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Still not FiT for Purpose

A response to the Office of the Tasmanian Economic Regulator's January 2022 Draft Investigation Report on the Regulated Feed-in tariff Rate for Standard Feed-in Tariff Customers.

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Summary

Overview

We are deeply disappointed that we are now at the beginning of another 3-year period in which the methodology for calculating and paying the benefits of locally generated electricity fed into the distribution network is to remain basically unchanged.

Much of the argument for a greater consideration of the benefit of distributed generation in included in previous TREA submissions, notably {TREA 2016, 2018b and 2019}. For convenience some of these arguments are repeated below and more detail is included in the documents referenced at the end of this submission.

TREA believes that the current FiT review process as mandated by the ESI Act and the Pricing Regulations is an inadequate mechanism for supporting the solar industry and other distributed energy resources in Tasmania.

Greater support for the implementation of distributed generation could contribute to reducing the cost and environmental impact of electricity supply in Tasmania and contribute to energy security and industry development.

There are two basic problems with the current FiT review process:

- The terms of reference focus mainly on the direct savings to retailers, rather than looking at the overall benefit to Tasmania. Even where indirect benefits are identified by OTTER, they are dismissed as not appropriate to include in a FiT rate because they do not flow through to consumers under current pricing arrangements.
- Technological innovation, the need for urgent action on climate change and the desire for a more resilient electricity system are all leading to rapid transformation of our energy systems. Treating solar PV as a minor contributor to our energy system undervalues the potential for the full suite of distributed energy resources to contribute to this transformation for the benefit of all customers (not just solar owners).

Setting a fair feed-in tariff

As we have argued in many previous submissions, a fair feed-in tariff should take into account:

- a wholesale price that reflects the total benefit to Tasmania, not just the saving to Aurora
- the fact that locally generated and used energy does not make use of, and should not pay for, the transmission network
- avoided losses from transmitting electricity over long distances
- savings from less demands placed on the distribution network
- the reduced greenhouse gas emissions resulting from solar's role in reducing imports from Victoria
- the health benefits from reducing import of fossil fuel based electricity.

Previous calculations on a fair FiT based on these factors is summarised in the Appendix and in more detail in the TREA submission to the Tasmanian state government Solar FiT Review {TREA 2018b}.

Alternative mechanisms to support distributed generation

TREA has consistently argued that a higher flat rate FiT is in the long term best interests of Tasmanian electricity consumers. However a flat rate FiT is only one mechanism for supporting greater uptake of distributed energy resources.

Additional mechanisms are described starting on page 6.

We acknowledge that most of these alternatives are outside the scope of the current OTTER FiT determination process. However they should be considered by OTTER in view of the wider role of the economic regulator in ensuring that the electricity system operates fairly and in the best long term interest of Tasmanian electricity consumers.

Context

The solar industry in Tasmania

TREA represents solar sales companies and solar installers operating in Tasmania. The solar industry is a highly competitive but highly regulated industry. Solar installers have to be licenced electricians.

In addition all solar installations have to be individually designed by a Clean Energy Council (CEC) accredited designer and the installation has to be supervised by a CEC accredited installer. Additional qualifications are required to design and/or install off-grid solar and battery systems and to design or install on-grid PV systems with batteries.

In Tasmania, almost every solar installation is inspected for standards compliance and electrical safety under a contract issued by Consumer, Building and Occupational Services in the Department of Justice. (Tasmania is the only state with 100% inspection of solar installations.) In addition, nationally, a sample of solar installations are inspected by the Clean Energy Regulator.

Fluctuations in the demand for solar driven by sudden changes in government policy make it more difficult to maintain a local industry that can deliver the required quality standards.

Support for the solar industry will ensure the continuation of these highly skilled jobs located throughout the state.

The move to a decentralised grid

There is widespread agreement that the electricity system is moving to a much greater role for renewable energy and for distributed generation and storage of energy. (See for example {TasNetworks 2018} and {ENA 2017}.) Nationally the ENA/CSIRO Roadmap maps out a future in which by 2050:

- *Networks pay distributed energy resources customers over $2.5 billion per annum for grid support services*
- *Electricity sector achieves zero net emissions*
- *$16 billion in network infrastructure investment is avoided by orchestration of distributed energy resources*
- *Reduction in cumulative total expenditure of $101 billion by 2050*
- *Network charges 30% lower than 2016*
- *$414 annual saving in average household electricity bills (compared with roadmap counterfactual, business as usual, pathway)* {ENA 2017 p.iv}.

