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Revisiting feed-in tariffs in Australia: A review

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ABSTRACT

Globally, solar photovoltaic (PV) is rapidly becoming a key source of energy, incentivised through the use of feed-in tariffs (FiTs). Solar PV is enjoying a similarly swift adoption in Australia, encouraged through FiTs. This review builds on earlier work, compiling and comparing FiTs in Australia across its states and territories for residential small scale photovoltaic installations. The purpose of this review is three-fold: (1) to synthesise a set of data on FiT policy which can be used to inform future Australia-wide policy analysis; (2) to understand the coevolution of: policies to subsidise solar panel installation; installation costs; and installation numbers; and (3) to employ this set of data on FiT policy to examine whether FiT policy corresponds with unintended adverse energy justice outcomes (i.e. electricity disconnections from the grid). The analysis presented in this review indicates that FiT policies correspond to a greater number of electricity disconnections from the grid. These findings are discussed in the context of broader debates.

1. Introduction

Solar photovoltaic (PV) is fast becoming an integral ingredient to the electricity mix for a number of countries across the globe. Worldwide, in 2015 the capacity of solar PV installed increased by 50 gigawatts, 25% above 2014 levels, yielding a cumulative installed capacity of close to 230 gigawatts. Now, in at least 20 countries, solar PV accounts for 1% or more to the annual electricity supply and as much as 8% in some European countries [1].

Feed-in tariff (FiT) policies have been used in a large number of countries and regions to incentivise solar PV installation [1–3]. The FiT can be described as a premium paid for electricity that is supplied to an electricity grid from a particular renewable energy generation source. This FiT can be a gross or a net FiT,[1] can be implemented at a national, or state/territory, or regional level. These FiTs can be technology-specific or technology-neutral [4]. The combination of tax incentives and renewable portfolio standards[2] can make FiTs popular form of policy among investors [4,5].

Since the initial implementation of FiTs in countries around the world during the 1990s and 2000s, the value of FiTs has declined over time or alternative yet similar policies have been introduced (e.g. feed-in premiums) [4,6–8]. However, the notion of subsidising costs of purchase, installation and maintenance of PV technology remains popular as well as necessary condition for solar PV adoption to flourish [4].[3] Generous FiT schemes over a period when the cost of solar PV also declines, can be accompanied by a boom in solar PV uptake. This is characteristic of the experience in Australia in 2010–12. It is also typifies the experiences in Spain, the Czech Republic and Italy in 2008, 2010 and 2011 respectively [4].

In Australia, FiTs have differed between states and territories and over time. These policies have been the subject of some controversy. For instance, FiTs have been argued to be a form of regressive taxation

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[1] Gross FiTs involve all generated energy first being purchased from the generator and the consumer then purchases all electricity from the grid. A net FiT involves only the unused part of the electricity generated is from a particular renewable energy generation source being purchased from the generator.

[2] The portfolio standards require a share of electricity to be sourced from renewable energy sources. This level needs to be met by each utility either by modifying their production or by paying a tax (this tax takes the form of a 'green certificate' purchased from renewable energy producers) [4].

[3] According to the International Energy Agency, in 2014, 96.3% of the world PV market depended on support schemes and that FiT schemes represented 63% of the types of policies in place [4].

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[9]. In contrast, it has been maintained that this mechanism could deliver savings to consumers in excess of AUD$1.8 billion over just two years (provided hypothetical FiTs eventuate) [10]. The paucity of a unified and widely available dataset on FiTs throughout Australia limits the ability of researchers to convincingly undertake an Australia-wide *ex post* policy evaluation. It also hampers researchers' capacity to replicate the findings from earlier studies and to ultimately progress knowledge on FiTs. This point is echoed by calls for more rigorously defined policy, market conditions and policy design features in order to optimise the efficacy of FiTs and implement the most appropriate designs of these policy mechanisms [3,5]. While these calls stem from a cross-country evaluation of FiTs in the European Union, these observations apply equally to Australia. In Australia, revisions to the FiTs, their heterogeneity between states and territories, not to mention the lack of a unified dataset on FiTs, hinder detailed analyses. These obstacles hinder efforts to extend knowledge with potentially detrimental implications for renewable energy policy in Australia [11].

Firstly, this review begins by building on earlier reviews [12–16], in particular, work by Ahmad Zahedi which summarised these schemes at their peak FiTs levels [14]. Through the course of revisiting FiTs in Australia, this review yields a synthesised set of data on FiTs, for the period 2007–2016. This set of data can be used to strengthen the reproducibility of empirical studies; and hence, bolster the quantity and quality of evidence and debate. Secondly, this review provides a unique account of the historical coevolution of installation costs and installation numbers in Australia. Thirdly, this review uses this set of data synthesised, subset to the region of South East Queensland, Australia, as the basis of an empirical study into the link between FiTs and electricity disconnections from the grid. On this third point, this review directly engages with debate surrounding the energy justice implications of FiTs in Australia. In this respect, this review not only, presents information which forms a crucial input into the assessment and additional analyses of FiT policy design, it also provides new evidence on the potential energy justice implications of FiTs in Australia.[4]

In what follows, Section 2 provides a broad overview of FiTs in Australia, while Section 3 describes the FiTs across Australia's states and territories. Section 4 reports new evidence. Section 5 discusses findings and FiT policy design in the context of broader debates. Section 6 concludes.

