

Proposed Guidelines and Agreements for Small
Grid-Connected Renewable Energy Systems

Final Report

December 2004

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Acknowledgements

The Australian Government through the Australian Greenhouse Office in the Department of the Environment and Heritage supported this project. The authors would like to thank the following people for their invaluable assistance:

Don Anderson (EnergyAustralia), Keith Baker (AGO), Darren Brown (Aurora Energy), David Cornelius (Victorian Essential Services Commission), Michael Dadour (Origin Energy), Ray Deacon (EECA – NZ), Dominic Drenen (Origin Energy), Paul Driver (ETSA Utilities), Glen George, Ian Gibb (Aurora Energy), Steve Gough (Country Energy), Tracy Greenhalgh (Unisearch), Ross Homberg (Powercor), Colin Jenkins (Powercor), Dennis Jones (Orion Group), Dave Keenan, Sinta Knox (TXU), Kerry Llewellyn (Western Power), Nicole Maundrell (Energex), Siva Moorthy (United Energy), Rebecca Myers (Ergon Energy), Paul Myors (EnergyAustralia), Travis Nadge (Australian Inland Energy), Peter O’Sullivan (Origin Energy), Max Rankin (TXU Networks), Fred Robson (Australian Inland Energy), Geoff Stapleton (Global Sustainable Energy Solutions), Jill Taylor (ORER), Trevor Toomer, Lisa Vosinthavong (ATO), Rebeka Weiley (Integral), Trevor Whitlow (Whitlow & Associates Ltd.).

Disclaimer

The opinions of the authors as expressed in this report are derived from a consultative process with a diverse group of stakeholders. While every reasonable step has been taken to ensure the viewpoint of each stakeholder has been accurately presented, the authors accept no liability for any misinterpretations that may have occurred.

Document navigation

The pdf version of this Review includes hyperlinks to aid navigation throughout the document.

The words ‘Final Report’ on the Title Page link to the Contents page where each heading links to the relevant section.

EXECUTIVE SUMMARY

This Final Report is based on responses to the report *Development of a Standard Connection Agreement for Small Grid-Connected Renewable Energy Systems: Discussion Paper*.

System owners can be readily divided into those who do not expect to have net export of electricity over a billing period, and those who do. For the former group, the connection agreement(s) can be much simpler, especially if an additional meter is not required. The latter group requires more complex agreement(s) that cover net exports of electricity, and the costs and nature of additional metering.

Thus we propose two different types of agreement; Basic Agreements, and Full Agreements. Given that the majority of systems are 1.5 kW or less, the Basic Agreements should be suitable for most installations. Since in some States and Territories, the retailers and distributed network service providers (DNSPs) are separate entities, for each of these types of agreement, we provide a version suitable for retailers, a version suitable for DNSPs and a version suitable for combined Utilities; thus six in all. We also provide a separate set of Guidelines (which includes a flowchart for the application process) for each of these situations.

These Agreements are intended to be used as Appendices to existing Standard Customer Contracts. In this way much of the detail required in a free-standing contract can be removed.

This Final Report is a 'living document'. It is intended to be a guide for ongoing development of grid-connection agreements and guidelines based on further consultation with stakeholders.

The current arrangements for physical connection to the grid, and sale of exported electricity, vary greatly throughout Australia. Both the processes followed and the final contracts range from very simple to very complex. Here, where a Basic Agreement is not appropriate, to reach some sort of compromise that all retailers and DNSPs may accept, we have incorporated more detail than some currently include in their agreements and/or guidelines.

However, it would also be counterproductive to increase the complexity of agreements and guidelines that retailers and DNSPs are already happy to use. In such cases, rather than using the forms proposed here, our Recommendations could simply be incorporated into existing forms.

Responses to the Discussion Paper were received from 33% of retailers and 47% of DNSPs in Australia. Although the responses were generally positive, a number of significant issues were raised, which could not be addressed within the agreed consultation process.

Thus it is likely that additional steps will need to be taken before standard Guidelines and Agreements can be finalised. This should involve more face-to-face consultation with retailers, DNSPs, installers and system owners, including roundtable discussions. The Department of Energy, Utilities and Sustainability (DEUS) is currently undergoing such a consultation process for NSW, and intends using this report as a basis for discussion.

The final recommendations regarding the issues raised in the Discussion paper, and their probable need for additional consultation, are given in the table on the following page.

Final Recommendations and Need for Additional Consultation

Issue	Recommendation
1	Upper limit on system size
	<p>The upper limit should be consistent with AS 4777: no more than 10 kVA for single phase units, and 30 kVA for three-phase units.</p> <ul style="list-style-type: none"> • Retailers may include a caveat that systems should be appropriately sized to meet demand • DNSPs may include a caveat that system size may be limited by local grid characteristics <p>There was no opposition to this recommendation.</p>
2	Type of metering scheme
	<p>Schemes 1, 2a or 2b should be acceptable.</p> <p>The modified recommendation is expected to be accepted.</p>
3	Additional technical connection requirements
	<p>Technical connection requirements in addition to those imposed by Australian Standards and State or Territory regulators should not be required for a standard connection agreement where a certified renewable energy installer is used.</p> <p>May require limited additional consultation to clarify that it does not preclude additional technical requirements in unusual situations.</p>
4	Requirement for specially certified or accredited electricians to grid-connect
	<p>If DNSPs require specially certified or accredited electricians to connect systems to their grid, they should provide training courses to licensed system installers.</p> <p>Will require additional consultation as it recommends DNSPs provide training courses to third parties such as system installers.</p>
5	Metering costs
	<ul style="list-style-type: none"> (i) A Basic Agreement that does not require an additional meter be adopted where possible. (ii) The DNSP should allow electricians or accredited system installers trained by the DNSP to install any additional metering required. (iii) Where an additional meter is required, a standard charge of no more than \$65 should be applied in order to recoup incidental costs such as Notification of Service Electrical (NOSE) works fees (the DNSP should pay the capital cost of the meter), and the DNSP should provide transparent costing and justification of any additional charge imposed. If the DNSP itself performs the meter installation, the charge may be increased to cover the actual costs incurred. (iv) Interval meters need not be part of a standard Connection Agreement but should be encouraged. <p>May require additional consultation because where a Basic Agreement is not used, it is based on acceptance of Recommendation 4, and that in this case, where the DNSP does not perform the installation, they should apply a standard charge of no more than \$65.</p>

6 Retail and reference rates	
(i) Retailers may offer reference rates that are higher than retail rates,	
(ii) Retailers should not offer reference rates that are less than retail rates, even when there is net export.	
Will definitely require additional consultation because of the uncertainty surrounding the costs and benefits of electricity exported to the grid.	
7 Cap on net exported electricity	
(i) Retailers should not place a cap on net exported electricity.	
(ii) The reference rate should either be fixed or pegged to the retail rate for the term of the connection agreement.	
Is unlikely to require additional consultation.	
8 Payment for net export	
Where a Basic Agreement is not in use, credit for net export should be carried forward until reaching at least \$50 and then paid.	
Will require some additional consultation because it may require retailers to change their billing systems.	
9 Duration of contract, notice for termination, and disconnection process	
<ol style="list-style-type: none"> 1. The Agreement should be open-ended, with earlier termination being in accordance with one of the following provisions. 2. If the system owner no longer wishes to participate under the terms of the Agreement, they may terminate it by giving one month advance written notice. 3. The DNSP or retailer may terminate the Agreement in the event that the system owner is in breach of the Agreement or the Standard Customer Contract, and the breach remains unremedied for one month after the system owner has been notified in writing of the breach. 4. The Agreement may be terminated at any time upon mutual agreement between the parties. 5. For legal reasons, where the system owner sells the system or property, the existing contract will need to be terminated and a new contract entered into with the new owners. 	
The disconnection process should be clearly stated in any grid-connection agreement.	
May require some additional consultation.	
10 Treatment of Renewable Energy Certificates	
The system owner should be given the option of transferring the RECs to an agent (such as their electricity retailer, the system supplier or a government agency), who would compensate the system owner using the ORER deeming formula and at least the current market value of RECs.	
May require some additional consultation simply because it may involve the retailer paying the system owner a reasonable sum of money up front (\$660–900 for a 1kW system). Note the Government has accepted the recommendation of the MRET Review Panel that the deeming time be extended to 15 years.	

11 Treatment of Greenhouse Gas Abatement Certificates

Since it is unlikely NGACs will be generated by residential-scale renewable energy systems, they should not be included in the agreement.

There was no opposition to this recommendation.

12 Treatment of Green Power Rights

- (i) Retailers are encouraged to sell exported electricity as Green Power.
- (ii) Retailers should apply net billing so if the system owner is on Green Power they effectively receive the Green Power tariff on any gross exports offset against gross imports.
- (iii) However, retailers should not have to pay the system owner the Green Power tariff for net exported electricity over the billing period, even if the system owner is a Green Power customer. This is based on the assumption that the system owner would benefit more from up-front payment of RECs than from an ongoing Green Power tariff.

May require further consultation if it overly complicates billing systems, and to explain how the MRET and Green Power systems interact. Note the Government has accepted the recommendation of the MRET Review Panel that the deeming time be extended to 15 years.

How the Mandatory Renewable Energy Target and Green Power interact

Under the Mandatory Renewable Energy Target (MRET) scheme, eligible generation can earn a REC (Renewable Energy Certificate), where each REC represents 1,000 kWh of renewable electricity. If that generation is also accredited under the National Green Power Accreditation Program it can also earn a GPR (Green Power Right).

If a retailer sells Green Power, it uses RECs to prove it has bought as much renewable electricity as it has sold as Green Power. However, if renewable electricity is sold as Green Power, it cannot also be used to meet MRET obligations. To avoid double counting, RECs submitted to the REC Registry are placed into a designated Green Power account.

Therefore, if the RECs from a PV system are transferred to a retailer, it can use them to either meet its MRET obligations or its audit requirements under the Green Power scheme.

Generation that is accredited under both schemes (and so can be sold as Green Power) will earn both a REC and a GPR. For a Small Generation Unit such as a PV system, the number of RECs generated is deemed according to the ORER deeming formula, not according to the amount of metered electricity produced. The Commonwealth government has accepted the recommendation of the MRET Review Panel that the deeming time be 15 years, which means a 1kW system would produce between 17.775 and 24.33 RECs (and GPRs), depending on its location.

For a more detailed discussion see *Development of a Standard Connection Agreement for Small Grid-Connected Renewable Energy Systems: Discussion Paper* (Passey et al., 2003), the Office of the Renewable Energy Regulator website (<http://www.orer.gov.au>), or the Green Power website (<http://www.greenpower.com.au>).

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1. Introduction

The Australian Greenhouse Office has provided funding for development of standard Agreements between the system owner and the retailer and DNSP for small (less than 10 kVA single phase, less than 30kVA three phase) grid-connected renewable energy systems throughout Australia. These Agreements need not be mandatory but would help simplify the grid-connection process for all concerned by providing greater certainty regarding performance, timing and costs.

The process of developing these Agreements has been divided into two stages, the second of which is presented in this report.

The **first stage** involved surveying DNSPs and electricity retailers regarding Agreements they currently use, and the processes they follow for approving grid-connection of small systems. Input was also sought from system owners, the Office of the Renewable Energy Regulator and the Australian Taxation Office. This information was presented in the report 'Development of a Standard Connection Agreement for Small Grid-Connected Renewable Energy Systems: Discussion Paper' (Passey *et al.*, 2004), which summarised the survey results, highlighted and discussed the main issues raised, and recommended how these issues should be addressed.

The Discussion Paper was sent to all electricity retailers and DNSPs in Australia, the Australian Taxation Office (ATO), the Victorian Essential Services Commission (VESC), the Office of the Renewable Energy Regulator (ORER), the National Electricity Market Management Company (NEMMCO), the Australian Greenhouse Office (AGO), the Sustainable Energy Development Authority (SEDA), the Australian Wind Energy Association (AusWEA), Bioenergy Australia, the Alternative Technology Association (ATA), the Business Council for Sustainable Energy (BCSE), system owners notified via the Argon discussion list, and others. Appendix 6.1 has a complete list of people and organisations that contributed to, were sent, and/or responded to the Discussion Paper.

In the **second and final stage**, this Final Report summarises the responses from stakeholders to the Discussion Paper, discusses the issues raised, and proposes Guidelines and Agreements.

This Final Report is a 'living document'. It is intended to be a guide for ongoing development of agreements and guidelines based on further consultation with stakeholders.

Section 2 of this Report describes the process for grid-connection relevant to both retailers and DNSPs, and the types of Guidelines and Agreements required; **Section 3** discusses the consultation process, and **Section 4** discusses the responses by stakeholders to each of the issues raised in the Discussion Paper.

2. Proposed Guidelines, Application Forms, and Agreement templates

Connection of a small-scale renewable energy system to the grid requires a number of different steps involving the system owner, the system installer, the retailer and the DNSP. In some situations the retailer and DNSP are not separate entities.

This process currently varies between different retailers and DNSPs. In some cases system owners complete only a single contract or agreement (provided to them by the installer), even where the retailer and DNSP are strictly separate entities. In others the system owner must first read through separate guidelines for the retailer and DNSP, then fill out attached application forms. The retailer and DNSP then develop agreements or contracts based on the information supplied in the application forms, and send them to the system owner to sign. In one other case the Standard Customer Connection Contract was all that was required.