The TasNetworks Transformation Roadmap suggests that in Tasmania by 2025:

- 40,000 customers will have their own renewable energy source (mainly solar)
- 17,000 people will be driving an electric car
- 5,000 people will have battery storage.

Tasmania is particularly well placed to benefit from this transformation as a result of:

- the ability of our hydro system to provide long term storage to back up variable renewable energy generation (both centralised and distributed)
- the skill base resulting from over a hundred years of renewable energy engineering
- state ownership of the major generation, network and retailing businesses.

To ensure the maximum shared benefit from this transformation it is important that Tasmania has a shared vision of our energy future which translates into integrated policies across government and GBEs. A vibrant solar industry is the basis on which to develop an industry sector leading the way in new technologies of energy management, distributed storage, and the optimal integration of electric vehicles into the electricity network.

Inadequacy of an incremental approach

The current FiT determination process is intended to set a methodology for the next three years. Many new technologies are likely to impact on the electricity industry over this period, in particular local grid-connected battery storage and the integration of electric vehicle charging into home energy management systems.

These technologies provide the potential for distributed generation to be fed into the grid when it is of most benefit, rather than just when the sun is shining. To encourage this benefit, price signals need to be sent to customers.

Scope issues and responsibility

In this section we attempt to separate out the issues on which we believe OTTER is able to respond given its current terms of reference and those issues which are relevant to the value of distributed generation but which require action by the state government or changes to the national electricity rules.

OTTER's ability to act

Appendix A to the draft determination sets out the legal basis for OTTER's determination.

OTTER's draft determination is strongly based on the principle of 'avoided cost to retailers' but this is not an absolute requirement of Section 44H of the ESI Act. OTTER is able to take into account "any other matter the Regulator thinks relevant".

We reject the assertion that any payment in excess of the benefit to retailers results in a cross-subsidy and that this is sufficient reason not to pay a higher rate. The claimed "principle that the feed-in tariff rate specified in the determination should not have the effect that any customer would effectively be cross-subsidising any other customer" is does not stand up to scrutiny and is not applied to other aspects of electricity pricing. Most notably the policy (which we support) that electricity tariffs are the same for consumers in urban and remote rural locations shows that all aspects of electricity pricing are subject to policy decisions and that pure 'cost reflective' pricing that avoids 'cross-subsidy' is an abstract concept that is impossible to put into practical effect.

Although we have criticisms of the National Electricity Objective, the goal of meeting "the long term interests of consumers of electricity with respect to: price, quality, safety and reliability and security of supply of electricity" provides a better basis for policy than 'avoided cost to retailers'.

As we have argued elsewhere in this submission, the wider take-up of customer owned energy resources (notably solar PV, batteries and grid-connected EVs) is inevitable and desirable. Policies that support this take-up can benefit all consumers, particularly in relation to the long term cost and reliability of electricity supply. We do not believe that the ESI Act prevents OTTER from taking these benefits into account.

Issues outside OTTER's responsibility

While we note above that OTTER is able to take into account "any other matter the Regulator thinks relevant", there are a number of issues related to the valuation of distributed generation that are most effectively dealt with through other avenues.

Social cost of carbon

The draft determination notes (p.35) that the Victorian FiT arrangements include 2.5 ¢/kWh for the avoided "social cost of carbon". While Tasmania's electricity usage is largely matched by renewable generation, it is also true that incremental distributed renewable generation reduces the import of coal-fired electricity from Victoria or allows increased export to Victoria, reducing greenhouse gas emissions in Victoria. As part of its commitment to reaching its net-zero target the Tasmanian Government could set a similar 'social cost of carbon'.

200% renewable electricity target

The Tasmanian State Government has legislated for a 200% renewable electricity target but has not proposed any mechanism for achieving this target. Additional support for distributed generation could provide a cost effective mechanism for contributing to this objective.

Avoided use of transmission network

The draft determination acknowledges (p.15) that distributed generation reduces the use of the transmission network. However this is not reflected in the FiT determination because "network costs are not avoidable costs to retailers". However the FiT determination does allow for the impact of reduced NEM fees. Retailers pay transmission network costs based on total energy sold irrespective of whether it comes via the transmission network or not. However they pay NEM fees based on energy purchased from the national market. We have previously estimated that reduced use of the transmission network should be valued at 2.5 ¢/kWh (see Appendix A or {TREA 2018b}).

