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Dear Mr Corbell

**Re: Submission regarding the Discussion Paper *National Capital to Solar Capital* with additional comments on the *Draft Sustainable Energy Policy***

First, I wish to express support for the point of view expressed in your opinion piece in the *Canberra Times* of 8 February 2010 regarding renewable energy feed-in tariffs. The piece showed a grasp of the complexities of the equity issue which has been lacking in some of the debate on the subject.

Secondly, I welcome the opportunity to comment on the DECCEW's consultation paper on options to expand the feed-in tariff scheme in the ACT. At some points I have also commented upon the *Draft Sustainable Energy Policy* so please consider this to be a submission regarding that document as well.

The ACT's *Electricity Feed-In (Renewable Energy Premium) Act 2008* is one of Australia's more generous FIT laws. Most of the other FIT laws in Australia are hardly ambitious, display peculiarly small minded thinking and are largely focussed on household scale PV generation.

**The main point of my submission is that the Territory should avoid damaging its emerging renewable energy sector by prematurely imposing additional limitations on the scope and generosity of the FIT scheme created by the Act, either in the form of installed capacity limits or scheme caps.**

I do hope that you may give serious consideration to the research and ideas presented in this submission in your upcoming legislative programme.

Yours sincerely,

James Prest
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***National Capital to Solar Capital, or Thinking Small and Imposing Premature Limits***

## Outline

A. The need for a Renewable Energy Target in the Act

B. Modelling of Risks and Benefits

C. Installed Capacity Limits or Stepped Output Tariffs?

D. Scheme Caps – A Blunt Instrument

E. Degression – A Better Alternative to Constrain Costs

## Key Points

1. Open the scheme to larger scale generators, i.e. support the introduction of an expanded electricity feed-in tariff in the ACT enabling payment of electricity feed-in tariffs to generators with a capacity greater than 30kW.

2. Avoid alteration of the gross feed-in tariff model; Maintain Goal of Stability and Consistency in FIT. The whole purpose of FIT is that they can provide longer term and more consistent support to RE technologies than measures which rely upon direct government budgetary allocations and which are vulnerable to the electoral cycle.[1]

3. The world PV market has been growing at rates of more than 35% per year for the past decade.[2] If the ACT has the right policies, it can participate in and benefit from some of this predicted activity.

4. The price of solar modules has consistently fallen over time, for example approx 35% in the world market in 2009, and this, based on Australian pricing, should be taken into account in consideration of capping the scheme.

5. Expand the community, industry and government mindset to encourage RE generation from sources in addition to solar PV, that is, solar thermal, wind energy, biogas, biomass in particular.

6. Consider ways to incentivise renewably produced heat and cooling in new and existing buildings, particularly through renewable heat legislation and the planning law framework.

[1] Muriel Watt, Robert Passey and Greg Watt (2008) "Designing A Coherent PV Strategy For Australia" ISES-AP - 3rd International Solar Energy Society Conference – Asia Pacific Region (ISES-AP-08), 25-28 November 2008 Sydney Convention & Exhibition Centre.
[2] Watt & Passey, ibid.

## A. Renewable Electricity Generation Target

In order for the ACT Renewable Electricity Feed-in Law to be part of a coherent policy, the ACT needs to legislatively enshrine a target for the intended proportion of renewably produced generation included in the generation mix.

The *Electricity Feed-In (Renewable Energy Premium) Act 2008* contains no target. Thus there is no clear policy direction in the Act at present.

Without a target there is no indication to the market and to investors of where the ACT is aiming for with its renewable energy law and policy. That fact in itself may act as a disincentive to investment.

The *Draft Sustainable Energy Policy (2009)* proposes a step to correct this deficiency. It states that by 2020 the ACT will aim to use renewable energy for at least 25 per cent of all electricity consumption (with an interim target of 15 per cent by 2012).[3] This surprisingly ambitious interim target [is it a typo?] is expressed as being subject to conditions contingent on the outcome of the community consultation.

The main point is that this target is not the same as a target for locally produced renewable electricity. It is consistent with the ACT simply buying a large proportion of its RE from producers interstate. This is predicated on assumptions that this greenpower will be produced elsewhere in the National Electricity Market, for example in NSW or Victoria or SA. However the ACT has no control over whether these levels of greenpower will be actually produced, apart from increasing the level of greenpower purchased by the ACT government itself.

There remains a need to set a target for locally produced renewable electricity.

The Discussion Paper states that by November 2009, solar PV generating capacity of 2.5MW had been installed, with a growth rate in installations of 180% over 12 months to March 2010. It predicts 27MW of distributed solar capacity will be connected to the network by five years from March 2009.[4]

The nearest the *Discussion Paper* comes to advocating a target is in its discussion of a scheme cap. It discusses a range of scheme caps from between 100MW and 310MW of installed capacity without clearly articulating this (by relying instead upon a retail price increase model).[5]

There is an urgent need for government to demonstrate leadership by setting a series of short, medium and long term targets for locally produced renewable electricity, rather than merely a cap.

**Recommendation**

Amend Objects clause of the *Electricity Feed-In (Renewable Energy Premium) Act 2008* to include a target to contribute to the increase in the percentage of renewable energy sources in electricity supply in the Territory to at least 2% by 2012, at least 15% by 2015 and to at least 25% by 2020. Part of this percentage could be from interstate sources of renewable electricity, but the legislation should still seek to set a target percentage for locally produced RE.

[3] *Draft Sustainable Energy Policy 2010–2020, p.5.*
[4] ACT (2009) *National Capital to Solar Capital: Options for an Expanded ACT Feed-in Tariff Scheme*, December, (hereafter 'Discussion Paper'), p.6.
[5] Discussion Paper, pp.11-18.