The complexity of current agreements, contracts and guidelines varies greatly between different retailers and DNSPs. They range in size from just over one page to 37 pages, and often contain considerable technical detail already covered by Australian Standards. Current processes also vary significantly in their treatment of RECs and Green Power Rights (GPRs).

System owners can be readily divided into those who do not expect to have net export of electricity over a year, and those who do. For the former group, the connection agreement(s) can be quite simple, especially if an additional meter is not required. The latter group requires more complex agreement(s) that cover net exports of electricity, and the costs and nature of additional metering.

Therefore, we propose two different types of agreement; Basic Agreements, and Full Agreements. Given that the majority of systems are 1.5kW or less, Basic Agreements should be suitable for most installations. In some States and Territories, the retailers and distributed network service providers (DNSPs) are separate entities, and so for each of these types of agreements, we provide a version that is suitable for Retailers, a version suitable for DNSPs and another 'Combined' Utility Agreement; thus six in total. These Agreements are intended to be used as Appendices to existing Standard Customer Contracts. In this way much of the detail required in a free-standing contract can be removed.

In the Full Agreements, we have included more detail than is currently included in many agreements and/or guidelines. ***However, it would be counterproductive to increase the complexity of agreements and guidelines that retailers and DNSPs are already happy to use. In such cases, rather than using the documents proposed here, our recommendations could simply be incorporated into existing documents.*** Some agreements are simple only because they do not include treatment of RECs and GPRs. These should be included and would increase complexity only slightly.

We also provide a separate set of Guidelines (which includes a flowchart for the application process) for each of these situations. Thus the forms in Table 1 are proposed. Text in [square brackets] will need to be changed by the retailer/DNSP/utility to what is relevant for their situation.

These documents are intended as guides only. Each retailer and DNSP will have their own legal requirements, especially regarding confidentiality clauses, mechanisms for dispute resolution, application of stamp duty etc. They will also have their own preferences regarding layout, and so in the forms proposed here, content is emphasised.

GST has not been included as part of the retail Agreement since it is determined separately by law regardless. Retailers also often have Private Rulings provided by the ATO. The ATO has

recently provided relevant information on its web site.¹ This is consistent with the more detailed interpretation provided in the Discussion Paper, which can therefore be used as a reliable guide. This interpretation is included as Appendix 6.8.

Table 1 Guidelines and Agreements for Retailers and DNSPs

	Retailer	DNSP	Utility
Basic Guidelines	Basic Guidelines for Offsetting Electricity Purchase Appendix 6.2.1	Basic Guidelines for Grid-Connection Appendix 6.3.1	Basic Guidelines for Grid-Connection and Electricity Offset Appendix 6.4.1
Basic Agreement	Basic Electricity Offset Agreement Appendix 6.2.2	Basic Grid-Connection Agreement Appendix 6.3.2	Basic Grid-Connection and Electricity Offset Agreement Appendix 6.4.2
Full Guidelines	Full Guidelines for Selling Electricity Appendix 6.5.1	Full Guidelines for Grid-Connection Appendix 6.6.1	Full Guidelines for Grid-Connection and Selling Electricity Appendix 6.7.1
Full Agreement	Full Electricity Sales Agreement Appendix 6.5.2	Full Grid-Connection Agreement Appendix 6.6.2	Full Grid-Connection and Electricity Sales Agreement Appendix 6.7.2

¹ See

<http://www.ato.gov.au/businesses/content.asp?doc=/content/41341.htm&pc=001/003/053/002/001&mnu=3761&mfp=001/003&st=&cy=1>

3. Consultation process

As can be seen from Appendix 6.1, the Discussion Paper received input from a number of different organisations and individuals. This included 10 of the 15 retail operations, and 10 of the 15 DNSP operations in Australia, as well as a number of system owners, the ATO, the VESC, the ORER, NEMMCO, and in New Zealand, Whitlow & Associates Ltd² and the New Zealand Energy Efficiency and Conservation Authority (NZ EECA).

The Discussion Paper was then sent to 52 organisations and individuals as per Appendix 6.1, who were given five weeks to respond (three weeks until the official close date, then another two). Any retailers and DNSPs that had not responded by the close date were sent a reminder email. Responses were received from only five retailers, seven DNSPs, and four individuals (two system installers, one system owner, and one member of the public that has just completed a Master of Science in Renewable Energy).

Thus only 33% of retailers and 47% of DNSPs have commented on the Discussion Paper and recommendations regarding customer Guidelines and Agreements. In addition, although the responses were generally positive, a number of significant issues were raised, which could not be addressed within the agreed consultation process. Although it is possible that organisations and individuals are more likely to respond if they are opposed to the Discussion Paper's proposals, it cannot be assumed that those that did not respond were in complete agreement.

Thus it is likely that additional steps will need to be taken before standard Guidelines and Agreements can be finalised. This should involve more face-to-face consultation with retailers, DNSPs, installers and system owners, including roundtable discussions. The Department of Energy, Utilities and Sustainability (DEUS) is currently undergoing such a consultation process for NSW, and intends using this report as a basis for discussion.

The main areas of contention are included in Table 2, which summarises the responses to each recommendation. Where consensus was not reached, the proposed Guidelines and Agreements provide a choice as indicated by EITHER [option a] OR [option b].

Often retailers and DNSPs would object to recommendations even if they were consistent with their current operations. This was because they feared the Guidelines and Agreements would be compulsory. Once it was explained this was not the case, they were generally happy to accept them. However, this fear of compulsory restrictions must be taken into account if standard Guidelines and Agreements are to be developed further.

The issues and recommendations highlighted in the Discussion Paper are listed in Section 4, along with the responses received from stakeholders. For a more complete record of responses, see Appendix 6.9.

² Whitlow & Associates Ltd were involved in the standard Agreements produced in New Zealand.

4. Responses by stakeholders

4.1. Proposal for Basic Agreements

Two responses (from a system owner and a member of the public), recommended the development of an 'ultra-lite' or Basic Agreement for systems where the owners do not wish to sell net excess electricity. This would allow connection to the grid without the need for an additional meter to measure export. Although some Jurisdictional Regulators have ruled that meters must be able to measure positive and negative flows separately, net metering may still be legal where all parties agree.

It was suggested a suitable system size for this sort of agreement could be up to 2.4 kW_p since it is the maximum allowable power rating for standard plug-in appliances, and is the typical power rating of an electric hot water system. The rationale for this type of agreement was that adding a 2.4 kW_p renewable energy system is little different to removing a 2.4 kW_p load. For example no agreement with, or notification of, the retailer or DNSP is required to convert from electric to solar hot water. In this case the customer would simply inform their retailer that an AS 4777-compliant system of certain characteristics had been installed at their premises. Although a RES differs to an electrical appliance in that it transmits electricity into the grid, an AS 4777-compliant inverter should avoid any problems such as islanding.

If a customer had net export in a billing period, instead of recording the new reading, the previous reading would be recorded. The customer would not be charged for electricity consumption until the meter reading is once again higher than the original reading. If the customer finds they have a significant net export over a long period, they may then enter into a more complicated agreement to sell this excess.

The advantages of this approach compared to a Full Agreement are that it would;

- simplify the Agreements with the retailer and DNSP,
- avoid the costs of an additional meter,
- simplify billing for retailers, and avoid the need to send payments to customers,
- result in net metering.

Therefore, where retailers and DNSPs consider such Basic Agreements acceptable, they are encouraged to make them available to system owners.

4.2. Responses to each Recommendation

Both Powerdirect and Origin Energy agreed with all the Discussion Paper's recommendations. Ergon Energy (retail) was opposed to 'quite a number' of the recommendations, unless they are voluntary, in which case they had 'no strong objections'.

The following table summarises the responses to each recommendation, and whether they are likely to be accepted by stakeholders. Each recommendation is then discussed in detail.

Table 2 Summary of Responses to Recommendations

Recommendation	Comments
1 Upper limit on system size	There was no opposition to this recommendation.
2 Type of metering scheme	Two DNSPs and an installer agreed with this recommendation. One DNSP thought the AGO should prefer schemes 3a or 3b, and one system installer liked the option of schemes 3a or 3b to prove the system was working. Opposition was from a system owner and a member of the public who thought net metering should be sufficient. The modified recommendation is expected to be accepted.
3 Additional technical connection requirements	There was no outright opposition to this recommendation, although EnergyAustralia stated additional technical requirements could be needed in some circumstances. As stated in the Discussion Paper, Western Power currently require a Chartered Professional Engineer with NPER standing to certify connection drawings. May require limited additional consultation to clarify that it does not preclude additional technical requirements in unusual situations.
4 Requirement for specially certified or accredited electricians to grid-connect	One DNSP, a system installer and a member of the public thought there should be no such requirement. Three DNSPs thought there should be. Will require additional consultation as it recommends DNSPs provide training courses to third parties such as system installers.
5 Metering costs	This issue received the most responses and was the most contentious. Recommendation (i) was opposed by five DNSPs and accepted by one, and recommendation (ii) was opposed by six DNSPs. Recommendation (iii) was opposed by two DNSPs and one retailer, and was supported by two DNSPs and a system installer. Will require additional consultation because where a Basic Agreement is not used, it is based on acceptance of Recommendation 4, and that in this case, where the DNSP does not perform the installation, they should apply a standard charge of no more than \$65.

6 Retail and reference rates
Two retailers opposed this recommendation, although both are currently complying with it.
Will definitely require additional consultation. This is because of the uncertainty surrounding the costs and benefits of electricity exported to the grid.
7 Cap on net exported electricity
One retailer gave conditional support for this recommendation.
Is unlikely to require additional consultation.
8 Payment for net export
Only one retailer responded to this recommendation, and opposed it.
Will require some additional consultation because it may require retailers to change their billing systems.
9 Duration of contract, notice for termination, and disconnection process
There was both support and limited opposition to this recommendation, and it may require some additional consultation.
May require some additional consultation.
10 Treatment of Renewable Energy Certificates
One DNSP agreed with this recommendation, the proposal of the retailer that responded to this issue is illegal, and it is likely the system owner that responded will accept the recommendation. However, because the Government has extended the deeming time to 15 years, this issue may require additional consultation.
May require some additional consultation simply because it may involve the retailer paying the system owner a reasonable sum of money up front. Since the Government has accepted the recommendation of the MRET Review Panel that the deeming time be extended to 15 years, this would be the value of between 17.775 and 24.33 RECs for a 1kW system.
11 Treatment of Greenhouse Gas Abatement Certificates
There was no opposition to this recommendation.
12 Treatment of Green Power Rights
The only opposition to these recommendations seemed to be based on a misunderstanding of how GPRs are calculated. Although this recommendation increases revenue to the retailer, further consultation may be required if it overly complicates billing systems.
May require further consultation if it overly complicates billing systems, and to explain how the MRET and Green Power systems interact. Note the Government has accepted the recommendation of the MRET Review Panel that the deeming time be extended to 15 years.

4.2.1. Issue 1 **System size**

What should the upper limit of small-scale grid-connected renewable energy systems be?

Original Recommendation

The upper limit should be consistent with AS 4777: no more than 10 kVA for single phase units, and 30 kVA for three-phase units

- Retailers may include a caveat that systems should be appropriately sized to meet demand
- DNSPs may include a caveat that system size may be limited by local grid characteristics

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
	3				1

The three DNSPs that responded to this issue (ETSA, EnergyAustralia and TXU Networks) thought the size recommendation was reasonable, provided the system was inverter-based, and they could restrict system size if local grid characteristics required it.

The only other response suggested there may be a need for another class of system that is cooperatively owned. If the system was within the size limits recommended here, the Agreements would need modification, but could essentially be the same as those proposed. If the system is larger, it would be covered by different Agreements and so is outside the scope of this report.

Final Recommendation

The original recommendation should be accepted.

However the types of “local grid characteristics” that would require limitations to the size of a system that meets Australian Standards are unclear, and this caveat may not be necessary.

4.2.2. Issue 2 Metering Scheme

Should a standard metering scheme be used, and if so, what type?

Original Recommendation

Either scheme 2a or 2b³ should be used as standard. This would be in keeping with the trend in Jurisdictional regulation, and would allow measurement of the system's gross export.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
	3	1	2		1

Two DNSPs (TXU Networks and EnergyAustralia) supported the proposed metering scheme. The other DNSP (United Energy) that responded, thought that metering scheme 3 would be required to accurately measure the number of RECs generated, and so should be supported by the AGO.

Of the two installers that responded to this question, one thought the recommended scheme "was fine", the other said that "from an installers point of view it is important that the actual energy from the PV system is measured - to prove the system is working". He also said that many inverters now have this function (although most do not keep a record of performance).

The responses from a system owner and the member of the public both recommended Type 1 (net) metering. This was because it is occurring in other countries (eg. United States, Germany, Switzerland, the Netherlands and Great Britain), is cheaper, provides more certainty of future revenue since the reference and retail prices will always be the same, and should be accurate enough since "electricity meters only have to be accurate to within $\pm 2\%$ ". With regard to confirming accuracy, it was suggested that the "UNSW should perform more reverse meter tests like that of Pacific Solar, on behalf of the AGO".

A DNSP (United Energy) and one of the system installers recommended that all meters be time of use, or 'interval' meters, in order for the full value of embedded generation to be recognised.

Final Recommendation

Schemes 1, 2a or 2b should be acceptable.

Although some Jurisdictional Regulators have ruled that meters must be able to measure positive and negative flows separately, net metering with a single meter may still be legal where all parties agree, and could be used for both Basic and Full Agreements. Where net metering is currently used, there is no need to complicate matters by requiring an additional meter. Although meters currently available are not calibrated or certified to measure flows in both directions, this would most likely require little effort, and so should be investigated further.

