SOLAR FEED-IN PRICING QUEENSLAND

Response to: -

QUEENSLAND PRODUCTIVITY COMMISSION

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Global Change Institute

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ABOUT THE GLOBAL CHANGE INSTITUTE

The Global Change Institute at The University of Queensland, Australia, is an independent source of game-changing research, ideas and advice for addressing the challenges of global change. The Global Change Institute advances discovery, creates solutions and advocates responses that meet the challenges presented by climate change, technological innovation and population change.

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The questions below are numbered in accordance with those set out in the Issues paper dated October 2015. Questions where no response has been submitted have been deleted.

2.1 IS THERE EVIDENCE OF SIGNIFICANT AND ENDURING MARKET FAILURES IN THE SOLAR EXPORT MARKET IN QUEENSLAND?

Market failure occurs, by definition, when market prices do not reflect or capture the true cost of economic activity on society as a whole. The biggest market failure that impacts solar power and energy more generally is the lack of a meaningful price on carbon dioxide emissions in order to mitigate climate change impacts. A key consequence of this in the electricity industry is to provide considerable advantages to incumbent fossil fuel generators at the expense of new entrants and new generation technologies. Moreover, market structures, ownership structures, regulations and institutions tend to reinforce the advantage of incumbency, reflecting in part, hysteresis and path dependency inherited from how the electricity industry has evolved historically.

Examples include the adequacy of the Regulatory Investment Test for Transmission for sponsoring the required transmission infrastructure for renewable projects located away from the existing grid; ability of mature commercial PPA arrangements to adequately compensate projects (e.g. ensure financial feasibility) involving newer second generation renewable technologies such as large scale solar thermal and PV; the small number of large vertically integrated retail companies who can underwrite PPA's often required for financial closure of projects.

Policy that is aimed at promoting investment in renewable energy including solar PV is primarily related to the policy objective of climate change mitigation. From the perspective of the solar industry, the biggest danger is that feed-in tariffs will be set to levels designed to protect the incumbent agents in the electricity industry from disruptive technologies instead of at rates that would ensure the financial feasibility of residential and commercial sector investments in solar PV. This seems to have been the broad approach taken by many State regulatory authorities in Australia most recently, with perhaps the exception being the ACT. In general, rulings by these State authorities do not seem to cite the requirement for financial feasibility of solar PV investments in setting feed-in tariff rates.

Financial feasibility, in this context, refers to earning a return from feed-in tariffs that allow owners of the solar PV systems to cover operating and capital costs as well as any required return to holders of debt or equity in the project. If the feed-in tariffs levels are not enough to ensure financial feasibility of investments in solar PV, then the industry is not ultimately sustainable over the longer term. Also, to the extent that the large retail companies supply these solar products, inappropriately low feed-in tariff rates could be inferred as representing a form of subsidy from residential and commercial owners of solar PV to the incumbent retail companies.

2.2 WHERE MARKET FAILURES ARE PRESENT, HOW ARE THEY BEST ADDRESSED?

The experience in Europe and Germany in particular shows that a properly structured and targeted feed-in tariff scheme can promote significant investment in renewable energy, so that economies of scale and scope can be exploited to drive down units costs of these technologies.

The key requirement should be to set feed-in tariff levels to rates that would ensure the financial feasibility of investments made by residential and commercial agents in solar PV. This would ensure the longer term viability of the solar PV industry. In setting feed-in tariff rates, institutional structures including gross or net feed-in arrangements as well as minimising Governmental financial exposure should be accounted for in decision-making. In particular, tariff settings should be cost reflective, adjusted over time to account for any competitive based cost reduction in installation costs and capacity allocations and compliance tightly monitored to eliminate rorting.

The extensive experience with feed-in tariffs in Europe, and in especially Germany and Spain, can inform policy debate about good and bad practices and procedures. See Cory, Couture and Kreycik (2009), Couture, Cory, Kreycik and Williams (2010) and Kreycik, Couture and Cory (2011) for good overviews.

2.3 DO SOLAR PV EXPORTS PRODUCE POSITIVE ENVIRONMENTAL AND SOCIAL IMPACTS THAT ARE CURRENTLY NOT PAID FOR THROUGH EXISTING PROGRAMS AND REBATES?