## Merton Rule and Distributed Generation

In order to achieve higher rates of distributed generation, I would recommend that the ACT also seriously consider introduction of its own version of the Merton Rule. The Merton Rule - named after the London borough that established it in 2003 - requires any new residential development of more than 10 units or any commercial building over 1000 square maters to reduce its carbon emissions by a certain percentage through the use of on-site renewables. Around half of UK's local authorities introduced the Merton rule, however, each one applies it to a different degree – for example, some might "expect" a developer to enforce a 10% rule, some will "require" 20% or more.[6]

In the Draft Sustainable Energy Policy it is stated that "Increased distributed generation will aim to reduce ACT greenhouse gas emissions by 5 per cent relative to 2020 business-as-usual emissions. The ACT Government will: 2.1. consider requiring all new ACT green-field developments and commercial buildings to include a detailed assessment of the benefits and viability of distributed generation options as a default position." [7]

However, this proposed policy will not have the force of law, and does not set any mandatory target for distributed generation in large commercial buildings. In addition, it is perfectly open to the developer to state that such generations would be "not feasible" or "not practicable" and have still complied with the proposed requirement.

## Carbon Neutrality and Renewables

If the ACT is to achieve the carbon reduction target set in the *Draft Sustainable Energy Policy* of being carbon neutral (or as it says "achieving zero net greenhouse gas Emissions") by 2060, then the ACT needs to be less timid with its renewable energy law and policy.

Locally there appears to be a lack of urgency and of heightened local responsibility in confronting human induced climate change. The IPCC 4th Assessment Report and the IARU Copenhagen Synthesis Report emphasise the need to ensure that emissions peak by 2015, and decline sharply thereafter if the trend of warming is to be constrained to no more than 2 degrees C (of average global warming).[8]

Scientists are warning that even this amount of warming could be problematic. As Professor Katherine Richardson, Chair of the Scientific Steering Committee of the congress and Chair of the writing team for 2009 IARU Climate Change Congress in Copenhagen (10-12 March 2009) said "The newest evidence indicates that society faces serious risks even with a global temperature rise of only about 2 degrees. If society wants to minimize these risks, then action must be taken now". She added: "Society has all the tools necessary to respond to climate change. The major ingredient missing is political will." [9]

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[6] http://www.solarcentury.co.uk/Knowledge-Base/The-Merton-Rule
[7] Draft Sustainable Energy Policy 2010–2020, pp. 12, 31
[8] IPCC 4th Assessment Report, Summary for Policy Makers.
[9] Media Release of IARU Congress, 18.6.09 at http://www.iaruni.org/events/past/meetings/090310_climatesummit/SynthesisReportMediaRelease180609.pdf . For whole report: http://climatecongress.ku.dk/pdf/synthesisreport

## Wind Energy

An example of this negativity and lack of foresight is the blanket assertion in the Sustainable Energy Policy which claims that the "the ACT is not suitable for wind generation".[10]

To encourage wind energy generation, there is a need for government to:

- Facilitate access to more detailed wind mapping in the ACT to publicise the most prospective sites for landscape sensitive wind generation;
- clarify the planning law framework for building installation of micro-wind within Canberra;
- clarify the planning law framework for vertical axis wind generators in commercial developments, particularly on building roofs;
- Consider amending the EIA schedule to the Planning and Development Act 2007 to raise the EIA threshold to enable construction of larger wind farms without an EIS. At present Schedule 4.2 states at Item 2(c) that an EIS is needed for "(c) a wind farm that will consist of 5 or more turbines or will generate 5 megawatts or more of electrical power;" With modern wind turbines having a capacity of 2MW each, it will actually be a small wind energy development that triggers the need for an EIS.

## B. Benefits and risks of extending the FIT

Whilst the Discussion Paper formally proposes that we consider amending the existing Feed-in-Tariff Scheme in 2010 to encourage participation of renewable generators with a capacity in excess of 30 kW, it then progresses to consider in detail how to constrain the operation of the FIT scheme.

In summary, the problem with the present approach to the feed-in law in the ACT is a pre-occupation on the part of some in the debate to limit the amount of the RE generation capacity in the ACT. This appears to be the main objective of the policy discussion for many stakeholders. A more accurate name for the Discussion Paper could have been: *How Can We Make Sure This Whole Thing is Not Too Successful?*

Although the direct costs of solar energy may be higher than some other GHG abatement options it is important to take into account other considerations.

The future costs of an expanded FIT law must be weighed against benefits, which in summary include:

- Peak time of use demand reduction
- Reduced transmission losses[11]
- Deferred needs for network augmentation[12]
- Employment multiplier effects
- Merit order effect
- Reduction in cost of solar etc installations over time
- Avoided environmental damage from coal fired generation.

Even if there are increased costs to the community associated with encouraging more generation of RE, these must be weighed against the positive and negative externalities associated with changing the energy mix.

[10] Draft Sustainable Energy Policy 2010–2020, p. 13
[11] Garnaut Review, p.452
[12] Garnaut Review, pp.451-2

The Stern Review suggested that there were substantial reasons for, and benefits likely to accrue from supporting RE:

> "The uncertainties and risks both of climate change, and the development and deployment of the technologies to address it, are of such scale and urgency that the economics of risk points to policies to support the development and use of a portfolio of low-carbon technology options….The positive externalities of efforts to develop them will be appreciable, and the time periods and uncertainties are such that there can be major difficulties in financing through capital markets."[13]

Renewable energy deployment laws are best seen as a complement to, rather than a substitute for, an emission trading scheme.[14] This is because there are market failures with the process of technological change itself,[15] and because RE laws seek to address a number of objectives other than least-cost abatement. One of these is diversity of low emission energy supplies. There is a need to create a portfolio of energy generation capabilities that will be available over the long term.[16]