However, if a system owner wishes to be rewarded for network support and reduced exposure to peak prices, they must be able to measure the net flow of electricity to the grid at particular times. To fully capture these benefits, interval metering is required. Although most inverters have this capability, they are not certified for tariff metering and would in any case require

³ Import-export metering using two unidirectional meters (2a) or a dual-element electronic meter (2b) on the grid side of the common point between the customer's generator and loads legs – as defined in Appendix 6.10.

separate monitoring or data download for the information to be stored. For a discussion of the costs and potential benefits of interval metering, see Issue 5.

Where the system installer wishes to install an extra meter, this should be allowed, but does not need to be part of a standard Agreement.

Metering schemes 3a or 3b are not required to calculate the number of RECs generated by a small renewable energy system, since RECs are deemed according to the ORER formula, not measured.

4.2.3. Issue 3 **Additional Technical Connection Requirements**

Should DNSPs impose technical connection requirements in addition to those imposed by Australian Standards and State or Territory regulators?

Original Recommendation

Technical connection requirements in addition to those imposed by Australian Standards and State or Territory regulators should not be required for a standard connection agreement where a certified renewable energy installer is used.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
	2				1

One DNSP (ETSA) said they do “not have any specific additional requirements for the installation of the grid connected inverter systems above the relevant Australian Standards and ESCOSA Codes”. The other DNSP (EnergyAustralia) stated that the Australian Standards and Jurisdictional Regulations allow DNSPs discretion to impose additional requirements to maintain system performance and for National Electricity Code obligations. The member of the public also thought that no additional requirements were necessary.

Final Recommendation

The original recommendation should be accepted.

The authors consider that requirements in addition to those imposed by Australian Standards and Jurisdictional Regulations, that are necessary to ‘maintain system performance and for National Electricity Code obligations’, would occur only in unusual circumstances, and so should not be part of a standard Agreement. Of course in such circumstances the standard Agreement could be altered as required.

As stated in the Discussion Paper, Western Power require a Chartered Professional Engineer with NPER standing to certify connection drawings. However, in their response to the Discussion Paper they did not address this issue.

4.2.4. Issue 4 Requirement for Specially Certified or Accredited Electricians

Should DNSPs be allowed to require that electricians connecting a system to the grid be specially certified or accredited beyond existing legal requirements.

Original Recommendation

The DNSP should not require electricians to be specially certified or accredited beyond legal requirements.

If you do believe that electricians should be specially certified or accredited, can you suggest ways in which the complexity and cost of this requirement could be minimised. For example the DNSP could have a list of approved electricians with a well-defined procedure for getting onto that list.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
	4 ¹		1		1

¹ Includes Western Power, which is also a retailer

It is important to distinguish between system installation and connection to the grid. A system installer must be an electrical contractor licensed by the appropriate State or Territory Government department (for example in NSW, the Department of Fair Trading), who also has a renewable energy installer's accreditation. Connection to the grid involves connection of the system to the DNSP grid through the owner's switchboard, and is generally carried out by the DNSP.

Regarding system installation, Western Power asked who would certify the renewable energy installer and manage the appropriate register. Both ETSA and the system installer pointed out that to receive the Photovoltaic Rebate Program (PVRP) rebate, the system installer had to be accredited by the BCSE.

For system connection, ETSA said it "does not have any specific requirement for specially certified or accredited electricians", although in their input to the Discussion Paper they said they required an A Class electrician. Powercorp stated that it "does not allow third party contractors to install type 5 (manual) and type 6 (interval) meters. These installations are completed by our own staff or our own sub contractors". Western Power questioned "why the DNSP should not require specially certified or accredited electricians". As outlined in the Discussion Paper, EnergyAustralia require all electricians working on or near their transmission and/or distribution system to be authorised by EnergyAustralia, where suitably qualified employees of Accredited Service Providers (ASPs) can be authorised. The NSW government requires that all work must be performed by ASPs, where accreditation is obtained from the Department of Energy Utilities and Sustainability (DEUS).

Neither the system installer nor the member of the public thought special certification or accreditation should be required.

Final Recommendation

DNSPs may require specially certified or accredited electricians to connect systems to their grid. In this case they should provide training courses to licensed system installers.

It is understandable that DNSPs wish to ensure that people working on their grid are suitably trained and qualified. However, if DNSPs have requirements above those specified by law, it

seems reasonable they provide training courses so system installers can complete the full service without needing a second person. DNSPs should also provide to potential system owners a list of approved system installers who have undertaken their training. In some jurisdictions it may not be legal for DNSPs to impose requirements above those specified by law. Allowance of such requirements would be at the discretion of the relevant regulatory body for that jurisdiction. Regarding certification of renewable energy system installers, the BCSE runs accreditation courses and keeps records of those achieving accreditation.

4.2.5. Issue 5 Metering costs

Should DNSPs charge for installation of metering, and if they do, what can they do to minimise costs? Assuming a standard charge should be levied, how should it be calculated?

Original Recommendations

- (i) If DNSPs do require the system owner to pay additional metering costs, they should allow suitably qualified system installers to perform the installation in order to reduce the installation cost component.
- (ii) A standard charge of no more than \$200 should be applied to recoup the shallow connection costs only.
- (iii) In the longer term, interval meters should be installed on all new premises, or where meters are being replaced, so as to facilitate future use of distributed generation, as well as demand management options.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
1	6		1		1

The responses from all DNSPs (apart from EnergyAustralia for recommendation (i)) to recommendations (i) and (ii) were that they should be allowed to continue their current meter installation processes and charge accordingly. United Energy believes that contestability of metering services and associated charges should be left to the Jurisdictional Regulator to assess and regulate. Similarly, EnergyAustralia considered that “Competition in the installation of meters and connections to the network should regulate installation costs”. Regarding recommendation (i), EnergyAustralia said it is currently working towards allowing bidirectional meter installation work to also be performed by Accredited Service Providers (ASPs), where accreditation is obtained from the Department of Energy, Utilities and Sustainability.

The retailer (TXU Retail) thought that “the agreement should recognise disadvantages to standardised metering arrangements, particularly the extra costs faced by participants to change from established procedures”, since they “already have adjusted to work with the diverse metering arrangements in place in the different States”.

The member of the public thought that if “the meter requires replacement, it should be at the cost of the system owner, but should be able to be installed by an approved RE system installer.” However, note also the argument presented in Issue 2 by the system owner and the member of the public that the costs of additional meter installation could be avoided if net metering was permitted.

The responses to recommendation (iii) by two DNSPs (Powercor and Western Power), and the retailer (TXU Retail), centred around the additional cost of interval metering compared to possible benefits. EnergyAustralia said the meters currently being installed by them are already interval-capable. United Energy stated that interval meters should be installed now and not in the longer term, considering their obvious advantages. The only other response to interval metering was from a system installer who recommended immediate use of single electronic dual element interval meters.

Final Recommendations

- (i) A Basic Agreement that does not require an additional meter be adopted where possible.*
- (ii) The DNSP should allow electricians or accredited system installers trained by the DNSP to install any additional metering required.*
- (iii) Where an additional meter is required, a standard charge of no more than \$65 should be applied in order to recoup incidental costs such as Notification of Service Electrical (NOSE) works fees (the DNSP should pay the capital cost of the meter), and the DNSP should provide transparent costing and justification of any additional charge imposed. If the DNSP itself performs the meter installation, the charge would be increased to cover the actual costs incurred.*
- (iv) Interval meters need not be part of a standard Connection Agreement but should be encouraged in the longer term.*

Recommendation (i) provides the least cost solution, but would not be adopted where the DNSP requires two meters to measure gross export. However, in the absence of interval metering, there seems little benefit in measuring gross export since it will not be known when that export occurred. This means its potential for network support or avoidance of peak prices will also not be known. For this to be determined, interval metering, not import/export metering, is required.

It is possible recommendation (ii) will be opposed by some DNSPs if they are not willing to train system installers so they can access the grid.

It is likely recommendation (iii) will be accepted by most DNSPs since the cost limit applies only where they do not perform the meter installation.

It is likely recommendation (iv) will be accepted because it reduces short-term costs.

While the responses from DNSPs are understandable, it is disappointing they did not suggest ways in which costs could be reduced for all concerned; for example by allowing suitably qualified system installers to perform the meter installation.

As outlined in the Discussion Paper, in all jurisdictions apart from Queensland and Western Australia, additional metering costs may be passed on to the system owner if the DNSP chooses to do so. Commendably, a number of DNSPs are not passing on any costs. However, some are passing on costs that are very high compared to the cost of the metering hardware and the time taken to install a meter. Allowing an electrician trained by the DNSP to install any additional metering, especially where they are also the system installer and so already on site, would reduce costs considerably. The majority of DNSPs included in the Discussion Paper do not impose charges additional to the meter and installation costs, and incidental costs such as Notification of Service Electrical (NOSE) works fees. Thus allowing a suitably qualified electrician to install the meter would avoid all costs (payable to the DNSP) except for incidental fees of about \$65. Any additional charges should therefore be transparent, and justified to the system owner, and preferably also to the relevant Jurisdictional Regulator. Of course, if the DNSP installed the additional meter(s) themselves, the charge could be higher.

Regarding the additional costs faced by retailers, as highlighted by TXU Retail, the authors believe that adoption of a standard metering scheme would reduce the complexity of billing systems and therefore costs.

As stated in the Discussion Paper, while adoption of interval metering could increase connection costs in the short term, with increased uptake this cost would decrease. Interval metering would provide DNSPs and retailers with greater ability to provide tariff structures that encourage specific patterns of electricity use. In addition, by correlating the generation profile with the network load profile, interval metering would clarify the ability of small-scale embedded

generation to provide both network support and reduced exposure to peak generation prices, and so could reduce costs overall.

Therefore, although it is not recommended as part of the current Connection Agreement, the authors believe that uptake of interval metering at least cost should be encouraged at a national level.

4.2.6. Issue 6 Retail and Reference Rates

Should the reference and retail rates be the same?

Original Recommendations

- (i) Retailers may offer reference rates that are higher than retail rates,
- (ii) Retailers should not offer reference rates that are less than retail rates, even when there is net export, unless they can demonstrate a reason for so doing.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
2 ¹					

¹ Includes Western Power that is also a retailer

Both responses thought the retailer should be allowed to set the reference rate as they thought fit. One stated that the “Company cost of generation, energy from net export is expensive”, while the other stated that it was “presumptuous for third parties to expect to influence commercial arrangements that are subject to bilateral market agreements/contracts”.

Final Recommendation

The original recommendations should be accepted.

It is true that retailers should be allowed to set the reference rate as they see fit. In a competitive market it is not possible to dictate rates unless passed through the Regulator. However, here we are not dictating what retailers do, only making a recommendation that most retailers are complying with anyway. The Discussion Paper stated that since the electricity produced by an embedded generator avoids TUOS and DUOS costs and NEM fees, the real cost to the retailer of paying identical reference and retail rates to an embedded generator, is their administration costs and profit.

In response to queries by stakeholders, the following explanation is provided regarding calculation of DUOS charges. DUOS charges for contestable end-users that do not have interval metering (most residential users) are based on the difference between the total amount of electricity leaving the relevant zone substation and the total amount of electricity reaching the contestable end-users with interval metering (after allowing for network losses). Thus the applicable DUOS costs payable by the retailer for contestable end-users without interval metering are not calculated for each end-user, and are not based on gross import at each site.

At times when the system owner is exporting to the grid, the DUOS charges applied to the retailer for the relevant zone substation will be reduced in proportion to the amount of electricity exported. When the system owner is importing from the grid, the DUOS charges applied to the retailer for the relevant zone substation will be increased in proportion to the amount of electricity imported. This means the DUOS charges payable by the retailer for the embedded generator site will be in proportion to the net import, and will be avoided in proportion to the net export (as are TUOS costs). Therefore when a retailer pays a system owner a reference rate the same as the retail rate for net export, the only costs to them are the administration and profit components. These costs can most probably be recouped through the sale of Green Power Rights, reduced network losses, and reduced exposure to peak prices. Note the retailer will receive 15 years of deemed GPRs in advance under the revised MRET arrangements. On this basis the authors recommend the reference rate should be no less than the retail rate.

4.2.7. Issue 7 **Cap on Net Exported Electricity**

Should retailers place a cap on net exported electricity for which they will pay?

Original Recommendations

- (i) Retailers should not place a cap on net exported electricity.
- (ii) The option of placing a cap on total distributed generation receiving the current tariffs should be considered, along with a greater certainty that tariffs for current installations will be maintained.
- (iii) The reference rate should either be fixed or pegged to the retail rate for the term of the connection agreement.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
1					

Only one response was received to this issue. TXU Networks does not currently place a cap on net exported electricity, but believes that, to minimise risk to retailers, retailers and system owners should have the flexibility to agree to a cap on net exported electricity if the situation in the market changes. They thought the cap should be available on both an amount basis as well as a period of credit basis to allow further flexibility.

Final Recommendation

The original recommendations should be accepted, although placing a cap on total exported could be quite arbitrary and so is not encouraged.

Current agreements should not have a cap on net exported electricity for which they will pay, and this should be an inflexible part of an Agreement to reduce financial risk for system owners. This is because payment for exported electricity is likely to be a significant component of the cost/benefit analysis of system purchase, but will be a very small component of the retailer's overall operations. Retailers of course have the option to review the need for an export cap in future contracts should conditions warrant, although as stated in Issue 1, excess export can readily be avoided through the use of a caveat that systems should be appropriately sized to meet demand.