2. A brief overview of FiTs in Australia

In March 2008, the Council of Australian Governments agreed that solar FiTs programs would have to have a relatively uniform structure throughout Australia. From July 2008 states and territories throughout Australia started to implement FiT schemes [2]. However, it was not until November 2008 that the Council of Australian Governments agreed on a set principles to achieve consistency in FiTs across Australia [18]. Perhaps unsurprisingly, different state and territories throughout Australia have implemented a range of various FiT mechanisms [2]. Nevertheless, the implementation of the FiTs in Australia has been associated with a corresponding rapid increase in small-scale residential solar PV systems. Over the four years between 2007 and 2010 the number of small-scale (< 10 kW) installed systems increased from 3923 to 281,500; a more than 70-fold increase. By the end of 2015, there were close to 1.5 million systems (1476,931 systems) installed (see Fig. 1) [19]. This increase from 2007 coincided with the implementation of the FiTs and low interest rates following the 2007–2008 financial crisis [20]. This increase in installation numbers also coincided with an increase of the national average electricity price (see Fig. 1).

The apparent success of the FiTs did not render the mechanism immune from conflicting arguments. Specifically, detracting from the ostensible success of the FiTs were arguments that the attendant cost borne by governments was escalating rapidly [22]. Further, there were arguments that an increase in solar-generated electricity forced retailers of grid electricity to cross-subsidise the provision of electricity grid infrastructure through regressive prices increases (i.e. the impact of electricity price increases is felt disproportionately by poorer customers without solar PV who remain dependent on grid electricity) [9,23]. Moreover, there were questions relating to the level of government subsidies in light of a faster-than-expected decline in the cost of solar PV technology (see Fig. 2) [24]. For instance, in 2016 the Northern Territory Power System Review reported that it is expected that the purchase of a solar PV system will pay for itself within 5.6 years [25].

These trends and concerns prompted the Council of Australian Governments to revise its set of principles for solar FiTs in 2013. The principles were revised to eliminate access to premium FiTs by 2014. Nevertheless, the revised principles retained a provision for a 'fair and reasonable' FiT to be provided [26].

Initially some FiTs had offered as much as 60 Australian dollar cents per kilowatt-hour (hereafter c/kWh) for gross meters [5] (i.e. in New South Wales) [28]. However, by 2016 the FiTs provided by retail electricity suppliers were voluntary for New South Wales, urban areas in Queensland and the Australian Capital Territory. In November 2016 the FiTs' value ranges appeared to be between 4 and 10 c/kWh, although the electricity retailers can modify them at any time. For Victoria, Queensland's regional areas, South Australia and Tasmania, a minimum threshold is imposed (varying between 5 and 7.448 c/kWh) [29–32].[6] In other states FiTs are regulated: the Northern Territory uses a buyback scheme which functions on a 1-for-1 principle (the retail rate is returned to the customer as a FiT), while Western Australia sets specific FiTs for specific locations where government- owned retailers operate.

In 2016, there are noticeable differences between current FiTs in different states and territories. A lack of regulation is associated with considerably lower FiTs. Furthermore, even where there are regulated minimums, rarely would retailers offer much more. For example, in a review of South Australian retailers, six out of the 13 retailers offered the minimum regulated FiT of 6.8 c/kWh, this included the largest retailers who collectively covered about 89% of the customers [30]. The other South Australian retailers offered rates varying between 7 and 12 c/kWh. Another example is regional Queensland where no deviation from the minimum regulated FiT was found (see Table 1).[7] For the Northern Territory and Tasmania FiTs are regulated, hence not included in the table.

Historical information on the types of FiTs offered by each Australian state is compiled in Table 2, sourced from a series of government reports, websites of government agencies and legislation

[4] In doing so, this review appeals to Sovacool and colleagues argument for a global energy system characterised by "...distributional and procedural justice alongside cosmopolitan (albeit anthropocentric) interpretations of equity and fairness." [17]. The normative framework they propose is based on the principles of availability, affordability, due process, transparency and accountability, sustainability, intragenerational and intergenerational equity and responsibility. We employ the definition of availability and affordability principles from Sovacool and colleagues. The principle of availability is captured by the statement: "People deserve sufficient energy resources of high quality." The principle affordability is captured by the statement: "The provision of energy services should not become a financial burden for consumers, especially the poor." [17].

[5] Similarly to gross and net FiTs described in the first footnote, gross metering refers to the application of feed-in tariffs to all electricity the solar PV generates. The consumer then purchases electricity from the grid at the retail price. Net metering refers to the application of feed-in tariffs to only that part of the electricity that the solar PV generates which is fed back to the grid, net of electricity used in the home [27].

[6] Note the Tasmanian system was voluntary up until 30 August 2013.

[7] Table 1 shows the current levels of feed-in tariffs in Australia at the time of writing (October 2016). This information is derived from the official Australian Government energy contracts comparison platform, 'Energy Made Easy' where retailers submit their current supply plans, in a standardised format to enable comparison. The survey method relies on recording feed-in tariffs provided by retailers in different postcodes in each state. Where available, the first distinct ten offers, in order of the lowest estimated energy bill, are recorded. The postcode areas chosen are random, but cover each classification of location centrality/remoteness for each state. [33].