar PV to low income households. There are a number of examples where individual Councils and Alliances have sought to encourage the bulk purchase of solar PV for households and local businesses. The potential role of Councils in enabling or facilitating local embedded energy and energy efficiency is growing, given related local community and business expectations to assist.

²² Somerville, D. and Gibbs, M. (2012) Legal and Governance Models for Shared Services in Local Government, Australian Centre of Excellence for Local Government, University of Technology, Sydney, Page 11.

The driver around exploration of ‘shared service’ models through the solar rates business case is similar but different. The key driver for establishing a ‘shared service’ is:

- To reduce the resourcing impact or impost on individual Councils looking to enable low income households the opportunity to access solar PV on ‘cash positive’ terms.

On the back of the Darebin Solar Savers experience, it is recognised that there are a range of staff overheads required to be met in the roll-out of a similar scheme. It follows that there is merit in exploring a shared service at scale to alleviate the need for each Council to separately invest in building resources and capability. Further, given Councils are currently facing rate capping (revenue restrictions) it would be reasonable to expect that some Councils may be reluctant to individually pursue this ‘new’ service. For a number of Councils, the number of relevant households that may be interested in the program may be too small to warrant an internal purpose-built program.

Further still, as these schemes are relatively new, there are a number of unknowns and potential complexities which need to be worked through. A centralised service approach to working through these issues appears to offer the benefit of consolidated options and solutions.

Shared service drivers for state government and key stakeholders

The key driver for the state government for supporting and engaging with a shared service structure is primarily a reduced need to engage with each individual local government, reducing administrative overheads. In effect the scaled shared service entity can provide an outsource model for service delivery from a state perspective, and encourages partnership and leverage across sectors (government and private). The costs and benefits are shared.

The alternate to a Council-led shared service vehicle for low income solar is for state government to place delivery responsibilities with a state government agency. While this is a legitimate approach (given a state scale ambition), there has been limited indication from the state government that this is the preferred path forward. The option for Sustainability Victoria (SV) to play a role as a delivery partner is outlined further in section 4.3 (below).

Creation of a more centralised shared service entity for low income solar also provides options for key stakeholders and delivery partners to leverage benefits from economies of scale and reduced transaction costs across multiple parties (i.e. Councils and to some extent, households). Rather than engaging directly with individual Councils or households incurring higher transaction cost, key stakeholders providing private finance or household energy services can respond to shared service procurement opportunities with greater confidence of scale for their business.

4.2. Characteristics of a low income solar shared service vehicle

Now that we better understand the drivers behind pursuing a shared service delivery, we turn to an examination of what would be the key characteristics of a low income solar shared service vehicle.

Scaled to state coverage

The ambition on scale has been conservatively set at 52,000 pensioner households currently located throughout the state. However, it is unlikely that the resourcing and shared ambition will see all Councils looking to facilitate low income solar outcomes at the same time. The shared service should have the potential to scale to state coverage but also the flexibility to respond to and provide aggregated services for combinations of Councils and associated partners whose ambition, budgets and timing align. Leading Councils need to be supported to embark in groupings that suit, and others supported to learn about the costs and benefits and options to follow on.

Adequate timeline for implementation

The tendency to short term programs (one to two years) does not necessarily align to a scaled approach to provision of services. Short term programs or pilots can be accommodated, but there is benefit in having an overarching commitment and ambition to implementation over a longer term i.e. ten years (given current proposed terms of a loan / rate based mechanism). State government program implementation is often aligned with election cycles, and program emphasis changes with changing policies and priorities from cycle to cycle. Still the ongoing costs to government of electricity concessions for low income householders and acknowledgement of ongoing welfare and hardship impacts in the residential energy sector point to a longer term commitment to addressing the problem at hand.

A longer term ambition is likely to underpin:

- a dynamic as opposed to a static services model - best practice, continuous improvement, and benchmarking dimensions of existing services
- the need for ongoing market research, brokering/matchmaking and awareness to realise best opportunities (in supply chain/partners, in extension of offering etc.)
- stable growth planning and engagement activities
- mature, credible status and quality of service (e.g. standardised, certified services and processes)
- a role in sector leadership and engagement
- supply chain certainty and capacity building.

Driving continuous improvement on financing terms and interest rate

Any shared service needs to be focused on the core purpose of delivering best possible financing terms on behalf of low income households. There are a broad range of interventions, as outlined in the solar finance section (above), and potential to scale and drive new innovations, products, rates and terms through a suitable shared service vehicle.