4.2.8. Issue 8 **Payment for net export**

How should credit for net export be paid?

Original Recommendation

Credit for net export should be carried forward until reaching at least \$50 and then paid.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
1					

Only one response was received to this issue. TXU Retail stated “How credit for net export is allocated should be at the discretion of the contracting parties”. They thought that imposition of guidelines could increase billing system costs that would ultimately be borne by the customer.

Final Recommendation

Where a Basic Agreement is not in use, the original recommendation should be accepted.

Most systems are unlikely to result in net export over a year and so a Basic Agreement would be suitable. In this case, if a customer had net export in a billing period, instead of recording the new reading, the previous reading would be recorded. The customer would not be charged for electricity consumption until the meter reading was once again higher than the original reading.

In response to TXU, it is likely the incremental costs of alterations to billing systems will cost less to the system owner than their not being paid for net export. If the costs of such alterations are high, they could be delayed until the billing system is next upgraded.

4.2.9. Issue 9 Duration of contract, notice for termination, and disconnection process

For how long should the agreement apply, how much notice should the system owner, retailer and DNSP be required to give to terminate the agreement, and what should be the process for disconnection?

Original Recommendations

- (i) The duration of the agreement should be at least five years.
- (ii) Early termination of an agreement by a retailer or DNSP should be allowed only under exceptional circumstances, such as an intractable safety issue arising or say, long standing non-payment of electricity bills etc. For legal reasons, where the system owner sells the system or property, the existing contract will need to be terminated and a new contract entered into with the new owners.
- (iii) Where an agreement is to be terminated by any party, one month notice should be given, and a contract should be open for negotiation one month prior to the termination date.
- (iv) The disconnection process should be clearly stated in any grid-connection agreement.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
1	3 ¹				1

¹ Includes Western Power, which is also a retailer

ETSA agreed with the proposed recommendations. The member of the public thought the agreement term should not be for only five years, but for the life of the system, and that disconnection should only be under exceptional circumstances. Western Power thought that in the case of a residence being sold, the agreement with previous contract terms and conditions should be assigned to the new owner without having to have a “new” agreement. TXU Networks thought that only 24 hours notice should be given by either party to terminate an agreement. TXU Retail said there should be a clear distinction between the duration of the customer contract to purchase electricity from the grid, and the contract to sell electricity to the grid. EnergyAustralia (networks) disagreed with recommendations (i), (ii) and (iii) because they do not require any agreement in addition to the Standard Form Customer Connection Contract (SFCCC) (unless the customer has entered into a separate negotiated customer connection contract), and although the SFCCC includes no provisions regarding duration of the contract, it outlines the circumstances under which a customer’s premises can be disconnected, and conditions of notice required. They agreed with recommendation (iv).

Final Recommendations

The following recommendations should be accepted, noting the impact of retailers and DNSPs having a legal obligation to connect consumers who comply with regulations.

- i. The Agreement should be open-ended, with earlier termination being in accordance with one of the following provisions.*
- ii. If the system owner no longer wishes to participate under the terms of the Agreement, they may terminate it by giving one month advance written notice.*

- iii. ***The DNSP or retailer may terminate the Agreement in the event that the system owner is in breach of the Agreement or the Standard Customer Contract, and the breach remains unremedied for one month after the system owner has been notified in writing of the breach.***
- iv. ***The Agreement may be terminated at any time upon mutual agreement between the parties.***
- v. ***For legal reasons, where the system owner sells the system or property, the existing contract will need to be terminated and a new contract entered into with the new owners.***
- vi. ***The disconnection process should be clearly stated in any grid-connection agreement.***

An open-ended contract reduces financial risk for the system owner, and the retailer and DNSP are protected by the termination provisions. Where the system owner sells the system or property, although the original Agreement would have to be terminated, its entire terms and conditions could be transferred to a new contract as long as no physical aspect of the system had changed.

Giving only 24 hours' notice to terminate an Agreement does not give sufficient time for the system owner to make alternative arrangements. Disconnection for safety or quality of supply reasons can be part of an agreement and can occur without notice.

Although EnergyAustralia's current SFCCC covers disconnection procedures and required notice, they have also stated they may need to upgrade their connection process to include a separate Agreement. In this case, given the differences between a customer simply purchasing electricity, and connecting an embedded generator to the grid, it is likely the disconnection procedures and notice required would also differ.

4.2.10.Issue 10 Treatment of Renewable Energy Certificates

How should the deemed RECs be treated in a grid connection agreement?

Original Recommendation

The system owner should be given the option of transferring the RECs to an agent (such as their electricity retailer, the system supplier or a government agency), who would compensate the system owner using the ORER deeming formula and at least the current value of RECs.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
1	1	1			

EnergyAustralia (networks) agreed with the recommendation. TXU Retail stated that “system owners should have the option of transferring the RECs to an agent however it should be up to the retailer to advise customers which agents the system owner has the option of transferring their RECs to”. The system owner thought the retailer should be required to buy all the deemed RECs relating to the system, if the customer wishes to sell them.

The Government has now accepted the recommendation of the MRET Review Panel that the deeming period for Small Generation Units (SGUs), including PV systems, of not more than 10 kW_p (or 25 MWh per annum) be increased from rolling five year periods to a single 15 year period.

This recommendation relates directly to Issue 10 and so its adoption has an impact on the standard Electricity Purchase Agreement. It means the amount paid up-front to the system owner increases from the five year deemed amount (\$220–300 for a 1 kW_p system) to the 15 year deemed amount (\$660–900). Since the recommendations of the MRET Review Panel were publicly available well before responses to the Discussion Paper were due, it is assumed the respondents have taken this into account.

Final Recommendation

The original recommendation should be accepted.

The recommendation by TXU Retail contravenes the *Renewable Energy (Electricity) Act 2000*, which states that a system owner can choose to whom they sell their RECs. Requiring the retailer to buy all the RECs is not really necessary as long as the system owner can sell them to someone else. In fact some system manufacturers offer discount prices in exchange for deemed RECs. The key point is that the system owner should always have a choice as to whom they sell their RECs and should not have to give the RECs to the retailer without suitable recompense.

4.2.11.Issue 11 Treatment of Greenhouse Gas Abatement Certificates

How should NGACs be treated in a grid-connection agreement?

Original Recommendation

Since it is unlikely NGACs will be generated by residential-scale renewable energy systems, they should not be included in the agreement.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
2	1				

Both retailers (Country Energy and TXU Retail), and EnergyAustralia (networks) agreed that NGACs did not need to be part of an Agreement for a small-scale system.

Final Recommendation

The original recommendation should be accepted.

4.2.12.Issue 12 Treatment of Green Power Rights

How should GPRs be treated in a grid connection agreement?

Original Recommendations

- (i) Retailers should sell exported electricity as Green Power.
- (ii) Retailers should apply net billing so the system owner is effectively paid the Green Power tariff on **any gross exports offset against gross imports.**
- (iii) Retailers should not have to pay the system owner the Green Power tariff for net exported electricity, even if the system owner is a Green Power customer. This is based on the assumption that the system owner would benefit more from up-front payment of RECs than from an ongoing Green Power tariff.

Response from stakeholders

Retailers	DNSPs	Owners	Installers	Government	Public
1					

TXU Retail stated that “The implication of the recommendations regarding Green Power Rights is major changes to the billing system to incorporate Green Power Rights as part of Photovoltaic. These costs incurred will need to be recouped. The retailer should have the discretion to determine whether the exports and imports to the system owner are deemed green energy.”

Final Recommendation

The original recommendations should be accepted.

As explained in the Discussion Paper, Green Power Rights generated by a generator that is both MRET and Green Power-compliant, and less than 10 kWp, are not related to the metering or billing system used by the retailer. They are calculated from the number of RECs deemed to be generated by the system according to the ORER formula. For each REC set aside in the Green Power Designated Account in the ORER REC Registry, the retailer is entitled to have sold 1MWh of Green Power. The recommendation that retailers sell exported electricity as Green Power simply means they can sell electricity at an additional premium (to the REC value), increasing their revenue. Therefore complication of billing systems should be minimal.

Here we have recommended the system owner is awarded the RECs and the retailer is awarded the GPRs. In this case, if the system owner does not sell their RECs to the retailer, they would need to ensure their RECs are deposited into the Green Power Designated Account, and the associated GPRs then awarded to the retailer.

Note the retailer will receive 15 years of deemed GPRs in advance under the revised MRET arrangements.

5. References

Passey, R., Roche, D., Watt, M. and Spooner, T. (2004) *Development of a Standard Connection Agreement for Small Grid-Connected Renewable Energy Systems: Discussion Paper*, January, 2004. Prepared for the Australian Greenhouse Office by the School of Electrical Engineering, University of NSW, and Greenwatt Pty Limited.

Available from

<http://www.pv.unsw.edu.au/documents/Small%20Grid%20Cnect%20Disc%20Paper.pdf>.

Roche, D. (2001) *Metering of embedded generators in Australia*, Prepared for the Australian Greenhouse Office, October 2001.

Available from http://reslab.com.au/publications/Assets/Presentations/Metering_draft.pdf

6. Appendices

6.1. Organisations and people involved in the development process

Organisation	Contact Name	Provided input to Disc. Paper?	Sent Disc. Paper?	Responded to Disc. Paper?
Retailers				
Actew AGL			Y	
AGL			Y	
Aurora Energy	Darren Brown	Y	Y	
Auspower			Y	
Australian Inland Energy	Travis Nadge	Y	Y	
Country Energy	Steve Gough	Y	Y	
Energex	Nicole Maundrell	Y	Y	
EnergyAustralia	Don Anderson	Y	Y	
Ergon Energy	Rebecca Myers	Y	Y	Y
Integral Energy	Rebeka Weiley	Y	Y	
NT Power and Water Corporation			Y	
Origin Energy	Dominic Drenen	Y	Y	Y
Powerdirect	Peter Giannopoulos		Y	Y
TXU Retail	Sinta Knox	Y	Y	Y
Western Power	Kerry Llewellyn	Y	Y	Y
DNSPs				
Actew AGL			Y	
AGL			Y	
Aurora Energy	Ian Gibb	Y	Y	
Australian Inland Energy	Fred Robson	Y	Y	
Country Energy	Steve Gough	Y	Y	Y
Energex			Y	
EnergyAustralia	Paul Myors	Y	Y	Y
Ergon Energy			Y	
ETSA	Paul Driver	Y	Y	
ETSA	Peter O'Sullivan			Y
Integral Energy	Rebeka Weiley	Y	Y	
NT Power and Water Corporation			Y	
Powercor	Colin Jenkins	Y	Y	Y
Powercor	Ross Homberg			Y

TXU Networks	Max Rankin	Y	Y	Y
United Energy	Siva Moorthy	Y	Y	Y
Western Power	Kerry Llewellyn	Y	Y	

Other

ATO		Y		
ORER	Jill Taylor	Y	Y	
NEMMCO	Angela Robinson		Y	
NEMMCO Info Centre		Y	Y	
WA ERIU	Brett Sadler	Y	Y	
Victorian Essential Services Commission	David Cornelius	Y	Y	
Whitlow & Associates Ltd	Trevor Whitlow	Y	Y	
NZ EECA	Ray Deacon	Y	Y	
Origin Energy Consultant	Georgine Duncan David Crossley		Y	
AUSWEA	Rick Maddox		Y	
Bioenergy Australia	Steve Schuck		Y	
ATA			Y	
BSCE	Ric Brazzale		Y	
Queensland University of Technology	Wendy Miller		Y	
ANZSES	Bill Parker		Y	
WA Sustainable Energy Assoc.	Johanna Gastevich		Y	

Installers

	Glen George			Y
Global Sustainable Energy Solutions	Geoff Stapleton			Y

Public

	Dave Keenan		Y	Y
	Rick Crawford		Y	
	Derek Wrigley		Y	
	Trevor Toomer		Y	Y
	Richard Elliott		Y	

6.2 Basic Retailer Documents

6.2.1 Basic Guidelines for Offsetting Electricity Purchase

Customer Guidelines for Offsetting Electricity Generated by a Small-Scale Renewable Energy System Against Imported Electricity

Introduction

These guidelines are for small-scale grid-connected renewable energy systems where the existing bidirectional or electronic meter is used to measure electricity exported to the grid (i.e. the meter runs backwards during times of export, and so the exported electricity will be offset against imported electricity). However, if the total exported electricity in a billing period is greater than imported electricity, the system owner will not be paid for net export of electricity (the difference between export and import), instead the difference will be carried forward to the next billing period. The maximum size of systems covered by these guidelines is 2.4 kilowatts (kW) single phase.

Purpose

It is intended that offsetting electricity generated by your renewable energy system against imports be allowed on the basis that you still require a supply of electricity from [retailer] (i.e. not a standalone system).

The guidelines have been prepared in order to:

- Promote customer installations that increase the amount of electricity generated from renewable sources supplied to the grid
- Define the billing arrangements including the treatment of Renewable Energy Certificates and Green Power Rights.

[retailer] Policy

[retailer] recognises that many environmentally-conscious customers wish to play their part in reducing the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by installing small renewable energy systems at their residences or premises. Connection to the grid allows system owners to maximise the output of their system by ensuring generation in excess of their immediate requirements is not wasted, while avoiding battery purchase and maintenance costs. System owners also benefit financially through offsetting electricity imported from the grid, and from the sale of Renewable Energy Certificates.