Yes, there is evidence that solar PV uptake, together with other energy efficiency measures have served to significantly reduce peak and average demand levels during the day in the NEM. This, in turn, has meant that less generation has had to be sought from the NEM to meet the lower residual scheduled demand during the day, thereby driving down carbon emissions generated from scheduled generation in the NEM.

Via the merit order effect, wholesale price reductions have also occurred by shortening the required generation stack and displacing higher cost generation at the top of the merit order. This higher cost generation would have been dispatched in the absence of the demand reduction produced by solar PV. Demonstrations of the merit order effect can be found in Molyneaux (2015).

2.4 IF SO, IS THE INVESTMENT IN SOLAR PV SUBOPTIMAL (FROM A SOCIETAL POINT OF VIEW)?

In the case of residential PV, this is hard to determine given the large investments that have occurred over the last decade. Up until now, participation in residential schemes has required the owner of the PV system to own the premises on which it is installed. In part, this assessment would also be linked to whether future residential investments could be potentially directed to regions which do not require significant network upgrades in order to support the higher levels of investment in and penetration of solar PV.

An option for promoting future expansion would involve broadening the scope of the scheme to other premises such as non-owner occupied dwellings and extend the scope of the scheme so that the benefits of solar PV installed at another location could be charged against the electricity account of investors who do not necessarily own or live in the properties the PV infrastructure is installed on.

There is reason to believe that investment in commercial scale solar PV is at a sub-optimal level. There are a number of potential advantages with commercial based investments over residential investments. First, scale economies can arise whereby the ($/Wp) installation costs for commercial systems are often lower than equivalent costs for smaller capacity residential based systems – see Table 1, Panel (A). When Levelised Cost of Energy (LCOE) analysis is undertaken, the levelised costs of commercial sized systems tend to be lower, in part, reflecting the lower installation costs – see Panel (B) of Table 1. Another factor is that the larger capacity allows for greater revenue streams from the sale of Small-scale Technology Certificates (STCs) associated with the Small-scale Renewable Energy Scheme (SRES) or avoided cost from reduced purchase of electricity from the grid.[1] These considerations, taken together, imply that the required feed-in tariff for financial viability would tend to be lower for commercial investments when compared to smaller residential investments.

Table 1. Comparison of Indicative Installation and Levelised Costs for Different Residential (Shaded Red) and Commercial (Shaded Yellow) PV Systems

Panel (A) ($/Wp) Installation Costs

1.5 kW	2 kW	3 kW	4 kW	5 kW	10 kW	10 kW	30 kW	50 kW	100 kW
$/Wp	$/Wp	$/Wp	$/Wp	$/Wp	$/Wp	$/Wp	$/Wp	$/Wp	$/Wp
2.33	2.15	1.78	1.62	1.52	1.70	1.78	1.80	1.36	1.57

Source: Solar Choice. See: http://www.solarchoice.net.au/blog/solar-pv-system-prices-november-2015 and http://www.solarchoice.net.au/blog/commercial-solar-system-prices-october-2015.

Panel (B) ($/KWh) Levelised Cost of Energy

1.5 kW	2 kW	3 kW	4 kW	5 kW	10 kW	10 kW	30 kW	50 kW	100 kW
$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh
0.414	0.347	0.278	0.237	0.200	0.194	0.188	0.165	0.114	0.132

Key assumptions used in LCOE analysis included CPI of 2.5%, nominal post tax WACC of 6.2%, interest rate used to service capex debt of 7.51% and FO&M including the annual charge for fixed component of Tariff 11 and Tariff 21 schemes for residential and commercial PV. For systems of 4 kW and over, we also assumed a fixed value of $2.40 per panel plus an extra 50% allocation for overheads for panel cleaning once a year. For smaller panel, we only attributed the annual charge for the fixed component of grid off-take tariff rates

The annual capacity factor used of 0.1739 was sourced from PVWATTS software for Brisbane assuming north facing system and other default settings in PVWATTS. The lifespan for residential was 15 years and commercial was 25 years with an inverter replacement factored into the ($/Wp)

[1] Details about the Small-scale Renewable Energy Scheme (SRES) can be found at: https://www.environment.gov.au/climate-change/renewable-energy-target-scheme.

installation cost assumptions for commercial PV. PVWATTS is available at: http://pvwatts.nrel.gov/.