However, problems with passage and introduction of a federal ETS law underline the need for effective local renewable energy incentive law. Lack of certainty over the future pricing of carbon will reduce the incentive to innovate in terms of zero carbon electricity generation technologies.[17] If carbon markets lack credibility, and investors have expectations of a low carbon price over the medium to long term, then investments in low carbon technologies will be discouraged.[18]

***The modelling in the Discussion Paper gives very little time to many of the reasons for encouraging more RE generation, and instead is focussed on exploring the very particular detail of predicted costs of an expanded RE sector, without explaining the assumptions lying behind these predictions. For example it is not stated whether the model assumes that the ACT electricity market grows or remains static. If the number of customers grows, this will lessen the impact of the FIT as it will be spread across more customers.***

There are external costs of conventional electricity generation from fossil fuels that are avoided by increasing levels of renewable energy generation. A German BMU Department document states "If these costs were allocated in strict accordance with the "polluter pays" principle, the price of electricity from fossil fuels would be much higher... A scientific study for the BMU came to the conclusion that external costs saved by the EEG, at €4.3 billion in 2007, were more or less equal to the additional procurement costs for the EEG.[19] There have been very significant environmental and economic benefits from the FIT law in Germany including employment and industry development. In an earlier study (2006) the BMU estimated the benefits of the German FIT law (the EEG) as including avoidance of external costs of electricity generation arising from climate change and air pollutants in the order of € 3.4 billion.[20] This was higher than EEG expenditure to promote renewables over the same period (3.2 billion Euros). Thus the promotion

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[13] Stern Review, p.347.
[14] McLennan Magasanik Associates (MMA), (2007), *Increasing Australia's Low Emission Electricity Generation – An Analysis of Emissions Trading and a Complementary Measure: Report to Renewable Generators of Australia*, (Internet publication), 73pp, at p.4.
[15] Ibid, p.4.
[16] Stern Review, p.111.
[17] Stern Review, p.399.
[18] Stern Review, p.399.
[19] German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (2008), *Electricity From Renewable Energy Sources:What does it cost us?*, p.34.
[20] BMU - Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2007) *Renewable energy sources in figures – national and international development - June 2007*, p.29. www.bmu.de/english

of renewable energy sources via the EEG was worthwhile in terms of the avoided external costs alone.[21]

Over the long term retaining and expanding the FIT law will provide a net benefit to the ACT.

Further specific benefits of encouraging solar energy in the ACT include:

- distributed energy source
- time of generation benefits matching peak demand curve in summer
- Emissions free
- Relatively predictable generation not as intermittent as wind energy
- Assists in achieving a diversified long term energy generation mix
- Developing a broader community of solar know-how in the ACT will insure against the risk that the Territory misses out on future economic opportunities surrounding solar energy technologies.
- Costs of PV modules are dropping consistently over time, enabling future reductions in level of FIT payments.
- Efficiency of PV modules are increasing consistently enabling future reductions in level of FIT payments.
- Local scientific expertise in solar technologies at the ANU can be built upon and commercialised. In particular I am referring to the Solar Thermal Group at ANU College of Engineering & Computer Science[22]; ARC Centre for Solar Energy Systems, College of Engineering and Computer Science,[23] and the Centre for Sustainable Energy Systems (CSES) within College of Engineering and Computer Science.[24]

## Demand reduction at Peak time of use

The FIT legislation in the ACT and throughout Australia could be amended with the intention of incentivising generation in summer at times of peak demand (i.e. midday to late afternoon). This is achieved in Spain by means of enabling the larger RE generators to sell into the spot market, and be paid in addition an incentive premium.

Solar generation has particular value during the summer months when there is the greatest demand for electricity, and when higher temperatures reduce the thermal capacity of conventional generators and the power transfer capability of the transmission system.[25]

The AEMO (Australian Energy Market Operator) publishes an annual Statement that predicts the demand - supply outlook for the NEM. The Statement published in 2009 contains data and charting predictions showing a summer supply-demand balance which is very tight in 2012-13. The AEMO is predicting a lack of summer reserve capacity in 2013-14. [26]

The reduction in demand for fossil fuelled electricity, thereby reduces the need to build new coal fired stations, which will lock NSW and ACT for another 30-40 years of FF generation. There is an abundant international energy policy literature on the dangers of path dependence and carbon lock-in.[27]

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[21] Ibid, p.28.
[22] http://solar-thermal.anu.edu.au/
[23] http://solararc.anu.edu.au/
[24] http://solar.anu.edu.au/cses.php
[25] Watt, M., Outhred, H.R., Oliphant, M., Collins, R., "Using PV to Meet Peak Summer Electricity Loads", ANZSES Destination Renewables, Australia, Australia and New Zealand Solar Energy Society, pp.486-495, 2003.
[26] National Generators Forum (2009) Submission to Senate Select Committee on Fuel and Energy, 22 July 2009, pp.8-9.
[27]

NSW has plans to build at least 1 new coal fired power station and to substantially augment two other existing coal fired stations. The detail of these plans, taken from AEMO's forecast of new capacity coming online in the next 5 years is reproduced in the table below.

**New Coal Fired Power Stations in NSW, Serving the ACT**

| **Company / Operator** | **Project & Technology** | **Commissioning Date** |
|---|---|---|
| Delta Electricity | Mt Piper Power Station expansion, two additional base load units. 2000 MW Coal | Summer 2015/16 |
| Eraring Energy | Eraring upgrade , Unit 1 increase to 720 MW Coal | December 2011 |
| Eraring Energy | Eraring Upgrade, Unit 4 upgrade increase to 720 MW Coal | September 2012 |
| http://www.aemo.com.au/data/gendata_prop.shtml | | |

## Merit Order Effect

Increases in electricity prices attributable to the FIT spread across all consumers must be countered against the impact of the 'merit order effect'.