Application

Customers seeking to offset electricity generated by a grid-connected renewable energy system must sign a Small Scale Renewable Energy Electricity Offset Agreement. Note that permission to grid-connect must be obtained from the relevant Distributed Network Service Provider, who must forward a copy of its Notice of Approval to [retailer].

Renewable Energy System Types

The types of renewable energy systems covered by these guidelines include:

- Solar (photovoltaic) arrays
- Small wind generators
- Micro hydro generators

Planning and Selection

[retailer] is not able to offer assistance in the planning and selection of your proposed renewable energy system. The Business Council for Sustainable Energy (www.bcse.org.au) has details of accredited installers, suppliers, and consultants who are experienced in this area.

[retailer] Responsibilities

[retailer] is responsible for all billing administration including treatment of Goods and Services Tax, Renewable Energy Certificates and Green Power Rights.

Energy Pricing

The electricity charge to be paid by the customer, including Goods and Services Tax, will be calculated according to the Standard Customer Contract. If the total Export Electricity has been greater than the Import Electricity over the Billing Period, and so the meter has run backwards, the Customer's electricity component of their bill will be zero and they will not be paid for net Export. The Customer will be charged for electricity only once the meter reading is greater than the reading on the last bill where there was net Import.

The standard Service to Property [or equivalent] charge still applies.

Renewable Energy Certificates and Green Power Rights

[retailer] offers to buy the full deemed amount of Renewable Energy Certificates generated by the customer's renewable energy system according to the Office of the Renewable Energy Regulator deeming formula. The price offered for each Renewable Energy Certificate is typically \$37 but may vary with time and will be stated on the Offset Agreement. The customer may choose to sell their Renewable Energy Certificates elsewhere.

[retailer] will assume ownership of any Green Power Rights generated by the customer's renewable energy system, without compensation to the customer. This will occur regardless of whether the customer is purchasing Green Power.

Process for Offsetting Electricity Generated by a Small-Scale Renewable Energy System to [Retailer]

Step 1

When you buy a system you should be given a list of accredited installers. The installer you choose can help with all the paperwork described in the following steps.



Step 2

Your installer will provide you with these Guidelines and two copies of the Offset Agreement, or you can contact [Retailer] and ask that they be mailed to you. They can also be found at [Retailer's website]. This document contains all the information you need to know to offset exported electricity against electricity imported from [Retailer].



Step 3

Please complete and sign the Offset Agreement and return both copies to [Retailer]. If you have any questions, please contact [Retailer] for clarification. [Retailer] will forward to your Network Service Provider a metering request for them to meter your installation.



Step 4

[Retailer] will offset your exported electricity against imports once it has both Copies of the Offset Agreement, and will forward to you a counter-signed copy of the Offset Agreement for your use.

6.2.2 Basic Electricity Offset Agreement

ATTACHMENT X:

SMALL SCALE RENEWABLE ENERGY ELECTRICITY OFFSET AGREEMENT

Schedule	
1	National Metering Identifier (NMI)
2	Commencement date
3	Capacity (kW) of renewable energy system
4	Type of Renewable Energy System (PV, wind, etc.)
5	Deemed number of Renewable Energy Certificates
6	Value of each deemed Renewable Energy Certificate
7	Name of Distributed Network Service Provider

Signature of Customer:

Name:

Date:

1. **Introduction**

- 1.1 This Offset Agreement is an extension of the existing Standard Customer Contract.
- 1.2 This agreement sets out the terms on which [the Retailer] consents to offset any electricity exported by the Renewable Energy System at the Premises against imported electricity, as well as any related credits such as Renewable Energy Certificates or Green Power Rights.

2. **System Size**

- 2.1 The Customer shall ensure that the power rating of the Renewable Energy System is no greater than 2.4 kW (single phase).

3. **Export Credits**

- 3.1 The electricity charge to be paid will be calculated according to the Standard Customer Contract. If the total Export Electricity has been greater than the Import Electricity over the Billing Period, and so the meter has run backwards, the energy component of the Customer's electricity bill will be zero and they will not be paid for net Export. The Customer will be charged for electricity only once the meter reading is greater than the reading on the last bill where there was net Import.
- 3.2 The standard Service to Property [or equivalent] charge still applies.
- 3.3 Goods and Services Tax shall be applied to the measurable flow of electricity according to law.

4. **Renewable Energy Certificates**

- 4.1 The parties agree that all right, title and interest in and to any Renewable Energy Certificates issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be retained by the Customer for their unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.
- 4.2 [the Retailer] offers to purchase, from the Customer, all Renewable Energy Certificates generated by the Renewable Energy System according to the deeming formula used by the Office of the Renewable Energy Regulator on the date this Agreement is signed by the Customer (as per schedule 5). This purchase shall occur without the Customer having to register their Renewable Energy System with the Office of the Renewable Energy Regulator.
- 4.3 Each Renewable Energy Certificate purchased by [the Retailer] from the Customer shall have the value stated in schedule 6.
- 4.4 The Customer reserves the right to sell the Renewable Energy Certificates generated by their Renewable Energy System to any other party as determined by law.

5. **Green Power Rights**

- 5.1 The Customer shall obtain, with [the Retailer]'s reasonable assistance, National Green Power Accreditation Program approval of the Renewable Energy System and:

- (a) maintain the National Green Power Accreditation Program approval during the term of this Agreement;
- (b) allow [the Retailer] to publish descriptions from time to time (including by way of specific reference to the Renewable Energy System by name) of the means by which electricity is generated by the Renewable Energy System;
- (c) authorise the National Green Power Accreditation Program to provide from time to time to [the Retailer], independent confirmation that you hold the National Green Power Accreditation Program Approval with respect to the Renewable Energy System; and

5.2 The parties agree that once the National Green Power Accreditation Program approval referred to in clause 5.1 has been obtained, all right, title and interest in and to any Green Power Rights issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be transferred to [the Retailer] for no consideration for [the Retailer]'s unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

6. Term and Termination

- 6.1 This Agreement commences on the Commencement date (schedule 2), and shall remain in operation indefinitely, or until it is earlier terminated in accordance with one of the following provisions.
- (a) If the Customer no longer wishes to participate under the terms of this Agreement, the Customer may terminate this Agreement by giving one month advance written notice to [the Retailer].
 - (b) [the Retailer] may terminate this Agreement in the event that the Customer is in breach of this Agreement or the Standard Customer Contract, and the breach remains unremedied for one month after the Customer has been notified in writing of the breach.
 - (c) This Agreement may be terminated at any time upon mutual agreement between the parties.

7. Liability

The Customer acknowledges that [the Retailer] shall not be liable for any loss, damage or injury that may occur or that is attributable to the installation and operation of the Renewable Energy System at the Premises.

8. Definitions

In this Agreement, the following definitions apply:

"Billing Period" means the period for the billing of electricity sales by [the Retailer] to the Customer under the Standard Customer Contract. Unless otherwise stated the Billing Period is three months.

"Customer Contract" means the "customer contract" (as that term is defined in the Act) in respect of the Premises.

"**Export Electricity**" means the quantity of electricity generated from the Renewable Energy System at the Premises which is exported into the Supply Network.

"**Green Power**" means the Green Power Scheme as defined by the most recent National Green Power Accreditation Program Accreditation Document.

"**Green Power Right**" means the Green Power Scheme as defined by the most recent National Green Power Accreditation Program Accreditation Document".

"**Import Electricity**" means the quantity of electricity sold by [the Retailer] to the Customer under the Standard Customer Contract.

"**Premises**" has the meaning given to the term in the *Electricity Act 1994* and at which the Customer proposes to install the Renewable Energy System.

"**Renewable Energy Certificate**" means the Renewable Energy Certificate as defined by the Commonwealth *Renewable Energy (Electricity) Act 2000* that relates to the Mandatory Renewable Energy Target.

"**Schedule**" means the schedule at the start of this Agreement.

"**Standard Customer Contract**" has the meaning in the *Electricity Act 1994*.

"**Supply Network**" has the meaning given to the term in the *Electricity Act 1994*.

"**Term**" is the period of time set out in clause 6.1.

EXECUTED as an agreement.

SIGNED for & on behalf of **[the Retailer]** by:

Signature:

Name:

Date:

Signature of witness

Name of witness

SIGNED by the Customer

Signature:

Name:

Date:

Signature of witness

Name of witness

6.3 Basic Distributed Network Service Provider Documents

6.3.1 Basic Guidelines for Grid-Connection

Customer Guidelines for Grid-Connection of a Small-Scale Renewable Energy System where Export is Offset Against Import

Introduction

These guidelines are for small-scale grid-connected renewable energy systems where the existing bidirectional or electronic meter is used to measure electricity exported to the grid (i.e. the meter runs backwards during times of export, and so the exported electricity will be offset against imported electricity). However, if the total exported electricity in a billing period is greater than imported electricity, the system owner will not be paid for net export of electricity (the difference between export import), instead the difference will be carried forward to the next billing period.

The renewable energy system is limited to 2.4 kilowatts (kW) single phase, and must be connected to the [Distributed Network Service Provider] grid via electronic DC/AC inverters. The guidelines do not cover engine-driven generators.

Purpose

- It is intended that such renewable energy systems be allowed to be connected to the grid on the basis that you still require a supply of electricity from the [Distributed Network Service Provider] grid (i.e. not a standalone system).

The guidelines have been prepared in order to:

- Promote customer installations that are safe for both the customer and for [Distributed Network Service Provider] line maintenance personnel
- Protect customer installations against damage under fault conditions
- Ensure that other [Distributed Network Service Provider] customers are not exposed to hazards or to disruptions of supply.

The primary concern of [Distributed Network Service Provider] is with the mains wiring and inverter, which provide the interface with the [Distributed Network Service Provider] grid, and which must be approved by [Distributed Network Service Provider]. The DC wiring of the renewable energy system and any batteries are the customer's responsibility, but must meet relevant Australian Standards and be installed by accredited personnel.

[Distributed Network Service Provider] Policy

[Distributed Network Service Provider] recognises that many environmentally-conscious customers wish to play their part in reducing the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by installing small renewable energy systems at their residences or premises. Connection to the grid allows system owners to maximise the

output of their system by ensuring generation in excess of immediate requirements is not wasted, while avoiding battery purchase and maintenance costs.

Application

Customers seeking to install inverter-connected renewable energy systems must sign a Small Scale Renewable Energy Electricity Connection Agreement. You will need to provide the name of your electricity retailer. [Distributed Network Service Provider] will forward a copy of its Notice of Approval to the nominated retailer.

Renewable Energy System Types

The types of renewable energy systems covered by these guidelines include:

- Solar (photovoltaic) arrays
- Small wind generators
- Micro hydro generators

All of these generally produce DC (direct current) electricity and must transmit their generated electricity via DC-to-AC (alternating current) sine wave inverters.

Planning and Selection

[Distributed Network Service Provider]'s main involvement with local generation is with the mains wiring and the sine wave inverter, which provides the interface with the grid. [Distributed Network Service Provider] is not able to offer assistance in the planning and selection of your proposed renewable energy system other than the inverter. The Business Council for Sustainable Energy (www.bcse.org.au) has details of Accredited Installers, Suppliers, and Consultants who are experienced in this area.

Relevant Standards and Guidelines

- [insert relevant State or Territory jurisdictional requirements]
- AS/NZS 3000:2000 – Australian/New Zealand Wiring Rules, published by Standards Australia
- Australian Standard AS 4777:2002 Grid Connection of Energy Systems via Inverters
 - AS 4777.1-2002 Part 1: Installation requirements
 - AS 4777.2-2002 Part 2: Inverter requirements
 - AS 4777.3-2002 Part 3: Grid protection requirements

Inverter Requirements

The electronic sine wave inverter must be of the grid-interactive type and must comply with AS 4777.2, which ensures it meets minimum safety and performance standards.

An important safety requirement for the inverter is that it must be prevented from back-feeding into the [Distributed Network Service Provider] network if the grid supply is externally de-energised. It should also be capable of restarting within a short period after the external grid supply is restored.

Installation and Connection to Grid

Installation of the renewable energy system should always be carried out strictly in accordance with the manufacturer's recommendations, and comply with AS 4777:2002. It must also meet any requirements of your local council's planning and building departments, such as heritage regulations.

Your system installer, or another electrical contractor licensed by [insert appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading] must carry out the electrical cabling and connection to your switchboard. The metering connection will be undertaken by EITHER your system installer as long as they have been appropriately trained by [Distributed Network Service Provider] OR [Distributed Network Service Provider] on advice from your installer that the system installation is complete. The wiring and equipment must be in accordance with the SAA Wiring Rules (AS/NZS 3000:2000) and with the [insert relevant jurisdictional regulations].

[Distributed Network Service Provider] Responsibilities

[Distributed Network Service Provider] must safeguard the safety of its employees and others who carry out work on its distribution network. [Distributed Network Service Provider] therefore reserves the right to inspect your installation by prior arrangement to ensure that it does not pose a hazard.

[Distributed Network Service Provider] may be obliged to disconnect your renewable energy system if it is causing nuisance to other customers connected to the grid. This is unlikely if an approved inverter is used.

Customer Responsibilities

The customer is responsible for the safe installation, operation and maintenance of the renewable energy system. The installation must conform to Australian standards AS/NZ 3000:2000, and AS 4777:2002. Your equipment should be regularly inspected and maintained in accordance with the manufacturer's and installer's instructions.