As mentioned previously, an efficient solution would source ten-year finance for these low income households at as little as 0 % and at most at 5 %, while pricing and allocating risks and costs

accurately and fairly. Taking an adaptive benchmarking approach through implementation helps drive the societal efficiency of the scheme over time.

In broad terms, the range of services and activities could include:

- Undertaking processes surrounding the establishment and agreement by individual Councils to apply a special rates charge (or similar) to nominated households and handle all communication with the householder around explaining and signing individual contracts.
- Designing and implementing group procurement processes and managing panels on behalf of Councils/government, to deliver one or more contractual arrangements for the provision of finance at agreeable terms to Councils or direct to households.
- Holding and/or managing a default fund on behalf of state government and the scheme. Manage pooled funds and transactions.
- Conducting ongoing market research and negotiation with potential partners and advocates.
- Revising business case delivery and pitch to prospective investors over time (public / private).
- Intergovernmental/inter-sectoral reporting on financial position and transactions.
- Governance and risk management.

Recruitment - communication and engagement with low income households

The communication and engagement overhead associated with recruitment of low income households to the solar scheme is thought to be a key area for economies of scale and cost savings to Councils. The design and branding of the communication material will need to satisfy the key stakeholders and partners and resonate with prospective low income households. Anecdotal evidence suggests that for the pensioner segment of low income households, communication with 'Council' representatives is key. The range of services and activities could include:

- Direct recruitment (letters, calls, emails, etc.)
- Recruitment administration (maintain client management system)
- Community workshops / seminars on scheme
- General communications (website, case studies, articles etc.)

Technical household energy (Solar PV) expertise

There are a range of services that need to be enabled through involvement of household energy (Solar PV) expertise. In broad terms these areas of activity include:

- screening of potential roof-tops for solar potential against electricity consumption profiles
- sizing and design of systems
- selection and purchase of PV panels, inverters etc.
- installation of systems
- connection and commissioning
- maintenance of operation (over, at minimum, the loan/rate charge term).

There is an overall responsibility to ensure these activities take place on a household by household basis to an agreed standard.

The separation of responsibilities between internal roles (housed / employed by the shared service) and contracted service providers will need to be determined. For the most part it is expected that contracted third parties, energy brokers/facilitators and solar PV providers, will be contracted to undertake energy services and installations following selection through a group procurement panel process. This should enable efficient, timely and competitive responses to scaled opportunities.

Group procurement

A range of the activities and services outlined above could be undertaken by third party service providers engaged via a 'group procurement' tender process. The ability to organise and group procurement on behalf of a group of Councils (or private residents, depending on design of the scheme, e.g. bulk buy schemes) is therefore a key function of the shared service.

The *Local Government Act 1989* provides the opportunity for Councils to perform functions inside and outside municipal districts and the ability, under Section 186 (5), for a Council entering into in a group procurement arrangement (lead by another Council, agent or 'in accordance with arrangements approved by the Minister') to avoid the need to repeat a range of administrative obligations and notifications.

One such group procurement arrangement approved by the Minister for Local Government is MAV Procurement, a not-for-profit unit of the Municipal Association of Victoria (MAV) focused on achieving better procurement outcomes for local government. The option for MAV Procurement to play a role as a delivery partner is outlined further in section 4.3 (below).

Ability to integrate other services – energy efficiency and thermal comfort?

Building a shared service delivery vehicle around reducing barriers to financing low income solar is a relatively focused intervention aligned to the problem statement set out in section 2. However, in time the opportunity to provide engagement, financing or other linkages to other improvements to low income households can be explored and integrated. Provided the service is not replicating but leveraging opportunities provided through other government and private channels, an expanded intervention should still pass the governments public benefits test.

4.3. Learning from pilots: partnerships for a state-scaled shared service

EAGA recently coordinated development and submission of the Solar PV for Low Income Households application to the state governments New Energy Jobs Fund (NEJF). Described in the text box below, the application is an attempt to scale and build on the Darebin Solar Savers (solar rates) scheme, with additional investigation of the provision of private finance through targeted bank loans (from one financial institution) at terms of 5 % p.a. over ten years.

If successful in obtaining funding, the program will leverage operational funds from state government to operate a shared service with funding toward salary costs of 3.1 FTE (for 2.5 years) and a small default fund of approximately \$50K.

Engagement and feedback from stakeholders (state government, Councils and the finance sector) through this current project would suggest there is more that can be done to position this 'pilot' NEJF application and the related commitment gathered from 22 Councils within a state scaled initiative.

If funded, the pilot can provide learnings relevant to building a state-scaled scheme.