Finally, using manufacturer information, we assumed that the panel systems were capable of supplying 80% of their power after 25 years and scaled the output on each system to be consistent with that implied rate of reduction in panel efficiency over a 25 year period.

The second reason why commercial PV may provide some advantages over residential reflects the relative paucity of commercial investments to-date. As such, there would be more scope for investment in parts of the distribution network that are strong, thereby requiring minimal network expenditure to support these investments.

The third reason reflects the fact that the scope for export to the grid is more unlikely with commercial scale systems and therefore most energy generated is likely to be used internally by the commercial enterprise. This is likely to minimise negative impacts associated with power flowing back into the distribution network and is more likely to provide positive network benefits including deferral of upgrades to the network.

2.5 WOULD A REGULATED SOLAR FEED-IN TARIFF BE AN EFFECTIVE AND EFFICIENT TOOL TO ADDRESS ENVIRONMENTAL EXTERNALITIES?

The promotion of investment in renewable energy is a core component of policies promoting the mitigation of climate change impacts through decarbonising electricity and energy systems more generally. The importance of the feed-in tariff is in ensuring the commercial viability of the solar PV investments themselves by linking the tariff rate to LCOE of the systems when involved with a gross feed-in tariff arrangement. This outcome, in turn, would ensure that the solar PV industry is placed on a commercially viable footing.

A case-study in point is Germany where feed-in tariffs have been the central policy instrument in driving the rapid expansion in solar PV investment to such an extent that considerable economies of scale and scope have been achieved which have been responsible for significantly driving down the ($/Wp) costs of panels and inverters as well as the feed-in tariff rates, themselves, over time. Competition in the industry has also driven down balance of plant costs as well through the development of lean manufacturing and procurement processes [see RMI (2013) and Fraunhofer ISE (2015)]. There is some evidence of this in Australia coming off the back of the significant expansion in the solar PV industry servicing the residential PV market following the introduction of what were initially quite generous feed-in tariff settings [RMI (2014)].

Tariff structure becomes more complicated in a net feed-in arrangement because of the need to charge costs of the investment against two different sources of implied revenue streams. The first is the tariff rate payable on energy that is not used and is fed back into the grid. The second is the cost savings implied in not having to purchase electricity from the grid, and instead, using power generated from the PV systems. This latter component is a cost savings but is treated as an imputed revenue stream when assessing the financial viability of the solar PV investment. This latter revenue stream depends crucially upon the tariff payable on grid supplied electricity such as Tariff 11 or Tariff 21 KWh electricity rates.

In this framework, the tariff on grid supplied power cannot be changed. Hence the tariff payable on electricity fed back into the grid becomes a key decision variable in determining the financial viability of the investment. The required tariff rate for financial viability however is likely to vary with the proportion of energy fed back into the grid and also with the capacity of the PV system as depicted in Table 2 for the various residential systems considered in Table 1.

Table 2. Assessment of indicative Tariff Rates Required On Exported Energy to Achieve Financial Viability as a Function of System Capacity and Proportion of Total Power Exported Back into the Grid

Export Share	Internal Usage Share	Fixed Tariff 21 Rate	1.5 kW	2 kW	3 kW	4 kW	5 kW	10 kW
		$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh	$/KWh
0.0	1.0	0.222	0.414	0.348	0.273	0.231	0.204	0.198
0.0	1.0	0.222	na	na	na	na	na	na
0.1	0.9	0.222	2.470	1.700	0.830	0.355	0.040	-0.035
0.2	0.8	0.222	1.360	0.980	0.545	0.306	0.113	0.113
0.3	0.7	0.222	0.995	0.740	0.450	0.290	0.149	0.160
0.4	0.6	0.222	0.810	0.620	0.400	0.282	0.204	0.185
0.5	0.5	0.222	0.700	0.548	0.375	0.277	0.214	0.200
0.6	0.4	0.222	0.628	0.499	0.353	0.274	0.222	0.209
0.7	0.3	0.222	0.575	0.465	0.339	0.272	0.227	0.216
0.8	0.2	0.222	0.535	0.440	0.329	0.270	0.231	0.221
0.9	0.1	0.222	0.505	0.418	0.321	0.268	0.234	0.225
1.0	0.0	0.222	0.478	0.402	0.315	0.267	0.236	0.229

In Table 2, the third row (shaded in orange) outlines the required return needed to ensure financial viability if no energy is exported back into the grid, but instead, all energy produced by the PV system is used internally. To the extent that these required rates exceed the Tariff 11 rate, then the investments cannot be financially feasible under the assumption of no exports back into the grid, as is the case with the 1.5 kW to 4 kW investments.