The customer is responsible for the safety of any person operating or maintaining generating equipment and accessories on the premises. The installer is responsible for fitting adequate protective devices to prevent damage to their renewable energy system under conditions of short circuit, voltage surge or other faults.

Insurance

Some household insurance policies do not cover the failure of electrical devices such as inverters. The renewable energy system may need to be separately specified on your insurance policy. You are advised to contact your own insurance company to check coverage. You do not need to take out public liability insurance to cover any negative impact on grid power quality. However, in the Connection Agreement, you will be required to indemnify [Distributed Network Service Provider] against any breach of relevant Guidelines, Standards and Codes, and against any loss or damage occasioned to the Distributed Network Service Provider or third parties resulting from the connection of the installation to their distribution system.

Energy Pricing, Renewable Energy Certificates, and Green Power Rights

The value to the customer of kilowatt hours (kWh) electricity generated by their renewable energy system will be determined by the relevant electricity Retailer. The agreement with the Retailer will also determine allocation and pricing of any Renewable Energy Certificates, or Green Power Rights associated with the renewable energy system.

Process for Connecting a Small-Scale Renewable Energy System to the [Distributed Network Service Provider] Grid

Step 1

When you buy a system you should be given a list of accredited installers. The installer you choose can help with all the paperwork described in the following steps.



Step 2

Your installer will provide you with these Guidelines and two copies of the Connection Agreement, or you can contact [Distributed Network Service Provider] and ask that they be mailed to you. They can also be found at [Distributed Network Service Provider's website]. This document contains all the information you need to know to arrange for connection of your system to the Grid.



Step 3

Please complete and sign the Connection Agreement and return both copies to [Distributed Network Service Provider]. If you have any questions, please contact [Distributed Network Service Provider] for clarification. You will need to arrange for your Retailer to forward to [Distributed Network Service Provider] a metering request for [Distributed Network Service Provider] to meter your installation.



Step 4

[Distributed Network Service Provider] will meter your installation once it has the following documents:

- Both Copies of the Connection Agreement
- A metering request from your Retailer

[Distributed Network Service Provider] will forward to you a counter-signed copy of the Connection Agreement for your use.

6.3.2 Basic Grid-Connection Agreement

ATTACHMENT X:

SMALL SCALE RENEWABLE ENERGY GRID-CONNECTION AGREEMENT WHERE EXPORT IS OFFSET AGAINST IMPORT

Schedule	
1	National Metering Identifier (NMI)
2	Commencement date
3	Capacity (kW) of renewable energy system
4	Type of Renewable Energy System (PV, wind, etc.)

Signature of Customer:.....

Name:

Date:

1 Introduction

- 1.1 This Connection Agreement is an extension of the existing Standard Customer Contract.
- 1.2 This agreement sets out the terms on which [the Distributed Network Service Provider] consents to connection of the Renewable Energy System at the Premises to their Supply Network.

2 System Size Requirements

- 2.1 The Customer shall ensure that the power rating of the Renewable Energy System is no greater than 2.4 kW (single phase).

3 Customer's Obligations

[the Distributed Network Service Provider]'s consent under this Agreement is conditional upon:

- (a) The Renewable Energy System complying with AS 4777:2002 Grid Connection of Energy Systems via Inverters.
- (b) The wiring and equipment being in accordance with the Australian/New Zealand Wiring Rules (AS/NZS 3000:2000).
- (c) The Renewable Energy System complying with [insert any relevant State or Territory jurisdictional requirements].
- (d) The Renewable Energy System having been installed by a Business Council for Sustainable Energy-accredited electrical contractor licensed by [insert the appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading], and the metering connection having been installed and checked according to the requirements of [insert the jurisdictional regulator or appropriate State or Territory Government department] prior to connection to your main switchboard.

4 Metering

- 4.1 No metering equipment in addition to the existing metering equipment at the Premises is required.

5 Access

- 5.1 The Customer consents to allow [the Distributed Network Service Provider], access to disconnect the interconnection facilities, without notice, in an emergency situation.
- 5.2 The Customer consents to allow [the Distributed Network Service Provider], access to inspect protective devices on the Renewable Energy System or metering equipment.

6 Operating Procedure

- 6.1 The Renewable Energy System may be taken off-line and disconnected from the Supply Network by the Customer or [the Distributed Network Service Provider] for operational reasons or for planned maintenance.
- 6.2 In the event that the Supply Network is unable to accept electricity generated by the Customer for any reason, no compensation shall be payable by [the Distributed Network Service Provider].

7 Disconnection by [the Distributed Network Service Provider]

- 7.1 [the Distributed Network Service Provider] may disconnect the Renewable Energy System if connection would breach technical or safety requirements under the Act or this Agreement.
- 7.2 [the Distributed Network Service Provider] may disconnect the Renewable Energy System if connection would in its reasonable opinion unreasonably interfere with the connection or supply of electricity to other customers.

8 Safety

The Customer shall:

- (a) install and maintain the Renewable Energy System and associated equipment in safe working order at all times that it is connected and in accordance with the requirements of this Agreement;
- (b) keep a copy of the Renewable Energy System operations manual, including detailed isolation procedures, in the main switchboard at all times; and
- (c) comply with the reasonable directions of [the Distributed Network Service Provider] in order to secure the safety and stable parallel operation of [the Distributed Network Service Provider]'s supply network and the Renewable Energy System.

9 Customer Obligations

- 9.1 The Customer shall, if the Renewable Energy System remains operational at the Premises, advise any subsequent occupant of the Premises of the requirement to enter into a new consent agreement with the [the Distributed Network Service Provider].

10 Term and Termination

- 10.1 This Agreement commences on the Commencement date (schedule 2), and shall remain in operation indefinitely, or until it is earlier terminated in accordance with one of the following provisions.
- (a) If the Customer no longer wishes to participate under the terms of this Agreement, the Customer may terminate this Agreement by giving one month advance written notice to [the Distributed Network Service Provider].
 - (b) [the Distributed Network Service Provider] may terminate this Agreement in the event that the Customer is in breach of this Agreement or the Customer Contract, and the breach remains unremedied for one month after the Customer has been notified in writing of the breach.
 - (c) [the Distributed Network Service Provider] may disconnect the Renewable Energy System at any time as permitted by law and with appropriate notice, and provision of reasonable cause, to the customer, in which case this Agreement shall terminate forthwith upon disconnection.
 - (d) This Agreement may be terminated at any time upon mutual agreement between the parties.

11 Liability

- 11.1 The Customer acknowledges that [the Distributed Network Service Provider] shall not be liable for any breach of relevant Guidelines, Standards and Codes, nor any loss, damage or injury that may occur that is attributable to the installation and operation of the Renewable Energy System at the Premises.
- 11.2 The parties acknowledge that the Customer is responsible for any insurance costs associated with their obligations or possible liability under this Agreement.

12 Definitions

In this Agreement the following definitions apply.

"Act" means the *Electricity Act 1994*.

"Account Number" means the electricity account number for the premises.

"Customer Contract" means the "customer contract" (as that term is defined in the Act) in respect of the Premises.

"Premises" means the premises (as that term is defined in the Act), at which the Customer proposes to install the Renewable Energy System.

"Renewable Energy System" means a renewable energy system, comprising one or more inverters, one or more energy sources and controls, connected to a low-voltage electricity

distribution network and having an installed capacity of up to 10 kVA single phase or 30 kVA three phase.

"**Schedule**" means the schedule at the start of this Agreement.

"**Supply**" means the supply of electricity from the Supply Network to the premises under standard tariff conditions.

"**Supply Network**" has the meaning given to the term 'supply network' in the Act.

12.1 **EXECUTED** as an agreement

SIGNED for & on behalf of **[the Distributed Network Service Provider]**

by:

Signature:

Name:

Date:

Signature of witness

Name of witness

SIGNED by the Customer

Signature:

Name:

Date:

Signature of witness

Name of witness

6.4 Basic Utility Documents

6.4.1 Basic Guidelines for Grid-Connection and Electricity Offset

Customer Guidelines for Grid-Connection of a Small-Scale Renewable Energy System where Export is Offset Against Import

Introduction

These guidelines are for small-scale grid-connected renewable energy systems where the existing bidirectional or electronic meter is used to measure electricity exported to the grid (i.e. the meter runs backwards during times of export, and so the exported electricity will be offset against imported electricity). However, if the total exported electricity in a billing period is greater than imported electricity, the system owner will not be paid for net export of electricity (the difference between export and import), instead the difference will be carried forward to the next billing period.

The renewable energy system is limited to 2.4 kilowatts (kW) single phase, and must be connected to the [Utility] grid via electronic DC/AC inverters. The guidelines do not cover engine-driven generators.

Purpose

- It is intended that such renewable energy systems be allowed to be connected to the grid on the basis that you still require a supply of electricity from the [Utility] grid (i.e. not a stand-alone system).

The guidelines have been prepared in order to:

- Promote customer installations that are safe for both the customer and for [Utility] line maintenance personnel
- Protect customer installations against damage under fault conditions
- Ensure that other [Utility] customers are not exposed to hazards or to disruptions of supply.
- Promote customer installations that increase the amount of electricity generated from renewable sources supplied to the grid
- Define the billing arrangements including the treatment of Renewable Energy Certificates and Green Power Rights.

The primary concern of [Utility] is with the mains wiring and inverter, which provide the interface with the [Utility] grid, and which must be approved by [Utility]. The DC wiring of the renewable energy system and any batteries are the customer's responsibility, but must meet relevant Australian Standards and be installed by accredited personnel.

[Utility] Policy

[Utility] recognises that many environmentally-conscious customers wish to play their part in reducing the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by installing small renewable energy systems at their residences or premises.

Connection to the grid allows system owners to maximise the output of their system by ensuring generation in excess of immediate requirements is not wasted, while avoiding battery purchase and maintenance costs. System owners also benefit financially through offsetting electricity imported from the grid, and from the sale of Renewable Energy Certificates.

Application

Customers seeking to install inverter-connected renewable energy systems and sell electricity to the grid must sign a Small Scale Renewable Energy Electricity Connection and Offset Agreement.

Renewable Energy System Types

The types of renewable energy systems covered by these guidelines include:

- Solar (photovoltaic) arrays
- Small wind generators
- Micro hydro generators

All of these generally produce DC (direct current) electricity and must transmit their generated electricity via DC-to-AC (alternating current) sine wave inverters.

Planning and Selection

[Utility]'s main involvement with local generation is with the mains wiring and the sine wave inverter, which provides the interface with the grid. [Utility] is not able to offer assistance in the planning and selection of your proposed renewable energy system other than the inverter. The Business Council for Sustainable Energy (www.bcse.org.au) has details of Accredited Installers, Suppliers, and Consultants who are experienced in this area.

Relevant Standards and Guidelines

- [insert relevant State or Territory jurisdictional requirements]
- AS/NZS 3000:2000 – Australian/New Zealand Wiring Rules, published by Standards Australia
- Australian Standard AS 4777:2002 Grid Connection of Energy Systems via Inverters
 - AS 4777.1-2002 Part 1: Installation requirements
 - AS 4777.2-2002 Part 2: Inverter requirements
 - AS 4777.3-2002 Part 3: Grid protection requirements

Inverter Requirements

The electronic sine wave inverter must be of the grid-interactive type and must comply with AS 4777.2, which ensures it meets minimum safety and performance standards.

An important safety requirement for the inverter is that it must be prevented from back-feeding into the [Utility] network if the grid supply is externally de-energised. It should also be capable of restarting within a short period after the external grid supply is restored.

Installation and Connection to Grid

Installation of the renewable energy system should always be carried out strictly in accordance with the manufacturer's recommendations, and comply with AS 4777:2002. It must also meet any requirements of your local council's planning and building departments, such as heritage regulations.

Your system installer, or another electrical contractor licensed by [insert appropriate State or Territory Government department e.g. in NSW is the Dept. of Fair Trading] must carry out the electrical cabling and connection to your switchboard. The metering connection will be undertaken by

EITHER

your system installer as long as they have been appropriately trained by [Utility]

OR

[Utility] on advice from your installer that the system installation is complete. The wiring and equipment must be in accordance with the SAA Wiring Rules (AS/NZS 3000:2000) and with the [insert relevant jurisdictional regulations].

[Utility] Responsibilities

[Utility] must safeguard the safety of its employees and others who carry out work on its distribution network. [Utility] therefore reserves the right to inspect your installation by prior arrangement to ensure that it does not pose a hazard.

[Utility] may be obliged to disconnect your renewable energy system if it is causing nuisance to other customers connected to the grid. This is unlikely if an approved inverter is used.

[Utility] is responsible for all billing administration including treatment of Goods and Services Tax , Renewable Energy Certificates and Green Power Rights.

Customer Responsibilities

The customer is responsible for the safe installation, operation and maintenance of the renewable energy system. The installation must conform to Australian standards AS/NZ 3000:2000, and AS 4777:2002. Your equipment should be regularly inspected and maintained in accordance with the manufacturer's and installer's instructions.

The customer is responsible for the safety of any person operating or maintaining generating equipment and accessories which are on the premises. The installer is responsible for fitting adequate protective devices to prevent damage to their renewable energy system under conditions of short circuit, voltage surge or other faults.

Energy Pricing

The electricity charge to be paid by the customer, including Goods and Services Tax , will be calculated according to the Standard Customer Contract. If the total Export Electricity has been greater than the Import Electricity over the Billing Period, and so the meter has run backwards, the Customer's electricity component of their bill will be zero and they will not be paid for net Export. The Customer will be charged for electricity only once the meter reading is greater than the reading on the last bill where there was net Import.