To maximize the benefits, further engagement is needed with state scaled delivery organisations which potentially hold aligned interests. MAV Procurement and Sustainability Victoria are two such organisations who have been preliminarily engaged through this project.

The scope of shared service characteristics (section 4.2) and financing options (section 3) are broader than the scope of what the NEJF pilot looks to address. Further engagement with MAV Procurement and SV representatives should enable further traction around shared ambition for a state scaled scheme, which would in turn provide support to the proposed NEJF pilot (if successful) or any other pilot scheme proposed and supported by Councils, government and private finance.

A summary of potential benefits to MAV Procurement and SV involvement in establishing a state scaled scheme are included here to encourage further consideration.

NEW ENERGY JOBS FUND APPLICATION - SOLAR PV FOR LOW INCOME HOUSEHOLDS

Seeks to install 1,193 solar PV on low income and vulnerable households across twenty two municipalities in Victoria. The project is proposed to be led by Maroondah City Council and coordinated by the Victorian Greenhouse Alliances. The initiative will be delivered over 2.5 years and will:

- scale-up the use of Council rates to provide individual loans to households and recover costs through the rates system
- catalyse private-sector investment within a community segment traditionally viewed as high risk to investors by establishing and evaluating partnership finance models with the banking sector
- establish a shared services approach to project implementation to enable access to dedicated capability and reduce resource requirements and risks to Councils. The approach will leverage economies of scale in administration, procurement and governance, and (importantly) enable participation by Councils not otherwise able to offer this service to their residents.

Work toward state scale involving MAV Procurement

Flexibility to scale – Councils can join individually or collectively to work via MAV Procurement as their procurement / contracting agent. It grants the opportunity for a flexible arrangement that could start small or be scaled to a state wide potential from the outset.

Energy services group procurement – drawing on recent experience in managing procurement relating to streetlight retrofits, MAV Procurement could set up procurement processes and panels of providers for solar panels, project management, facilitation and energy service brokering services.

Financial services group procurement – a procurement process seeking suitable financial products for low income solar could be attempted, given MAV's core expertise in this area (as below).

Leverage the Local Government Finance Vehicle (LGFV) - The LGFV is a mechanism that could be employed to provide 'cheaper' finance to the local government sector, in part to provide additional funding via Councils for provision of solar PV to low income households. The long term expectation is that capital will be provided to Councils through LGFV at 1 % p.a. below bank finance.

Encourage investment from state and Commonwealth government – with scale comes the opportunity to seek direct investment from state and Commonwealth entities. For example, the Clean Energy Finance Corporation (CEFC) had expressed some interest in investing through the LGFV, given they have notionally allocated \$230 million for local government sector investment.

Work toward state scale involving SV

Program delivery and design input – SV hold technical expertise across renewable energy and energy efficiency program delivery for the built environment. They may provide input and technical advice on program design and delivery matters. They may also provide connection to benefits and interactions with other schemes (i.e. VEET) if integration is preferred.

New opportunities – with energy, environment and climate change portfolios aligned there may be opportunities for SV to attract dedicated program support using this or similar business cases.

State level branding and regional staff – promotion and co-branding with a state government agency may encourage increased engagement with the program. SV have some regional staff and their work programs could be aligned to provide additional engagement and program support.

Investment attraction – SV have investment attraction, procurement and data governance and management capabilities which may be useful to leverage at pilot and state scales.

Appendix 1

Stakeholder consultation to date

This background paper is informed by stakeholder consultation as agreed with the project manager. Further consultation will be necessary to confirm findings, to refine proposed financial modelling (for example, for the default fund), to better understand legal provisions and options to inform them, and to elaborate concepts behind a delivery model and shared services arrangements.

To date, the project team has consulted with the following parties:

- Robert White and Michael Prentice, nab bank
- Jacob Edwards, Bank Australia
- John Bergin, Bendigo Bank
- Catherine Bremner, ANZ Bank
- Cameron Spence, MAV Procurement
- Tanya Corrie, Good Shepherd
- Linda Tremewen, Victorian Government (MWRRG)
- Leighton Vivien and Julia Keeble, Victorian Government (DELWP)
- Peter Dobson, Prem Panickar and Kristen Wood, Victorian Government (DELWP)
- Sally Moxham, Sustainability Victoria

Further consultations are planned with these and other stakeholders as the business case process continues.