Fixing this anomaly would require changes to the NEM Rules.

Innovative tariff structures

A flat feed-in tariff does not provide the required flexibility to encourage the best use of distributed energy resources. (We have previously supported OTTER's decision that a time-varying FiT is not a useful addition.) Elsewhere in this submission we mention other possibilities including network support payments and aggregation of services via virtual power plants (VPPs).

The development and trialling of innovative tariff structures and other price signals requires coordinated action by TasNetworks and electricity retailers. The state government should facilitate this coordination.

Metering anomaly

Residential solar owners in Tasmania who are still on the tariff 31+41 combination are not receiving the full value of the energy they generate because of a problem with their meter software. Solar has

to be connected to either the tariff 31 (light and power) or tariff 41 (heating and hot water) circuit. Most people connect it to the tariff 31 circuit. If they are generating solar and using electricity on the tariff 41 circuit at the same time **solar owners are charged about 9c for using their own electricity**[1]. A software solution is available to fix this but both Aurora and TasNetworks have declined to implement this.

Alternative mechanisms to support distributed generation

The value of energy fed back into the grid from distributed energy resources is strongly dependent on both time and location:

- Wholesale energy prices in the National Electricity Market (NEM) are set every 5 minutes. Energy fed into the grid is of most value when wholesale prices are high.
- Much of the network costs that make up around 40% of the retail cost of electricity result from building a network that can meet peak demand. Energy fed into the grid that reliably reduces peak demand can significantly reduce the need for network investment.
- In some locations the local distribution network is at close to capacity. Locally exported energy can delay or avoid expensive upgrades to wires and transformers.

Network support payments

Locally generated solar electricity stored in batteries can provide additional value at times when the local distribution network is close to capacity. This is the basis of the very successful TasNetworks trial on Bruny Island. Customers with batteries are paid a premium of around $1/kWh to feed energy back into the grid when demand is high via an arrangement known as network support payments.

This arrangement should be available to customers in other locations where the local distribution network is sometimes at close to capacity. This would provide an additional incentive for customers to install solar PV with batteries. With sufficient battery capacity in those locations, expensive network upgrades can be delayed or avoided, reducing network costs for all customers in future.

Aggregation of distributed energy resources

The value of distributed energy resources (solar PV, batteries, electric vehicle charging and energy management systems in houses) is greater if they can be coordinated to deliver reliable services to the electricity network. The in-principle announcement by the AEMC to support moves to allow "energy users to participate directly in the wholesale electricity market" will facilitate this participation[2].

Tasmania should support rule changes which allow organisations to offer these aggregation services without having to work through an energy retailer.

Size of eligible systems

Which systems are eligible for a regulated FiT is set at the state level. Eligible system sizes vary enormously, typically around 10-30 kW but ranging up to 100 kW in Victoria.

[1] With current meter software, excess generation on tariff 31 is treated as exports and a FiT is paid, the energy then flows back into the tariff 41 circuit without leaving the building and is charged at the tariff 41 rate. For more information see http://tasrenew.org.au/metering/

[2] For more explanation see https://reneweconomy.com.au/this-is-huge-rule-changes-to-boost-solar-pv-and-batteries-99826/ and https://www.aemc.gov.au/news-centre/media-releases/supporting-reliable-and-secure-power-system-least-cost-consumers

In the days of premium FiTs there was a case for limiting the size of eligible systems. Once the FiT is calculated to reflect the benefit of the energy exported there is no logical reason to set a low limit on the size of eligible systems. Some cut-off point between eligibility for a FiT and generators that fall within the NEM rules is necessary. Given that eligibility for STCs for solar projects is capped at 100 kW it would be logical to use the same level for FiT eligibility.

Larger embedded generators can cause problems for network operation in some locations but the logical mechanism for this is at the connection agreement stage with TasNetworks, not by a blanket limit on the size of eligible systems.

If the FiT methodology includes consideration of health and environmental benefits, it would be logical that only renewable energy sources (wind, solar, hydro) should be eligible rather than other embedded generators (eg gas co-generation).

Eligibility should be for any embedded generator connected to the distribution network (rather than the transmission network).

Network voltage regulation

In some locations high voltage levels in the distribution network result in customers not being allowed to install solar, or being restricted in the amount of energy they are allowed to feed back into the grid[3]. TasNetworks is currently trialling methods to cost effectively control distribution network voltages[4]. These measures should be supported and extended.