For example, the 1.5.kW system would require a tariff of 41.4 c/KWh or greater for viability under the assumption of no exports but can only attract the much lower Tariff 11 rate of 22.2 c/KWh. Under the latter tariff rate, the solar PV plant cannot generate enough output at that tariff rate to provide enough avoided cost savings to cover the cost of installing the system and paying off other running costs over its lifetime. Instead, to achieve this, it needs a much higher tariff rate of at least 41.4 c/KWh. From the perspective of the investment, this signifies an inadequate return on energy generated that is internally consumed.

For very low rates of export, a very large feed-in tariff on electricity exports may be needed to ensure viability if it has to potentially compensate for the inadequate return on internally used electricity alluded to above due to Tariff 11 being significantly below the required return on internally used energy. This is shown in Table 2 for the 1.5 kW and 2 kW investments for export percentages of 10 and 20 per cent (e.g. corresponding to export shares of 0.1 and 0.2). For systems where the return on internally used energy is poor, as in the 1.5 kW to 4 kW systems above, the required tariff on exported energy tends to decline as export share increases as less poorly valued internal energy is used and a greater share of energy generated is exported. It should be noted from Table 2 that the rates of decline in the 3kW and 4 kW systems required tariff rates in Columns 6 and 7 are much more moderate in scope than is the case of the 1.5 kW and 2 kW system (in

Columns 4 and 5). This follows because the former two systems required return on internal energy usage is still inadequate but a lot closer to the Tariff 11 rate than is the case for the smaller 1.5 kW and 2 kW systems.

The situation is the converse for the last two systems considered – the 5 kW and 10 kW systems. In this case, the required returns on internally used energy are actually below the Tariff 11 rate payable on electricity taken off of the grid. Hence, using power internally from the solar PV systems constitutes a large cost savings which is then imputed to the NPV analysis as a revenue stream. This cost saving is magnified to the extent that viability would eventuate at a lower tariff rate than is actually used to calculate the avoided cost, thus magnifying it over what is actually needed to ensure financial viability. In this case, as export share increases, the required tariff on the exported electricity increases as more power is transferred away from the 'highly profitable' internal usage to the less profitable exporting activity. The rate of increase in the required tariff on exported energy, however, also plateau's off at higher export shares.

Clearly, what the above analysis shows is that assessing required tariffs on both exported and internally used energy for establishing financial viability is complex and likely to be related to system size, export share and the adequacy of grid based off-take tariff structures.

2.6 WHAT ARE THE OBJECTIVES OF A SOLAR EXPORT PRICING POLICY?

The objectives should be to promote investment in solar PV by requiring that the feed-in tariffs ensure financial viability of the actual investments. The arrangements determining the feed-in tariffs should be cost reflective of trends on installation cost components while also eliminating any potential rorting or non-compliance of the system. These goals should help minimise the impact on State Government financial position as well as minimising the impact on electricity prices given, however, the achievement of the first objective mentioned above. See Cory, Kreycik and Williams (2010) and Kreycik, Couture and Cory (2011) for further details.

2.7 WHERE OBJECTIVES ARE IN CONFLICT, WHICH OBJECTIVES TAKE PRIORITY AND WHY?

The central objectives having primacy are: (1) financial viability of solar PV investment; and (2) the development of a successful and healthy solar industry in the State.

Given the considerable solar resources available in Queensland and the high carbon emission intensity of the current generation fleet, the development of both the solar PV and solar thermal industries will be central in de-carbonising the economy as well as offering industries that have enormous development potential within this State.

Its development generally would also be a central plank of any climate change mitigation strategy aimed at de-carbonising the electricity generation sector.

2.8 WHAT PRINCIPLES SHOULD BE USED TO GUIDE SOLAR EXPORT PRICING POLICY AND ANY REGULATION OF FEED-IN TARIFFS?

Solar export pricing should be tailored at ensuring that the industry remains commercially viable by ensuring that investment in solar PV systems are financially viable. Feed-in tariff setting should not be used in a way that makes such investment commercially unviable, thereby stifling the development of this industry.