This is where large amounts of lower cost renewable energy sources (such as wind power) actually reduce the wholesale market price of electricity, pushing down spot market prices in a liberalised market. This price dampening effect of RE generation has been documented for Spain [38], Denmark [39], and Germany.[28]

This benefit of RE is unlikely to become significant in the ACT unless a national FIT law were to be passed Federally, and there is considerable commissioning of RE generating capacity nationwide. The difficulty is that unless renewable electricity generation is significantly, i.e., massively increased in the ACT there will be little or no effect felt in the National Electricity market. The total NEM installed capacity in 2009 was around 39.3 gigawatts (GW).[29] The present volume of installed solar PV capacity in the ACT is 27MW.[30]

## Dangers of Non-Transparent Modelling

Although the discussion paper is said, on the one hand, to be about exploring how to expand the FIT legislation to include larger capacity generators of RE, on the other hand, one cannot fail to notice that it is focussed on how to restrain the scheme so that it does not become "too large".

[28] de Miera, G. S.; González P. del Río, Vizcaíno, I. (2008) "Analysing the impact of renewable electricity support schemes on power prices: The case of wind electricity in Spain." 36 Energy Policy 3345-3359; Munksgaard, J. and Morthorst, P. E. (2008). "Wind power in the Danish liberalized power market – Policy measures, price impact and investor incentives," 36 Energy Policy, 3940-3947; Senssuss, F.,Ragwitz, M.,Genoese, M. (2009). The merit-order effect: A detailed analysis of the price effect of renewable electricity generation on spot market prices in Germany. 36(8) Energy Policy 3086-3094.

[29] National Generators Forum (2009) Submission to Senate Select Committee on Fuel and Energy, 22 July 2009, p.4.

[30] Discussion Paper, p.6.

The paper employs one-eyed and very selective economic modelling (with non-transparent assumptions) which seeks to exhaustively predict the future costs to the community of future RE installations, whilst ignoring multiplier effects and learning effects, and not adequately documenting either the costs of conventional FF generation nor the benefits of distributed RE generation.31

The modelling does not take account of the effect of tariff degression (i.e. reductions over time), which is likely, given the predictable pattern of lower prices of PV modules over time. With solar PV modules becoming both cheaper and more efficient over time, it is then possible to pay lower rates of FIT to generators, particularly larger generators.

**Worldwide Average Module Selling Price vs. Cumulative Sales , 1976-2008 (2040)**

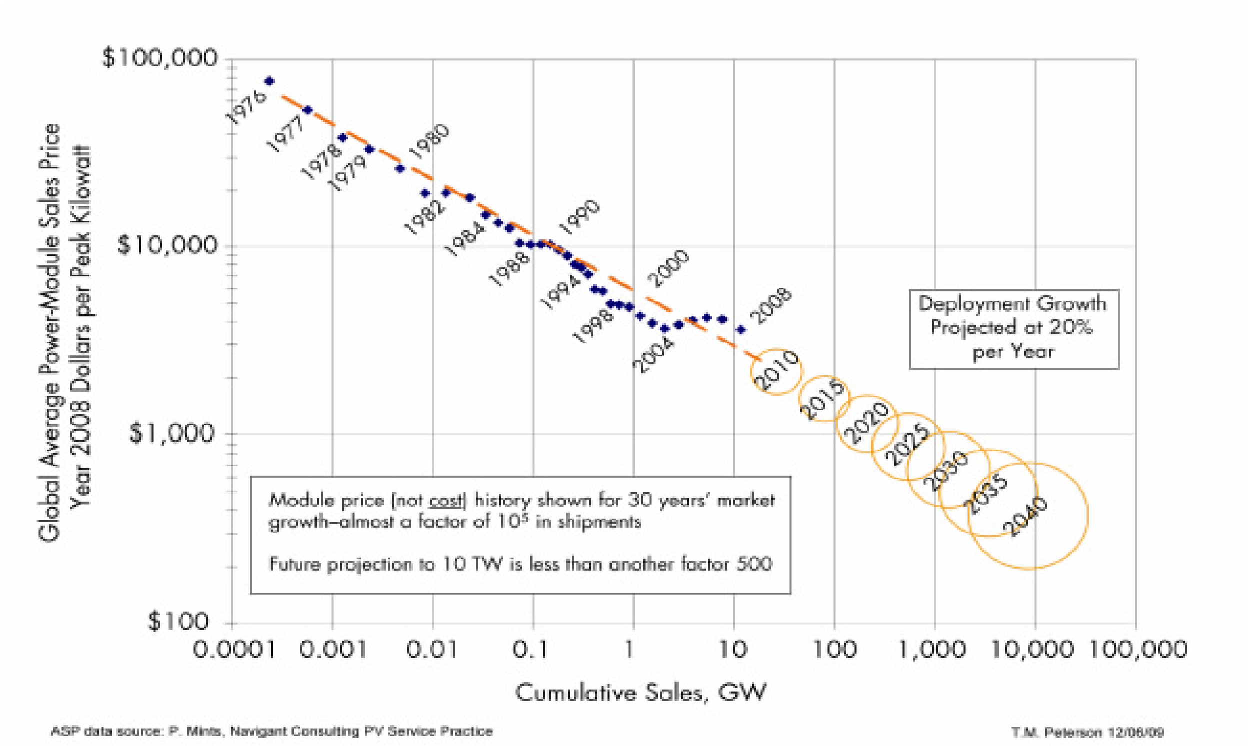


*Figure 10. Worldwide Average PV Power-Module Selling Price vs. Cumulative Sales, 1976–2008, with Projection to 10 TW*

Source: EPRI (2009) Solar Photovoltaics: Status, Costs & Trends, p. 12

The dangers of this type of modelling, and the risks that it can be politicised were only too well illustrated with the so-called modelling released by Prof. Calzada in Spain, which was widely and uncritically reported up by the US media and conservative commentators in an order to raise questions about Green Jobs in Spain. The US Department of Energy's National Renewable Energy Laboratory in a response stated that Calzada's study "represents a significant divergence from traditional methodologies used to estimate employment impacts from renewable energy. In fact, the methodology does not reflect an employment impact analysis. Accordingly, the primary conclusion made by the authors - policy support of renewable energy results in net job losses - is not supported by their work."[32] Analysis by ISTAS in Spain found numerous errors in the work