Non-monetary benefits of solar in Tasmania

Solar PV has many additional advantages to Tasmania that cannot be readily translated to a ¢/kWh value for energy fed into the grid:

Contribution to 100% renewable electricity: household PV contributes to Tasmania becoming the first Australian state to reach 100% renewable electricity (and one of the few in the world).

Private capital investment: Households and businesses invest their own money to make savings on their electricity use, and to contribute to a sustainable energy system. Part of the energy generated is exported to the grid and used by other consumers. This replaces energy which would otherwise require capital investment by Hydro Tasmania or other generators.

Energy security: Distributed PV contributes to diversity of supply and makes Tasmania's electricity system less dependent on rainfall, or single points of failure such as Basslink. Solar contributes most to our energy supply in summer when our rainfall is lower. As battery prices decrease there will be increasing opportunities for distributed generation and storage to provide secure energy supplies at times of network outage, for both individual consumers and through local microgrids.

Direct jobs: The Tasmanian solar industry employs the equivalent of around 400 full time people. These highly skilled jobs are located throughout the state. Many more jobs would be created with a more ambitious goal for solar.

Industry development: Beyond the direct jobs in solar installation, building Tasmania's capacity in emerging technologies such as battery storage, smart grids and demand management will create the jobs of the future as the world moves to a decentralised and decarbonised energy system.

Price stability: Renewable energy technologies have high capital costs, but very low and predictable running costs.

[3] For more details on voltage problems see http://tasrenew.org.au/solar/overvoltage/
[4] see page 46 of the TasNetworks 2018 Annual Planning Report https://www.tasnetworks.com.au/our-network/planning-and-development/planning-our-network/

Energy literacy: Installation of solar PV gives homeowner a strong interest and motivation to better understand and manage their energy consumption. This will be an important driver of the uptake of new technologies such as local storage, demand management and integration of electric vehicle charging which ultimately can lead to a more flexible and economical electricity system.

References and further information

ATSE 2009, *The Hidden Costs of Electricity: Externalities of Power Generation in Australia*, Australian Academy of Technological Sciences and Engineering, Mar 2009
This Academy study addresses the external social and environmental costs – the externalities – that accompany all electricity generating technologies. These are costs not accounted for in the market price of electricity arising from impacts on, for example, climate, human health, crops, structures and biodiversity. Until identified, and then if possible quantified in monetary terms, they remain hidden, playing a limited role in technology selection. The ATSE study builds on the methodology of the European ExternE project and applies it to Australian conditions.
http://www.atse.org.au/content/publications/reports/energy/hidden-costs-electricity.aspx

Backroad 2016, *NEM residential supply chain cost components*, Backroad Connections, 28 Nov 2016.
A spreadsheet explains the methodology and calculates the components of a typical residential electricity bill in each NEM jurisdiction and nationally.
http://backroad.com.au/wp-content/uploads/2016/11/NEM-residential-supply-chain-cost-components-v07p.xlsx

Backroad 2017a, *Determining a fair value for distributed generation: Research Report and Bibliography*, Backroad Connections Pty Ltd, 10 Apr 2017
http://www.backroad.com.au/wp-content/uploads/2017/07/fair-value-dg-report.pdf

Backroad 2017b, *Fair value of distributed generation (feed-in tariff) project*
This project undertook extensive research and advocacy on the setting of FiTs and developed a number of relevant resources in including a fact sheet on transmission charges and a 2016 fact sheet on the determining a FiT for Tasmania.
http://backroad.com.au/?page_id=97

DSG 2018, *Solar feed-in tariff Review*, Tasmanian Department of State Growth, 7 Jul 2018
Consultation document for the feed-in tariff review being conducted by the Department of State Growth.
https://www.stategrowth.tas.gov.au/energy_and_resources/energy/solar_feed-in_tariff_review

ENA 2017, *Electricity Network Transformation Roadmap Final Report*, Energy Networks Australia & CSIRO, April 2017
The Electricity Network Transformation Roadmap has been developed to provide detailed milestones and actions to guide an efficient and timely transformation over the 2017-27 decade. It envisages a future in which up to 45% of all electricity is generated by customers and the total electricity system has zero net emissions by 2050.
http://www.energynetworks.com.au/electricity-network-transformation-roadmap