Tariff structures should be reflective of the costs of installing PV systems. This includes modifying tariffs over-time to account for reductions in cost components associated with scale and scope economies and technological innovations. Appropriate setting of capacity targets as well as close monitoring for rorting and other forms of non-compliance activities should also be implemented.

Lessons from elsewhere in the world including Germany and Spain that have successfully used feed-in tariffs to underline the strong and rapid development of solar and other renewable industries would be of value in guiding policymakers. Good overviews can be found in Cory, Kreycik and Williams (2010) and Kreycik, Couture and Cory (2011).

2.9 HOW SHOULD FAIRNESS BE DEFINED?

Assessment of fairness in public discourse about feed-in tariffs has often been applied quite narrowly, being restricted to that portion of the community who cannot install solar PV systems because they cannot afford to or do not own the dwellings they live in. That debate occurs within a framework where little or no consideration is actively given to the role that investment in renewables, including solar PV, is playing in meeting climate change mitigation policy objectives.

One component in assessing fairness or equity that is often overlooked relates to factoring in the impacts of climate change on the least advantaged parts of the community because they will be the part of the community least able to adapt to the adverse consequences of climate change. Such impacts would include the potential for property damage from extreme weather events, health impacts from more extreme heat wave events, increased prices for food as food and water security become increasingly threatened, and the increased strain on Government resources when confronted with wide ranging consequences of climate change, more generally.

Another issue of fairness that is also often ignored is the issue of inter-generational fairness. Our current generation is widely perceived as the last generation to be able to mitigate the impacts of climate change while the next couple of generations (including young children of today) will face the consequences of our current actions or inactions over this issue.

3.1 WHAT ARE THE COSTS AND BENEFITS OF EXPORTED SOLAR ELECTRICITY?

The main cost is the money required to fund the feed-in tariff scheme which will have to be borne by retail customers irrespective of whether it is funded from either Government revenue or via levy through the Distribution Network Chargers or via accounts with Retail Electricity Companies.

To the extent that the scope of the investment possibilities remains limited, it could be conceived as a subsidy payment from those without solar PV to those customers with solar PV. However, if so, it is one of many subsidies currently operating including significant subsidies from electricity users without air-conditioning to those with air-conditioning, and subsidies from future generations to the current fossil fuel and mining industries. A more general form of subsidy is from the general population to heavy carbon dioxide emitters whose bottom lines do not account for the damage they are causing to the environment, public health and the prospects of future generations. Finally, if feed-in tariffs are set too low and preclude financial viability of solar PV investments, then this will be a subsidy from the owners of solar PV to other customers (who benefit from lower C02 emissions and lower wholesale electricity prices associated with increased solar PV deployment) and to retail companies.

The benefits of investment in solar PV relates to the reductions in carbon emissions and mitigation of climate change impact which is a society wide benefit and which contrasts very significantly with the environment/climate change mitigation impacts of numerous fossil fuel/mining industry subsidies. The other major benefit is the reduction in wholesale electricity prices via the merit order effect which is also a very general benefit.

A final benefit is a strong vibrant industry with positive economic spin-offs, including the taking up of workers from other industries that may be in decline as well as providing tax revenue to the State. It would also be an enabler for the development of the energy storage industry as well.

3.2 WHO INCURS THE COSTS AND ACCRUES THE BENEFITS FROM EXPORTED SOLAR ELECTRICITY? HOW WILL FUTURE MARKET DEVELOPMENTS IMPACT ON COSTS AND BENEFITS?

The answer to Issue 3.1 outlines major classes of agents who incur the costs and accrue the benefits.

3.3 WHERE THERE IS A CASE TO REGULATE FEED-IN TARIFFS, IS THE EXISTING APPROACH TO PRICING SOLAR EXPORTS APPROPRIATE? IF NOT, WHAT ALTERNATIVE APPROACH WOULD BE THE MOST EFFECTIVE AND EFFICIENT WAY TO PRICE SOLAR EXPORTS?

To the extent that the current approach to regulated feed-in tariffs produce tariff rates that are not sufficient to ensure the financial viability of the solar PV investments, then that approach will not be appropriate.