[31] The exception is where the paper discusses avoided transmission losses at p.8.
[32] Eric Lantz and Suzanne Tegen (2009) NREL Response to the Report 'Study of the Effects on Employment of Public Aid to Renewable Energy Sources' from King Juan Carlos University (Spain), White Paper
NREL/TP-6A2-46261, August 2009, http://www.nrel.gov/docs/fy09osti/46261.pdf#page=8

of Calzada. These included: (1) Lack of scientific rigor (2) The ideology of the document prevents scientific analysis (3) It uses a bad definition of green jobs (4) It ignores the actual profitability of investments in renewable (5) the report ignores the Spanish FiT scheme (6) it ignores the declining costs of renewable energy (7) does not consider environmental externalities and (8) does not take account of the fact that wind energy cuts the wholesale price of electricity.[33]

This should serve as a cautionary tale against the use of modelling when the assumptions of the modelling are not clearly articulated, and where the modelling does not attempt to cost or include environmental benefits and electricity network benefits associated with distributed RE generation.

## C. Policy Choice: Installed capacity limits or Stepped Tariffs (Based on Output)

As a flat rate FIT, unfortunately the Territory's Feed-in Act meets one of the tests of "Bad FIT design" as set out the Handbook of FIT design by Mendonca et.al. (2009). As the authors explain, a flat rate tariff which gives the same remuneration for all renewables "contradicts the basic idea of a FIT."[34]

FIT laws with technology specific support enables the scheme administrator to prevent situations in which windfall profits are reaped by particular technologies (such as large scale wind power). They also enable adjustment so that for other emerging technologies, the level of remuneration is not too low, leading to a situation in which there is nil or minimal investment response. Technology specific levels of support enable the regulator to ensure that emerging or niche renewable energy technologies can be encouraged and commercialised.

A crucial distinction is that capacity limits are not the same as scheme caps. Some submissions to the review confuse these two concepts. At present, the Act includes premises based installed capacity limits but no scheme cap. The *Electricity Feed-In (Renewable Energy Premium) Act* 2008, in s. 5B Act states "(2) this Act does not apply to an NEL compliant renewable energy generator installed at premises if the capacity of the generator, or the total capacity of all the NEL compliant renewable energy generators installed at the premises, is more than 30kW.

At present, where the total capacity of installed RE generators at a premises is not more than 10kW are eligible for 100% of the premium rate. Where the total capacity of RE generators at a premises is more than 10kW but not more than 30kW—get 80% of the premium rate.

Such installation limits prevent investors for accessing economies of scale. They also discourage, more accurately, *prevent* the establishment of community investment in large scale plant, and discourage community solar parks and wind farms.

I am not advocating that larger capacity installations should receive identical remuneration to smaller capacity installations. The solution is to allow unlimited size of installations but simply to pay a smaller FIT rate per KWh generated, in other words, introduce a model of stepped FIT design.

[33] ISTAS (2009) "Análisis crítico del documento "Study of the effects on employment of public aid to renewables energy sources de G. Calzada" Mayo de 2009, Centro De Referencia En Energías Renovables y Empleo Del Instituto Sindical de Trabajo, Ambiente y Salud (ISTAS) de Comisiones Obreras, http://www.istas.net/web/index.asp?idpagina=3569 with an English translation at http://switchboard.nrdc.org/blogs/paltman/media/ISTAS%20_ENG.doc

[34] Mendonca et al (2009), op.cit., p.59.

## Setting the premium rate

FIT rates should be set per technology due to the very different learning curves of renewable energy technologies. European-style FITs recognize the different underlying costs of various technologies in setting the rates that the utilities will pay for electricity.

Dr Watt of CEEM at the UNSW has suggested some methods for controlling the rate of deployment other than using caps. In a submission to the Senate Inquiry into a Bill for a national FIT law she wrote:

"A particular focus of policies that support deployment of technologies is to achieve a certain level of uptake…. Where a FiT is used, if the pool of potential investors is not adequately understood – their motivations, financial positions and so on – overheated markets can result initially if the tariffs are set too high. Set the tariffs too low and the investments could be negligible, consequently wasting the time and effort that has been invested in development of the scheme. The most obvious solution is to set the initial tariff at the 'right' level – but this is easier said than done if the FiT is being used as a broad support mechanism. An advantage of a FiT over a scheme such as MRET is that it can be adjusted each year in response to changing circumstances and to help target a certain level of deployment. Within each year it is possible to use a system of price 'tiers' that reduce as certain levels of deployment are reached. This can also apply to individual systems using a tariff that decreases at higher levels of generation. This avoids the need for setting a potentially problematic cap on the size of the scheme, a source of considerable angst in some international cases."[35]

## Tariff level depending on plant size

*The Discussion Paper asked the community to develop and assess options for increasing the size of eligible installations, including examining models operating in other jurisdictions nationally and internationally;*

My submission supports the expansion of the capacity limit on individual installations by amendment of s.8 of the Act.

Instead of capping the scheme it is a more preferable option to lead growth by means of adjustment of FIT tariffs according to the size of installations. There are three groups of stepped tariff designs which exist :

- Tariff level depending on location (particularly for wind energy)
- Tariff level depending on plant size
- Tariff level depending on fuel type.[36]

The German Renewable Energy Sources Act (EEG) provides a good example of the differentiation of a FIT offering with regard to plant sizes, technologies used and fuel type. The following table shows different tariff steps for PV according to capacity.