ESC Vic 2018, *Minimum feed-in tariff*, webpage, Essential Services Commission of Victoria
https://www.esc.vic.gov.au/electricity-and-gas/electricity-and-gas-tariffs-and-benchmarks/minimum-feed-tariff (accessed 5 Aug 2018)

Gilding 2017, *Fair Value of Distributed Generation project, RenewEconomy articles*, Jack Gilding, 20 Mar 2017
Full text of three RenewEconomy articles summarising the findings from the FiT research project.
http://www.backroad.com.au/wp-content/uploads/2017/07/2017-03-20-RenewEconomy-fair-value-articles.pdf

Gutwein 2018, *Wholesale Electricity Price Order*, Peter Gutwein, Tasmanian Government Gazette, 14 May 2018
This order, generally referred to as *The WEP Order*, is made under the Electricity Supply Industry Act 1995. It sets a regulated wholesale electricity price used to set regulated retail tariffs at $79.68/MWh (7.968c/kWh).
http://www.economicregulator.tas.gov.au/Documents/18%201149%20%2020180514%20Special%20Gazette.pdf

OTTER 2022, *Regulated Electricity feed-in tariff rate to apply from 1 July 2022, Pricing Investigation Draft Report*, Jan 2022
https://www.economicregulator.tas.gov.au/electricity/pricing/retail/2022-standing-offer-investigation-and-determination

SST/ATA 2013, *Fair feed-in tariffs for Tasmania, A joint submission in response to the Tasmanian Economic Regulator Draft Report of September 2013*, Save Solar Tasmania and Alternative Technology Association, 2 Oct 2013
http://www.solarcitizens.org.au/tas_docs

TasNetworks 2018, *TasNetworks Transformation Roadmap 2025*, TasNetworks, Jan 2018
https://www.tasnetworks.com.au/about-us/corporate-profile/our-strategy/

TREA 2016, *Valuing Solar for Tasmania's Future: Submission to the Office of the Tasmanian Economic Regulator in response to the Draft Investigation Report on the Regulated Feed-In Tariff Rate*, 15 Mar 2016
http://tasrenew.org.au/wp-content/uploads/2016/03/2016-03-15-TREA-FiT-submission.pdf

TREA 2018a, *State government is keeping solar owners in the dark*, media release 26 Jun 2018
http://tasrenew.org.au/wp-content/uploads/2018/06/2018-06-26-TREA-FiT-media.pdf

TREA 2018b, *Solar for Tasmania's Future*, Tasmanian Renewable Energy Alliance, 6 Aug 2018
Submission to the Tasmanian state government Solar FiT Review.
http://tasrenew.org.au/wp-content/uploads/2018/08/2018-08-06-TREA-solar-review-submission.pdf

TREA 2019, *Not FiT for Purpose*, 30 Apr 2019
A response to the Office of the Tasmanian Economic Regulator's March 2019 Draft Investigation Report on the Regulated Feed-in tariff Rate for Standard Feed-in Tariff Customers.
https://www.economicregulator.tas.gov.au/Documents/19%20749%20%20Tasmanian%20Renewable%20Energy%20Alliance%20Inc%20-%20FiT%20-%20Submission.pdf

Appendix – Calculation of a fair FiT

The following calculations are from the TREA submission to the Tasmanian state government Solar FiT Review {TREA 2018b}.

A fair feed-in tariff should take into account:

- a wholesale price that reflects the total benefit to Tasmania, not just the saving to Aurora
- the fact that locally generated and used energy does not make use of, and should not pay for, the transmission network
- avoided losses from transmitting electricity over long distances
- savings from less demands placed on the distribution network
- the reduced greenhouse gas emissions resulting from solar's role in reducing imports from Victoria
- the health benefits from reducing import of fossil fuel based electricity.

Taking the above factors into account our estimate of the value of a fair price for energy fed into the distribution network is in the range of 18 to 21.6c/kWh as per the following table.

Source of value	Minimum	Maximum
Wholesale value of energy	9.8	11.8
Avoided network losses	0.1	0.1
Avoided transmission costs	2.5	2.5
Reduced distribution costs	1.9	2.8
Reduced CO_2 emissions	2.4	3.1
Health benefits	1.3	1.3
	18	21.6

Wholesale electricity price

The current OTTER FiT rate is based on the wholesale price of energy set by the Treasurer {Gutwein 2018}. This was set by the government with the explicit objective of minimising regulated retail electricity prices and has been set at 7.968c/kWh for 2018-2019.