The standard Service to Property [or equivalent] charge still applies.

Renewable Energy Certificates and Green Power Rights

[Utility] offers to buy the full deemed amount of Renewable Energy Certificates generated by the customer's renewable energy system according to the Office of the Renewable Energy Regulator deeming formula. The price offered for each Renewable Energy Certificate is typically \$37 but may vary with time and will be stated on the

Connection and Offset Agreement. The customer may choose to sell their Renewable Energy Certificates elsewhere.

[Utility] will assume ownership of any Green Power Rights generated by the customer's renewable energy system, without compensation to the customer. This will occur regardless of whether the customer is purchasing Green Power.

Insurance

Some household insurance policies do not cover the failure of electrical devices such as inverters. The renewable energy system may need to be separately specified on your insurance policy. You are advised to contact your own insurance company to check coverage. You do not need to take out public liability insurance to cover any negative impact on grid power quality. However, in the Connection Agreement, you will be required to indemnify [Utility] against any breach of relevant Guidelines, Standards and Codes, and against any loss or damage occasioned to the Utility or third parties resulting from the connection of the installation to their distribution system.

Process for Connecting a Small-Scale Renewable Energy System to the [Utility] Grid

Step 1

When you buy a system you should be given a list of accredited installers. The installer you choose can help with all the paperwork described in the following steps.



Step 2

Your installer will provide you with these Guidelines and two copies of the Connection and Electricity Offset Agreement, or you can contact [Utility] and ask that they be mailed to you. They can also be found at [Utility's website]. This document contains all the information you need to know to arrange for connection of your system to the Grid.



Step 3

Please complete and sign the Connection and Electricity Offset Agreement and return both copies to [Utility]. If you have any questions, please contact [Utility] for clarification.



Step 4

[Utility] will meter your installation and offset your exported electricity against imports once it has both copies of the Connection and Electricity Offset Agreement. [Utility] will forward to you a counter-signed copy of the Connection and Electricity Offset Agreement for your use.

6.4.2 Basic Grid-Connection and Electricity Offset Agreement

ATTACHMENT X:

SMALL SCALE RENEWABLE ENERGY GRID-CONNECTION AND ELECTRICITY OFFSET AGREEMENT

Schedule	
1	National Metering Identifier (NMI)
2	Commencement date
3	Capacity (kW) of renewable energy system
4	Type of Renewable Energy System (PV, wind, etc.)
5	Deemed number of Renewable Energy Certificates
6	Value of each deemed Renewable Energy Certificate

Signature of Customer:.....

Name:

Date:

1 Introduction

- 1.1 This Agreement is an extension of the existing Standard Customer Contract.
- 1.2 This agreement sets out the terms on which [the Utility] consents to the connection of the Renewable Energy System at the Premises to their Supply Network, and the terms on which [the Utility] consents to offset any electricity exported by the Renewable Energy System at the Premises against imported electricity, as well as any related credits such as Renewable Energy Certificates or Green Power Rights.

2 System Size

- 2.1 The Customer shall ensure that the power rating of the Renewable Energy System is no greater than 2.4 kW (single phase).

3 Customer's Obligations

[the Utility]'s consent under this Agreement is conditional upon:

- (a) The Renewable Energy System complying with AS 4777:2002 Grid Connection of Energy Systems via Inverters.
- (b) The wiring and equipment being in accordance with the Australian/New Zealand Wiring Rules (AS/NZS 3000:2000).
- (c) The Renewable Energy System complying with [insert any relevant State or Territory jurisdictional requirements].
- (d) The Renewable Energy System having been installed by Business Council for Sustainable Energy-accredited electrical contractor licensed by [insert the appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading], and the metering connection having been installed and checked according to the requirements of [insert the jurisdictional regulator or appropriate State or Territory Government department] prior to connection to your main switchboard.

4 Metering

- 4.1 No metering equipment in addition to the existing metering equipment at the Premises is required.

5 Access

- 5.1 The Customer consents to allow [the Utility], access to disconnect the interconnection facilities, without notice, in an emergency situation.
- 5.2 The Customer consents to allow [the Utility], access to inspect protective devices on the Renewable Energy System or metering equipment.

6 Export Credits

- 6.1 The electricity charge to be paid shall be calculated according to the Standard Customer Contract. If the total Export Electricity has been greater than the Import Electricity over the Billing Period, and so the meter has run backwards, the energy component of the Customer's

electricity bill shall be zero and they will not be paid for net Export. The Customer shall be charged for electricity only once the meter reading is greater than the reading on the last bill where there was net Import.

6.2 The standard Service to Property [or equivalent] charge still applies.

6.3 Goods and Services Tax shall be applied to the measurable flow of electricity according to law.

7 Renewable Energy Certificates

7.1 The parties agree that all right, title and interest in and to any Renewable Energy Certificates issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be retained by the Customer for their unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

7.2 [the Utility] offers to purchase, from the Customer, all Renewable Energy Certificates generated by the Renewable Energy System according to the deeming formula used by the Office of the Renewable Energy Regulator on the date this Agreement is signed by the Customer (as per schedule 5). This purchase shall occur without the Customer having to register their Renewable Energy System with the Office of the Renewable Energy Regulator.

7.3 Each Renewable Energy Certificate purchased by [the Utility] from the Customer shall have the value stated in schedule 6.

7.4 The Customer reserves the right to sell the Renewable Energy Certificates generated by their Renewable Energy System to any other party as determined by law.

8 Green Power Rights

8.1 The Customer shall obtain, with [the Utility]'s reasonable assistance, National Green Power Accreditation Program approval of the Renewable Energy System and:

- (a) maintain the National Green Power Accreditation Program approval during the term of this Agreement;
- (b) allow [the Utility] to publish descriptions from time to time (including by way of specific reference to the Renewable Energy System by name) of the means by which electricity is generated by the Renewable Energy System;
- (c) authorise the National Green Power Accreditation Program to provide from time to time to [the Utility], independent confirmation that you hold the National Green Power Accreditation Program Approval with respect to the Renewable Energy System; and

8.2 The parties agree that once the National Green Power Accreditation Program approval referred to in clause 8.1 has been obtained, all right, title and interest in and to any Green Power Rights issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be transferred to [the Utility] for no consideration for [the Utility]'s unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

9 Operating Procedure

- 9.1 The Renewable Energy System may be taken off-line and disconnected from the Supply Network by the Customer or [the Utility] for operational reasons or for planned maintenance.
- 9.2 In the event that the Supply Network is unable to accept electricity generated by the Customer for any reason, no compensation shall be payable by [the Utility].

10 Disconnection by [the Utility]

- 10.1 [the Utility] may disconnect the Renewable Energy System if connection would breach technical or safety requirements under the Act or this Agreement.
- 10.2 [the Utility] may disconnect the Renewable Energy System if connection would in its reasonable opinion unreasonably interfere with the connection or supply of electricity to other customers.

11 Safety

The Customer shall:

- (a) install and maintain the Renewable Energy System and associated equipment in safe working order at all times that it is connected and in accordance with the requirements of this Agreement;
- (b) keep a copy of the Renewable Energy System operations manual, including detailed isolation procedures, in the main switchboard at all times; and
- (c) comply with the reasonable directions of [the Utility] in order to secure the safety and stable parallel operation of [the Utility]'s supply network and the Renewable Energy System.

12 Customer Obligations

The Customer shall, if the Renewable Energy System remains operational at the Premises, advise any subsequent occupant of the Premises of the requirement to enter into a new consent agreement with the [the Utility].

13 Term and Termination

- 13.1 This Agreement commences on the Commencement date (schedule 2), and shall remain in operation indefinitely, or until it is earlier terminated in accordance with one of the following provisions.
- (a) If the Customer no longer wishes to participate under the terms of this Agreement, the Customer may terminate this Agreement by giving one month advance written notice to [the Utility].
 - (b) [the Utility] may disconnect the Renewable Energy System at any time as permitted by law and with appropriate notice, and provision of reasonable cause, to the customer, in which case this Agreement shall terminate forthwith upon disconnection.
 - (c) [the Utility] may terminate this Agreement in the event that the Customer is in breach of this Agreement or the Customer Contract, and the breach remains unremedied for one month after the Customer has been notified in writing of the breach.

- (d) This Agreement may be terminated at any time upon mutual agreement between the parties.

14 Liability

- 14.1 The Customer acknowledges that [the Utility] shall not be liable for any breach of relevant Guidelines, Standards and Codes, nor any loss, damage or injury that may occur that is attributable to the installation and operation of the Renewable Energy System at the Premises.
- 14.2 The parties acknowledge that the Customer is responsible for any insurance costs associated with their obligations or possible liability under this Agreement.

15 Definitions

In this Agreement the following definitions apply.

"Act" means the *Electricity Act 1994*.

"Account Number" means the electricity account number for the premises.

"Billing Period" means the period for the billing of electricity sales by [the Utility] to the Customer under the Standard Customer Contract. Unless otherwise stated the Billing Period is three months.

"Customer Contract" means the "customer contract" (as that term is defined in the Act) in respect of the Premises.

"Export Electricity" means the quantity of electricity generated from the Renewable Energy System at the Premises which is exported into the Supply Network.

"Green Power" means the Green Power Scheme as defined by the most recent version of the "National Green Power Accreditation Program Accreditation Document".

"Green Power Right" means the Green Power Right as defined by the most recent National Green Power Accreditation Program Accreditation Document.

"Import Electricity" means the quantity of electricity sold by [the Utility] to the Customer under the Standard Customer Contract.

"Net Export/Import" means the difference between Export Electricity and Import Electricity.

"Premises" means the premises (as that term is defined in the Act), at which the Customer proposes to install the Renewable Energy System.

"Renewable Energy Certificate" means the Renewable Energy Certificate as defined by the Commonwealth *Renewable Energy (Electricity) Act 2000* that relates to the Mandatory Renewable Energy Target.

"Renewable Energy System" means a renewable energy system, comprising one or more inverters, one or more energy sources and controls, connected to a low-voltage electricity distribution network and having an installed capacity of up to 10 kVA single phase or 30 kVA three phase.

"Schedule" means the schedule at the start of this Agreement.

"**Supply**" means the supply of electricity from the Supply Network to the premises under standard tariff conditions.

"**Supply Network**" has the meaning given to the term 'supply network' in the Act.

"**Tariff**" means the retail Tariff paid by the Customer for electricity they import from the Supply Network.

"**Term**" is the period of time set out in clause 13.1.

15.1 **EXECUTED** as an agreement

SIGNED for & on behalf of **[the Utility]**

by:

Signature:

Name:

Date:

SIGNED by the Customer

Signature:

Name:

Date:

Signature of witness

Name of witness

Signature of witness

Name of witness

6.5 Full Retailer Documents

6.5.1 Full Guidelines for Selling Electricity

Customer Guidelines for Selling Electricity Generated by a Small-Scale Renewable Energy System

Introduction

These guidelines cover the sale of electricity generated by a small-scale grid-connected renewable energy system to [retailer]. The maximum size of systems covered by these guidelines is 10 kilowatts (kW) single phase, or 30 kilowatts (kW) three phase. Note that systems should be appropriately sized to meet demand.

Purpose

It is intended that the sale to [retailer] of electricity generated by your renewable energy system be allowed on the basis that you still require a supply of electricity from [retailer] (i.e. not a standalone system).

The guidelines have been prepared in order to:

- Promote customer installations that increase the amount of electricity generated from renewable sources supplied to the grid
- Define the billing arrangements including the value of exported electricity to the customer
- Define the treatment of Renewable Energy Certificates and Green Power Rights.

For larger systems up to 1000kVA in capacity and all engine-drive generators, refer to a companion document that has been produced by [retailer].

[retailer] Policy

[retailer] recognises that many environmentally-conscious customers wish to play their part in reducing the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by installing small renewable energy systems at their residences or premises. Connection to the grid allows system owners to maximise the output of their system by ensuring generation in excess of their immediate requirements is not wasted, while avoiding battery purchase and maintenance costs. System owners also benefit financially through the sale of electricity exported to the grid, and from the sale of Renewable Energy Certificates.

Application

Customers seeking to sell electricity generated by a grid-connected renewable energy system must sign a Small Scale Renewable Energy Electricity Sales Agreement. Note that permission to grid-connect must be obtained from the relevant Distributed Network Service Provider, who must forward a copy of its Notice of Approval to [retailer].

Renewable Energy System Types

The types of renewable energy systems covered by these guidelines include:

- Solar (photovoltaic) arrays
- Small wind generators
- Micro hydro generators

Planning and Selection

[retailer] is not able to offer assistance in the planning and selection of your proposed renewable energy system. The Business Council for Sustainable Energy (www.bcse.org.au) has details of accredited installers, suppliers, and consultants who are experienced in this area.

[retailer] Responsibilities

[retailer] is responsible for reading the customer's electricity meters, calculating the net amount either owed to [retailer] by the customer or to the customer by [retailer], and all billing administration including treatment of Goods and Services Tax, Renewable Energy Certificates and Green Power Rights. [retailer] is also responsible for honouring any amounts owed to the customer.

Customer Responsibilities

The customer is responsible for allowing ready access to any electricity meters related to electricity covered by the Sales Agreement between [retailer] and the customer.