## German solar PV - FIT rates [37]

[35] http://www.ceem.unsw.edu.au/content/userDocs/SenateFiTInquiryAPVACEEM.pdf
[36] Klein, op.cit., p.26.
[37] EPIA - Overview of European PV support schemes, 13/10/2009 http://www.epia.org/uploads/media/Overview-National_Support_Schemes.pdf

| Feed-in Tariff | Rooftop | | | | | | | | Ground-mounted installations | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ≤ 30 kW | | > 30 kW | | > 100 kW | | > 1.000 kW | | All sizes | |
| | Degression rate | €/kWh | Degression rate | €/kWh | Degression rate | €/kWh | Degression rate | €/kWh | Degression rate | €/kWh |
| 2009 | 8% | 0.4301 | 8% | 0.4091 | 10% | 0.3958 | 25% | 0.3300 | 10% | 0.3194 |
| 2010 | 8% | 0.3957 | 8% | 0.3764 | 10% | 0.3562 | 10% | 0.2970 | 10% | 0.2875 |
| 2011 | 9% | 0.3601 | 9% | 0.3425 | 9% | 0.3242 | 9% | 0.2703 | 9% | 0.2616 |

*NB: without adjustments from the growth corridor*

Power generation costs may also differ between plants within the same RES-E technology due to the plant size, the type of fuel used, or the diverse external conditions at different sites, like wind yield or solar radiation."

For many RES-E technologies the specific electricity generation costs per kWh differ according to the plant size. The second group of stepped tariff designs takes this into account. Almost all EU countries applying feed-in tariffs use different levels of remuneration according to the size of a RES-E plant. In most of these cases capacity scopes (for example PV plants with a capacity from 5 to 100 kW) are used to determine the level of FITs.[38]

The ACT Greens make some useful suggestions in their submissions on the Discussion Paper:

> "It would be preferable if there was a transparent way of establishing what the premium rate should be through a clear statement of the expected ROI, as well expected efficiency savings by industry over the life of the program should it run longer than just a few years. This would allow industry to be able to reasonably predict the premium rates several years in advance. If this modelling could be replicated for large scale PV and solar thermal systems, the ACT could decide on a premium rate that delivered a ROI that was considered within range to attract long term investment. It would be a better approach to decide on what is an acceptable ROI for both household, medium scale and large scale systems, and set the percentage premium rate accordingly, rather than assume one size fits all."

## *D. Scheme Caps – A Blunt Instrument*

### (i) General Observations

Capacity caps are a blunt instrument for constraining the impact of the system and are likely to lead to a dramatic crash in investment activity.

The Discussion Paper makes claims that a cap is necessary to encourage investor certainty (p.10). These comments are both counter intuitive and run counter to the evidence from several European jurisdictions which initially had uncapped FIT schemes.

Capacity Caps are included within the chapter on "Bad FIT Design" in Mendonca et.al.(2009). The reasons cited include: "Capacity cap[s limit the total amount of newly installed capacity and consequently hinder the creation of mass markets."[39]

Caps can also lead to a stop/go investment cycle which is very damaging to the creation of a sustainable local industry over the long term. Mendonca et al. continue: "once the cap is reached,

[38] Klein, op.cit., p.37.
[39] Mendonca et al (2009), p. 63.

the market usually collapses as no more capacity can be installed for a long time."[40] In order to develop a market and a sustainable industry it is necessary to focus on achieving predictable market growth through certainty and policy stability.

The statement in the *Discussion Paper*, that "investment stalled where there was no cap in place" (p.10) is contrary to the empirical evidence which is at hand from other jurisdictions In fact, the opposite is the case if we look at Spain and Germany, which for a period had no cap and had massive growth. Without a cap there is likely to be a solar boom if the tariff is sufficiently generous. With a cap, the growth will come to a dramatic end, as soon as the market perceives a real risk of the cap being reached in the near future.

Investors perceive the situation as a 'volume risk', as Mitchell et. al. explain, suggesting that this problem is normally confined to TGC or quota systems like Australia has at the Federal level, and does not affect FIT laws unless a cap quota is applied:

> "A generator's revenue is a function of both price and volume. In a feed-in system, there is no volume risk because the network operator is obliged to accept all renewably generated electricity. A quota system sets an overall volume for renewable generation, it does not give individual generators a guarantee that their output will be bought. Under such a system, a plant that can sell all its output in the beginning may later be replaced by cheaper generation. Volume risk is related to the amount of money the Government is prepared to have spent on renewables, by whoever pays for it. If the mechanism is essentially revenue capped as both competitive mechanisms and quota mechanisms are, then there will always be volume risks."[41]

This risk was recognised by Origin Energy in its submissions to the Discussion paper. It stated:

> "Investment certainty is critical Programs designed to encourage investment in small-scale renewable generation (such as the Commonwealth's Photo Voltaic Rebate Program) have reduced investment certainty as targets are met and funding withdrawn." (p.3)

Capping the scheme will have a negative downwards impact on intentions to invest., because it will introduce additional uncertainty about the future of the scheme, and whether caps will be continuously adjusted downwards from year to year, at some ill-defined point in the future. .

Finally, the Discussion Paper at p.9 contains an inaccuracy, where it refers to caps being introduced to limit the exposure of the "funding agency". The FIT is funded by all electricity consumers, not the government, and it is misleading to suggest that an FIT has budgetary implications for government. This is apart from indirect effects on the electricity price and positive impacts via increased revenue from increased economic activity in the renewables sector.

FiT experts Mendonca, Jacobs and Sovacool have explained "We usually recommend no limitation on renewable energy deployment and consider caps in FITs to be bad FIT design" [42] They make an exception for developing countries. Hopefully the ACT does not consider itself to be in this category.

The ACT government is proposing a good thing - removing the capacity limitations (at present a very small 30kW), but at the same time is proposing a cap on the size of the scheme, which when reached would stop payments to complying generators who didn't fall within the aggregate capacity limit.