An alternative calculation of a Tasmanian wholesale price is that conducted by OTTER in accordance with clause 8.1(a) of the *Standing offer price approval process in accordance with the 2016 Standing Offer Determination (28 April 2016)*. For 2018-2019 this price is 9.806c/kWh.

The value of exported household energy in Tasmania should be the value to the state, not the saving to Aurora from the purchase of energy from Hydro Tasmania at regulated prices.

The two-way operation of Basslink allows Tasmania to export electricity to Victoria when Victorian prices are high and import from Victoria when Victorian prices are low. Tasmania's ability to maximise gains from this process is constrained by the export capacity of Basslink (500 MW) and the availability of water in dams in Tasmania.

We have calculated the value of Basslink imports and exports using data for Basslink flows and Victorian wholesale NEM prices obtained with the NEM Review product from Global Roam. Using data for every 30 minutes in 2017-2018, the average price for exported electricity was 11.8c/kWh and the average cost of imported electricity was 7.4c.

Any additional Tasmanian generation (or energy conservation) reduces the energy we import from Victoria and increases the amount we can export over Basslink at time of highest prices.

On the basis of these various approaches, we argue that the value to Tasmania of additional energy exported to the grid is between 9.8c/kWh and 11.8c/kWh depending on assumptions.

Transmission costs

Aurora passes on to consumers TasNetworks charges for the use of the transmission network irrespective of whether the energy is sourced via the transmission networks or locally from solar PV. Customers pay for a service that is not provided — use of the transmission network for the proportion of their energy that comes from distributed generation. Transmission charges should only apply to the electricity actually carried on the transmission network. These savings should be shared with solar owners. Allocating 80% of these savings to solar owners and 20% to the retailer would provide an incentive to the retailer to encourage distributed generation.

In the calculations above we have used 80% of the 3.19c transmission component of Tasmanian typical electricity costs as described in {Backroad 2016}.

Network losses

In Tasmania about 5% of centrally generated electricity is lost in the transmission and distribution networks[5]. Distributed solar PV avoids almost all these losses because the energy is used in the immediate vicinity. Applied to the 2018-19 Standing Offer determination rate of 9.8c this would equate to 0.5c. We have used a lower figure because we believe that no transmission costs and reduced distribution costs should be charged for solar PV and this would constitute double counting.

Distribution network savings

There are at least two ways in which distributed generation makes less use of the distribution network and reduces its costs. Exported energy from solar PV is typically used close to the point of export and therefore makes significantly less use of the 'poles and wires'. Also a significant proportion of the cost of the distribution network is the transformers which convert higher voltages down to 230V. Solar inverters have this capability built in and export power at 230V.

We have argued for additional mechanisms to reflect the higher value of distributed generation in areas where the distribution network is constrained. In order to determine the general value of distribution network savings we have used a somewhat arbitrary allowance of 20-30% of the 9.37c/kWh distribution component of Tasmanian typical electricity costs as described above.

Reduced CO_2 emissions

Each kWh of solar PV that displaces imported coal fired electricity from Victoria creates a reduction in CO_2 emissions that is worth a minimum of 2.4c to 3.1c using current carbon pricing estimates. Carbon pricing that met the global objective of keeping global warming well below 2°C would translate to a much higher value.

The Victorian single rate FiT for 2018-2019 is 9.9c/kWh {ESC Vic 2018} and this includes an allowance of 2.5c/kWh for the "avoided social cost of carbon". A similar allowance should be applied to the Tasmanian FiT since any increased solar generation in Tasmania reduces imports of mainly coal fired Victorian electricity.

Health benefits

The best available Australian research suggests that each kWh of solar PV that displaces coal fired electricity contributes 1.3c in reduced health costs {ATSE 2009 p.46}. The health impacts of coal fired electricity are felt mainly on the mainland but this should not absolve Tasmania from the moral

[5] For example in the OTTER Final Report for the 2016 Regulated FiT Investigation Marginal loss factor and Distribution lost factor increase the FiT by a combined factor of 5.3%.

obligation to reduce these impacts when they arise from generating electricity imported into Tasmania.

This benefit is not currently reflected in any Australian FiTs but Victorian legislation makes provision for future FiTs to include a component based on the "avoided human health costs attributable to a reduction in air pollution".