Appendix 2

Examples of applying a default fund

Task: Determine how many solar PV loans (2 kW each @ \$3,350) can be covered by a \$50,000 fund

Assume that lenders would only offer a 5 % loan over ten years if they were exposed to a probability of default (PD) of 0.01, under normal circumstances (i.e. no default fund). Also assume that lenders involved in a solar rates scheme are lending to a market segment that they would normally attach a higher probability of default to, equal to 0.025.

In the first case, lenders should only expect a loss (EL) of \$33.50 at worst (assuming the full value of the loan is outstanding at time of default, i.e. exposure at default or EAD = \$3,350) across all borrowers. But in participating in the scheme, their expected loss is \$83.75 per loan. To be comfortable in participating in the program, the default fund needs compensate such that lenders are no worse off than in normal operating conditions.

We can apply, for participating lenders supported by a proportion of compensation, R:

$EL = PD \times LGD \times EAD$ and define R as the proportion of loss covered by the default fund.

i.e. $EL = PD \times (1 - R) \times EAD$ (note: loss given default LGD = 1 if there is no compensating mechanism)

Substituting $EL = \$33.50$; $PD = 0.025$; $EAD = \$3,350$, we get:

$R = 0.6$, i.e. in case of default, the fund needs to compensate the lender by $0.6 \times \$3,350$ or \$2,010. A \$50,000 default fund can therefore account for close to 25 defaults.

Assuming that default incidents are independent²³ and applying a binomial distribution, if the fund is applied with a 95 % confidence interval that it can cover all default events within a low income solar scheme, then the scheme can involve a total of 698 loans.²⁴

In another example and applying the same methods, it is instructive to understand what size of default fund would be able to cover a low income solar program aimed at installing 2 kW solar PV systems on 56,000 owner-occupied pensioner households. Using the same illustrative frequencies of default (which we again caution need to be revised using industry figures if available), a default fund would have to be prepared to pay out up to \$2.94 m over the life of the program. In this example, this default fund sum would leverage \$187 m in capital outlays to install solar PV systems (56,000 units at \$3,350 per unit). Figure 5 uses the variables from these examples and shows the linear relationship between default fund size and number of households involved in a program, all other factors being equal.

²³ Note that they may not be independent if borrowers and/or lenders are subject to pervasive changes in market conditions or if there are structural relationships between the loans.

²⁴ This figure is determined using the Excel function *binom.inv* (*N*, *p*, *alpha*).

The examples above use illustrative probability of default figures, which can be revised on consultation with lenders and/or through findings in rolling out a pilot scale scheme. Further, to ensure improving default fund performance in line with growing risk, it would make sense to roll out any large scale program in a gradual and staged manner, with information gathering mechanisms to improve the understanding of risk over time and revisit the fund's size and expectations accordingly.

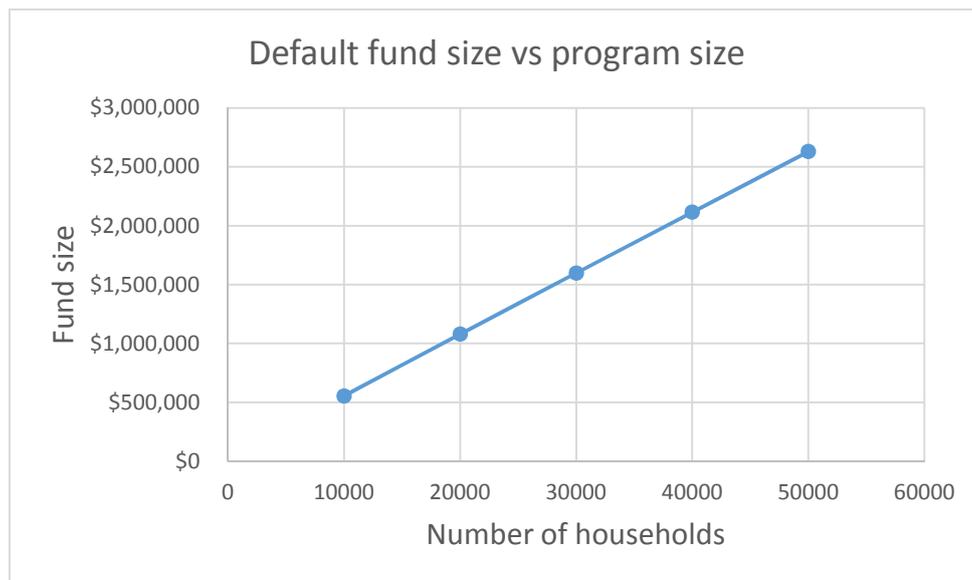


Figure 5: Default fund size and number of households in a low income solar program.