Discussion of imposition of a scheme cap is premature. The motivations of some stakeholders, particularly incumbent interests in the electricity industry, who are suggesting the introduction of

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40 Mendonca, op.cit, p.64.
[41] C. Mitchell, D. Bauknecht, P.M. Connor (2006) "Effectiveness through risk reduction: a comparison of the renewable obligation in England and Wales and the feed-in system in Germany" 34 Energy Policy 297–305.
[42] Mendonca et al (2009). p.l68.

a cap at this stage should be called into question. There are some parties who see expansion of the renewable energy sector in the territory as unnecessary, and who are seeking to introduce a cap in order to prevent major growth in the renewable sector.

Crucial distinction is that capacity limits are not the same as scheme caps. At the present the Act includes capacity limits but no scheme cap.

## (ii) Case Study: Spain

In the Discussion Paper (p.10) it is claimed that in overseas jurisdictions "investment stalled when there was no cap was in place" as allegedly investors "were exposed to the risk of not being included within the scheme when eventually completed."

The first part of the sentence mis-describes what occurred in Spain. The investment actually stalled because of a cap was suddenly introduced, *not* because a cap was lacking ! Administrative difficulties associated with the operation of the cap compounded difficulties for investors.

It would be an understatement to say that scheme caps dissuade investment. In some cases they can kill off growth in a solar market. Evidence of this comes from appraisal of caps introduced in Spain, as viewed by business commentators . Speaking of the effect of cutting tariff rates, “However, "the most harsh cut would be the introduction of a (installation) capacity limit, which would be clearly seen as very negative by the market in our view, since a significant capacity limit already impacted the Spanish market very negatively," DZ Bank's Kuerten wrote. Reuters continued : “Such a cap caused Spain to shrink from the world's biggest market in 2008 to an expected number five this year, according to industry association EPIA. A similar development could hurt Germany's 9.5 billion euro ($14.1 billion) solar sector.[43]

A report from Greentech media states: “Spain has been better known as a hot solar market that cooled considerably when its government shrank its solar incentives because they were costing too much money. The country was the largest in 2008, when its feed-in tariff promised awesome returns of investments. As a result, the pace of installation far, far exceeded the government's expectations, and prompted it to set a 500-megawatt cap for 2009 to reign in the growth. The country installed around 2.7 gigawatts of solar power in 2008, up from 560 megawatts in 2007.”[44]

In another article, headed **“**Spain Pays for Its Poorly Executed Solar Subsidy**,** Greentech media, state:

“Spain had a lucrative feed-in tariff program that required utilities to buy solar electricity at high rates set by the government. After seeing an explosive growth of solar projects that far surpassed its estimates, the government reduced the solar electricity rates for solar power plants installed after September 2008 “The mistakes happened in 2008 but the echoes were felt in 2009. Spain went from being the largest PV market in 2008 to almost zero in 2009.” [45]

[43] Christoph Steitz “German solars face incentive cuts, foreign sales key”, Reuters, Wed Sep 23, 2009.
[44] Ucilia Wang “Spain’s Solar Export Ambition”, Greentech Media, 01 05 10 . http://www.greentechmedia.com/articles/read/spains-solar-export-ambition/
[45] Eric Wesoff 12 28 09 "Top Ten Greentech Misses in 2009" *Greentech Media*

## (iii) Case Study II- NSW

The New South Wales Solar Bonus scheme has an overall cap of 50 megawatts capacity. If that capacity is to be reached this will trigger are review of the provisions by the Minister. The NSW Act states:
"The review is to be undertaken as soon as possible after 1 July 2012 or as soon as the Minister becomes aware that the total generating capacity of all complying generators reaches 50 megawatts, whichever occurs first."[46]

The NSW renewable energy firm, Energy Matters stated that:

> "Another looming potential problem is the program may be a victim of its own popularity - a short term boom followed by a bust. It appears the Solar Bonus Scheme is capped at 50 megawatts and given the many precedents set in other regions around the world including Ontario, Florida and Spain, a small cap usually means a rush within the first year of the program and then the quota for the entire program is filled…. It is entirely possible that a NSW review may recommend no additional capacity be apportioned once the 50 megawatt cap is reached. While those who have already installed systems will continue to receive the premium rate for the remainder of the seven years, those who aren't already in the program will miss out entirely,"[47]

## (iv) Case Studies III and IV – Florida and Czech Republic

Other regions around the world with low-cap feed in tariff programs have filled their quotas years before their programs were due to end - two examples are Ontario's original program and Florida's scheme. In Florida, the Gainesville City Commission set a total installation cap of 4 megawatts (MW) per year. In 2009, the Gainesville solar FiT reached its 4 megawatt cap in just three weeks (by February 28, 2009).[48] One solar contractor interviewed by a local newspaper stated

> "It's created almost a rat race where everybody's trying to get their fair share as quick as possible," he said. "Every company in the state is trying to get a portion and it's gone in a couple weeks. At that point we don't have a sustainable business. Four megawatts is not enough to attract the kind of investment they're trying to attract."[49]

By February 2009 the program had already, in the vernacular, "maxxed out" for the remainder of 2009. One year later, things had progressed much further. A check of the GRU website on 6.3.10 indicated

"GRU has received enough completed applications to reach our annual target of 4 megawatts through 2016. We are no longer accepting applications for this program."[50]

This example again suggests that an FIT cap, if introduced in the ACT would be likely to cause investment to boom and then bust.

A similar scenario occurred in the Czech Republic. According to an online investor newsletter relying upon a Bloomberg report of a press conference by the CEO Petr Zeman of the Czech Republic's electricity-grid operator, **CEPS AS.** The report stated:

> A hard cap being put in place by the Czech Republic is the latest fear among solar investors. A hard cap on new solar would be the worst-case scenario in the Czech Republic, as it would echo the drastic shift in Spanish solar policy in 2008.[51]

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[46] s.195, *Electricity Supply Act 1995* (NSW) as amended by *Electricity Supply Amendment (Solar Bonus Scheme) Act 2009*.