The answer to Issue 2.6 outlines the broad principles around the most appropriate approach to price solar exports.

3.4 HOW SHOULD THE PRICE BE STRUCTURED AND PAID? SHOULD FEED-IN TARIFFS ACCOUNT FOR VARIATIONS IN VALUE DUE TO LOCATION AND TIME?

The broad principles and requirements about the structure of the feed-in tariffs were discussed in the answer to Issue 2.6.

Given the requirement to set feed-in tariff rates at levels that will ensure financial viability of the solar PV investment, and that they be cost reflective, this requirement was shown to potentially vary with the capacity and ($/Wp) installation cost of the solar PV system, prevailing grid take-off tariff (i.e. Tariff 11 or 21) and extent of export back into the grid. The nature of the renewable resource will also fundamentally affect viability calculations via its effect on the annual capacity factor. Therefore, feed-in tariffs should be based upon the underlying regional renewable resource and varied as necessary to ensure that regional based solar PV investments are financially viable.

If residential and commercial customers owning solar PV systems are on grid off-take time of use tariffs, the higher peak rates are likely to reduce the size of the feed-in tariff for exported energy needed to achieve commercial viability. Under these circumstances, there would be some justification for varying the feed-in tariff rates for exported electricity between daytime peak and off-peak periods.

If the customers are on fixed rate grid off-take tariffs, then feed-in tariffs should not vary to reflect specific time-of-use considerations.

For solar PV with storage, the need for time varying rates may then emerge as arbitrage becomes possible with the stored energy and timing to reflect local residential based peaks that typically emerge in the early evening period.

Given the societal wide benefits as well as the benefits flowing to future generations of climate change mitigation activities conducted now, a strong public finance argument could be made for funding feed-in tariff programs from funds drawn from a long term public debt instrument. In this way, future generations can also contribute towards meeting the costs of current climate change mitigation programs and activities that produced significant benefit streams to them by contributing to the servicing of the interest payable on the debt instrument. See Musgrave and Musgrave (1984, 691-694).

3.6 WHEN SHOULD THE FEED-IN TARIFF BE REVIEWED OR UPDATED?

Based upon the German experience, the feed-in tariff rates should be reviewed annually and adjusted over time to reflect changes in the cost of different cost components including panels, inverters and balance of plant costs.

The experience from Europe and especially Germany is that significant increases in solar PV investments produced by well targeted feed-in tariffs produced significant scale and scope economics as well lean efficient installation and procurement processes. It was found that installation cost reductions occurred at a significant rate and annual reviews were necessary to adjust feed-in tariffs appropriately to capture these reductions in unit installation costs.

These economies of scale and scope and development of the solar PV industry, reduction in installation costs and adoption of lean efficient manufacturing processes that characterise the German industry, in particular, has been directly attributed to feed-in tariffs targeted at rates needed to ensure commercial viability of solar PV projects.

In contrast, America went down the path that seems to have been recently adopted by many States regulatory authorities in Australia including in the 2013 QPC Issue paper (QPC 2013). The result in America was the development of a less efficient and significantly higher cost solar PV industry – see RMI (2013). In fact, the development of the solar PV industry in America has been so underwhelming that many States have now begun to investigate options for incorporating feed-in tariffs to stimulate investment in the industry. If Australia mimics the American policy, we can probably expect a similarly underwhelming outcome.

3.7 HOW SHOULD THE FEED-IN TARIFF BE REVIEWED OR UPDATED?

Given the role of the QPC in determining regulated electricity tariffs in Queensland and administering completion policy more generally as it relates to the electricity industry, it is well placed to determine appropriate levels for feed-in tariff and adjust them through time to ensure that they remain cost reflective.

Given that the key policy goal underpinning investment in solar PV, and renewables, more generally is climate change mitigation, that part of the State bureaucracy responsible for developing and administering State climate change mitigation policy should have oversight of the program.

4.4 ARE THERE OTHER BARRIERS TO A WELL-FUNCTIONING SOLAR EXPORT MARKET?

One of the major barriers to the solar export market is the ability to enter into a grid connection agreement with the relevant distribution company. At present there is little regulation in this area and each agreement is negotiated on a case-by-case basis.

This is most prevalent in the commercial/industrial scale system size and due to the low levels of deployment at this scale to date, there have been few opportunities to overcome the perceived problems.

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