[47] Energy Matters, http://www.energymatters.com.au/government-rebates/solar-bonus-scheme.php

[48] Anthony Clark "Solar tariff program reaches its limit in only 3 weeks", Gainsville.com, http://www.gainesville.com/article/20090228/ARTICLES/902270894?Title=Solar-tariff-program-reaches-its-limit-in-only-3-weeks, 28.2.2009.

[49] John Gurski, eastern regional business manager of Sullivan Solar Power, interviewed in Clark, op.cit.

[50] http://www.gru.com/OurCommunity/Environment/GreenEnergy/solar.jsp, viewed, 6.3.10.

### (v) If a Cap is to be Introduced, What Cap Design is Best?

Experts on FIT legislation recommend that if the capacity is to be implemented, the legislation should include provision so that the revision takes place prior to the scheme capacity cap being reached. For example, the Act could be amended to state that if 75% of the cap capacity is reached then at that point that the scheme cap and tariff level must be revised. As Medonca has suggested, "to put it in a nutshell: don't wait until you reach the cap."

In Spain, tariffs and caps are adjusted quarterly according to demand in previous quarter:

- If at least 75% of the cap for the previous quarter is reached, rates decrease by a maximum of 2.5%, and the cap is increased by the same amount.
- Conversely, if less than 50% of the cap is reached, rates increase and caps decrease by the same amount.
- If between 50 and 75% of the caps are reached, incentive levels and caps remain the same.
- The annual digression rate is capped at 10%. Annual caps adjust in inverse proportion to digression (e.g. If rates decrease by 8%, caps will increase by 8%).[52]

Several submissions discuss a quota system. However this approach is not normally part of FIT design in many jurisdictions. Avoiding a quota system is part of the simplicity of FIT approach compared to TGC quota systems. A quota system can be avoided if (1) tariff levels are adjusted in order to moderate uptake, and (2) tariff degression is also employed to moderate the risk of excessive rates of return (ROI).

Introducing a cap with measures associated in order to avoid a stop go investment cycle creates *additional problems* in itself of a bureaucratic and administrative nature. For example if the legislation provides for 100 MW of capacity to be installed on the basis of a first-come first-served system, in which applicants must apply in advance on a quarterly basis to government for approval of their FiT payment this will force government into an administrative role which would not be necessary if there was no scheme cap at all. Origin Energy, in its submission to the Discussion Paper, echoed this view, writing: “An overall scheme cap would be preferable to an annual cap. The cost of administering an annual cap and the potential for it to detract from rather than enhance certainty should rule out this option.”

## E. A More Subtle Alternative to Caps - Tariff Degression

The main point to be made is that other methods for constraining scheme costs exist, apart from capacity caps. In discussion of scheme caps in the FIT Handbook (2009), Mendonca et al suggest that “we recommend other design options” including tariff degression and flexible tariff degression.[53] Tariff degression provides incentives for technology and design based cost reductions, because these are the only way to maintain profitability in the building of new installations.

The purpose of degression is to take account of the ongoing decreases in solar PV panel costs, as well as other learning effects for other RE technologies. This is explained by the Fraunhofer Institute:

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[51] Eric Rosenbaum “Czech Republic Takes Aim at Solar” The Street.com, 16.2.10 http://www.thestreet.com/story/10682270/2/czech-republic-takes-aim-at-solar.html

[52] EPIA - Overview of European PV support schemes - last update on 13/10/2009 at p.19.

[53] Mendonca et. al. p.64.

> This degression in compensation was derived from so-called "learning curves". It is in keeping with the fact that technologies become cheaper, for various reasons, with increasing market penetration: learning effects in production occur, higher discounts can be negotiated in purchase of supplied components and materials and sales and marketing become more efficient. Such "technology learning" is anticipated – and promoted – by the compensation degression."[54]

According to Muriel Watt of CEEM, UNSW: "The FiT should be fixed only for the systems installed in any one year and can be changed for the systems installed in successive years. A predetermined system of reducing FiT price "tiers" over the scheme timeframe can provide predictability for investors and a known expense for government. The FiT for installations in successive years could decrease by say 5% to capture and encourage cost reduction potential as the industry moves down the cost learning curve."[55]

Germany applies a more subtle way of constraining the growth of FIT renumerated sector, which is to apply so called degression growth corridors. If the growth of the PV market (new installations) in a year is stronger or weaker than the defined growth corridor, the degression in the following year will increase or decrease a percentage point respectively: [56]

| Growth corridor | Degression | 2009 | 2010 | 2011 |
|---|---|---|---|---|
| **Upper limit in MWp** | Above: +1% | 1,500 | 1,700 | 1,900 |
| **Lower limit in MWp** | Below: -1% | 100 | 1,100 | 1,200 |

MWp = Megawatt Peak (capacity)

[54] *Summary of the report "Feed-in systems in Germany and Spain, and a comparison", Frauenhofer Institute for Systems and Innovation research, 2005*

[55] Australian PV Association and Centre for Energy and Environmental Markets UNSW (2009) Submission to the Senate Standing Committee on Environment, Communications and the Arts
Inquiry into the Renewable Energy (Electricity) Amendment (Feed-in-Tariff) Bill 2008, August 2008 http://www.ceem.unsw.edu.au/content/userDocs/SenateFiTInquiryAPVACEEM.pdf , see "Key Design Principles of a Renewable Energy Feed-in-Tariff".

[56] EPIA (2009) *Overview of European PV support schemes*, 13/10/2009, http://www.epia.org/uploads/media/Overview-National_Support_Schemes.pdf

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