Energy Pricing

[retailer] applies net billing to all electricity exported to the grid. This means that for all electricity exported to the grid, [retailer] will pay the customer a rate equal to the retail rate paid by the customer for electricity they import from the grid, unless the customer is on Green Power. This applies whether there is net export or net import over the billing period. If the customer is on Green Power, [retailer] will pay only the equivalent non-Green Power tariff for net exported electricity [this arrangement assumes the customer was paid up-front for Renewable Energy Certificates].

The billing period is three months. If there is net import from the grid over this period the customer will be sent a bill for that amount plus the standard Service to Property [or equivalent] charge. If there is net export to the grid over this period, and its value is greater than \$50 after subtracting the standard Service to Property [or equivalent] charge, the customer will be paid this amount. If its value is not over \$50, the amount will be credited to the next billing period.

Goods and Services Tax

If the electricity imported from the grid and exported to the grid are metered separately, the customer must pay Goods and Services Tax on all electricity imported from the grid (gross import), not just the net import (gross import minus gross export). If the exported and imported electricity are not metered separately, the customer will pay Goods and Services Tax only on net import (if any).

If the customer is registered for Goods and Services Tax, and the production of electricity earns revenue for their business enterprise, they must charge [retailer] Goods and Services Tax. If imported and exported electricity are metered separately, [retailer] must pay Goods and Services Tax on any gross export. If the exported and imported electricity are not metered separately, the [retailer] will pay Goods and Services Tax only on the net export (if any).

Renewable Energy Certificates and Green Power Rights

[retailer] offers to buy the full deemed amount of Renewable Energy Certificates generated by the customer's renewable energy system according to the Office of the Renewable Energy Regulator deeming formula. The price offered for each Renewable Energy Certificate is \$37. The customer may choose to sell their Renewable Energy Certificates elsewhere.

[retailer] will assume ownership of any Green Power Rights generated by the customer's renewable energy system, without compensation to the customer. This will occur regardless of whether the customer is purchasing Green Power.

Process for Selling Electricity Generated by a Small-Scale Renewable Energy System to [Retailer]

Step 1

When you buy a system you should be given a list of accredited installers. The installer you choose can help with all the paperwork described in the following steps.



Step 2

Your installer will provide you with these Guidelines and two copies of the Sales Agreement, or you can contact [Retailer] and ask that they be mailed to you. They can also be found at [Retailer's website]. This document contains all the information you need to know to sell electricity to [Retailer].



Step 3

Please complete and sign the Sales Agreement and return both copies to [Retailer]. If you have any questions, please contact [Retailer] for clarification. [Retailer] will forward to your Network Service Provider a metering request for them to meter your installation.



Step 4

[Retailer] will buy your exported electricity once it has both Copies of the Sales Agreement, and will forward to you a counter-signed copy of the Sales Agreement for your use.

6.5.2 Full Electricity Sales Agreement

ATTACHMENT X:

SMALL SCALE RENEWABLE ENERGY ELECTRICITY SALES AGREEMENT

Schedule	
1	National Metering Identifier (NMI)
2	Commencement date
3	Capacity (kW) of renewable energy system
4	Type of Renewable Energy System (PV, wind, etc.)
5	Type of metering (two unidirectional meters, single bidirectional meter etc.)
6	Tariff for exported electricity
7	Deemed number of Renewable Energy Certificates
8	Value of each deemed Renewable Energy Certificate
9	Name of Distributed Network Service Provider

Signature of Customer:

Name:

Date:

1. Introduction

- 1.1 This Sales Agreement is an extension of the existing Standard Customer Contract.
- 1.2 This agreement sets out the terms on which [the Retailer] consents to credit any electricity exported by the Renewable Energy System at the Premises, as well as any related credits such as Renewable Energy Certificates or Green Power Rights.

2. Export Electricity

- 2.1 The Customer shall ensure that the power rating of the Renewable Energy System is no greater than 10 kW (single phase) or 30 kW (three phase).
- 2.2 If the amount of Export Electricity, averaged over a Billing Period, exceeds 60 kWh per day for a single phase system or 180 kWh per day for a three-phase system, [the Utility] is under no obligation to provide credits to the Customer for the portion of Export Electricity exceeding this limit.

3. Export Credits

- 3.1 Export Credits shall be applied on the basis that Export Electricity for each Billing Period shall be offset against Import Electricity for that Billing Period ("Net Billing").
- 3.2 If the Import Electricity exceeds the Export Electricity the electricity charge to be paid shall be calculated according to the Standard Customer Contract.
- 3.3 If the Export Electricity exceeds the Import Electricity:
 - (a) the amount by which the Export Electricity exceeds Import Electricity shall be valued by multiplying that amount by the relevant Tariff (according to schedule 6, and equal to the retail Tariff paid by the Customer for electricity they import from the grid under the Standard Customer Contract, unless the Customer is on Green Power) ("Export Credit"). If the Customer is on Green Power, [the Retailer] shall pay only the equivalent non-Green Power Tariff for net exported electricity (according to schedule 6); and
 - (b) if the cumulative Export Credit is greater than \$50 it shall be paid to the Customer, but otherwise shall be carried forward to the credit of the Customer in subsequent Billing Periods until it is expended by applying it in accordance with clauses 3.1 and 3.2, or until it increases the current Billing Period's Export Credit to greater than \$50 at which time the Export Credit shall be paid to the Customer.
- 3.4 The standard Service to Property [or equivalent] charge still applies.
- 3.5 Goods and Services Tax shall be applied to the measurable flow of electricity according to law.

4. Renewable Energy Certificates

- 4.1 The parties agree that all right, title and interest in and to any Renewable Energy Certificates issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be retained by the Customer for their unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

- 4.2 [the Retailer] offers to purchase, from the Customer, all Renewable Energy Certificates generated by the Renewable Energy System according to the deeming formula used by the Office of the Renewable Energy Regulator on the date this Agreement is signed by the Customer (as per schedule 7). This purchase shall occur without the Customer having to register their Renewable Energy System with the .
- 4.3 Each Renewable Energy Certificate purchased by [the Retailer] from the Customer shall have the value stated in schedule 8.
- 4.4 The Customer reserves the right to sell the Renewable Energy Certificates generated by their Renewable Energy System to any other party as determined by law.

5. **Green Power Rights**

- 5.1 The Customer shall obtain, with [the Retailer]'s reasonable assistance, National Green Power Accreditation Program approval of the Renewable Energy System and:
- (a) maintain the National Green Power Accreditation Program approval during the term of this Agreement;
 - (b) allow [the Retailer] to publish descriptions from time to time (including by way of specific reference to the Renewable Energy System by name) of the means by which electricity is generated by the Renewable Energy System;
 - (c) authorise the National Green Power Accreditation Program to provide from time to time to [the Retailer], independent confirmation that you hold the National Green Power Accreditation Program Approval with respect to the Renewable Energy System; and
- 5.2 The parties agree that once the National Green Power Accreditation Program approval referred to in clause 5.1 has been obtained, all right, title and interest in and to any Green Power Rights issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be transferred to [the Retailer] for no consideration for [the Retailer]'s unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

6. **Statements of Account**

- 6.1 The amount of Export Credits (if any) applied to bills rendered by [the Retailer] to the Customer during each Billing Period pursuant to clause 3 shall be recorded and accounted for in the invoices issued by [the Retailer] to the Customer for such Billing Period under the Standard Customer Contract.

7. **Term and Termination**

- 7.1 This Agreement commences on the Commencement date (schedule 2), and shall remain in operation indefinitely, or until it is earlier terminated in accordance with one of the following provisions.
- (a) If the Customer no longer wishes to participate under the terms of this Agreement, the Customer may terminate this Agreement by giving one month advance written notice to [the Retailer].

- (b) [the Retailer] may terminate this Agreement in the event that the Customer is in breach of this Agreement or the Standard Customer Contract, and the breach remains unremedied for one month after the Customer has been notified in writing of the breach.
- (c) This Agreement may be terminated at any time upon mutual agreement between the parties.
- (d) If this Agreement is terminated, all accumulated Export Credits shall be paid in full to the Customer.

8. **Liability**

The Customer acknowledges that [the Retailer] shall not be liable for any loss, damage or injury that may occur or that is attributable to the installation and operation of the Renewable Energy System at the Premises.

9. **Definitions**

In this Agreement, the following definitions apply:

"Billing Period" means the period for the billing of electricity sales by [the Retailer] to the Customer under the Standard Customer Contract. Unless otherwise stated the Billing Period is three months.

"Customer Contract" means the "customer contract" (as that term is defined in the Act) in respect of the Premises.

"Export Electricity" means the quantity of electricity generated from the Renewable Energy System at the Premises which is exported into the Supply Network.

"Green Power" means the Green Power Scheme as defined by the most recent version of the "National Green Power Accreditation Program Accreditation Document".

"Green Power Right" means the Green Power Right as defined by the most recent National Green Power Accreditation Program Accreditation Document".

"Import Electricity" means the quantity of electricity sold by [the Retailer] to the Customer under the Standard Customer Contract.

"Net Export/Import" means the difference between Export Electricity and Import Electricity.

"Premises" has the meaning given to the term in the *Electricity Act 1994* and at which the Customer proposes to install the Renewable Energy System.

"Renewable Energy Certificate" means the Renewable Energy Certificate as defined by the Commonwealth *Renewable Energy (Electricity) Act 2000* that relates to the Mandatory Renewable Energy Target.

"Renewable Energy System" means a renewable energy system, comprising one or more inverters, one or more energy sources and controls, connected to a low-voltage electricity distribution network and having an installed capacity of up to 10 kVA single phase or 30 kVA three phase.

"**Schedule**" means the schedule at the start of this Agreement.

"**Standard Customer Contract**" has the meaning in the *Electricity Act 1994*.

"**Supply Network**" has the meaning given to the term in the *Electricity Act 1994*.

"**Tariff**" means the retail Tariff paid by the Customer for electricity they import from the Supply Network.

"**Term**" is the period of time set out in clause 7.1.

EXECUTED as an agreement.

SIGNED for & on behalf of **[the Retailer]** by:

Signature:

Name:

Date:

Signature of witness

Name of witness

SIGNED by the Customer

Signature:

Name:

Date:

Signature of witness

Name of witness

6.6 Full Distributed Network Service Provider Documents

6.6.1 Full Guidelines for Grid-Connection

Customer Guidelines for Grid-Connection of a Small-Scale Renewable Energy System

Introduction

These guidelines cover private renewable energy systems up to 10 kilowatts (kW) single phase, or 30 kilowatts (kW) three phase, which customers wish to connect to the [Distributed Network Service Provider] grid via electronic DC/AC inverters. Note that grid restraints at the site of connection may limit systems to sizes below the above levels. The guidelines do not cover engine-driven generators.

Purpose

- It is intended that such renewable energy systems be allowed to be connected to the grid on the basis that you still require a supply of electricity from the [Distributed Network Service Provider] grid (i.e. not a standalone system).

The guidelines have been prepared in order to:

- Promote customer installations which are safe for both the customer and for [Distributed Network Service Provider] line maintenance personnel
- Protect customer installations against damage under fault conditions
- Ensure that other [Distributed Network Service Provider] customers are not exposed to hazards or to disruptions of supply.

The primary concern of [Distributed Network Service Provider] is with the mains wiring and inverter, which provide the interface with the [Distributed Network Service Provider] grid, and which must be approved by [Distributed Network Service Provider]. The DC wiring of the renewable energy system and any batteries are the customer's responsibility, but must meet relevant Australian Standards and be installed by accredited personnel.

For larger systems up to 1000kVA in capacity and all engine-drive generators, refer to a companion document that has been produced by [Distributed Network Service Provider].

[Distributed Network Service Provider] Policy

[Distributed Network Service Provider] recognises that many environmentally-conscious customers wish to play their part in reducing the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by installing small renewable energy systems at their residences or premises. Connection to the grid allows system owners to maximise the output of their system by ensuring generation in excess of immediate requirements is not wasted, while avoiding battery purchase and maintenance costs.

Application

Customers seeking to install inverter-connected renewable energy systems must sign a Small Scale Renewable Energy Electricity Connection Agreement. Your installer will need to provide a sketch of the electrical wiring changes proposed. You will need to provide the name of your electricity retailer. [Distributed Network Service Provider] will forward a copy of its Notice of Approval to the nominated retailer.

Renewable Energy System Types

The types of renewable energy systems covered by these guidelines include:

- Solar (photovoltaic) arrays
- Small wind generators
- Micro hydro generators

All of these generally produce DC (direct current) electricity and must transmit their generated electricity via DC-to-AC (alternating current) sine wave inverters.

Planning and Selection

[Distributed Network Service Provider]'s main involvement with local generation is with the mains wiring and the sine wave inverter, which provides the interface with the grid. [Distributed Network Service Provider] is not able to offer assistance in the planning and selection of your proposed renewable energy system other than the inverter. The Business Council for Sustainable Energy (www.bcse.org.au) has details of Accredited Installers, Suppliers, and Consultants who are experienced in this area.

Relevant Standards and Guidelines

- [insert relevant State or Territory jurisdictional requirements]
- AS/NZS 3000:2000 – Australian/New Zealand Wiring Rules, published by Standards Australia
- Australian Standard AS 4777:2002 Grid Connection of Energy Systems via Inverters
 - AS 4777.1-2002 Part 1: Installation requirements
 - AS 4777.2-2002 Part 2: Inverter requirements
 - AS 4777.3-2002 Part 3: Grid protection requirements

Inverter Requirements

The electronic sine wave inverter must be of the grid-interactive type and must comply with AS 4777.2, which ensures it meets minimum safety and performance standards.

An important safety requirement for the inverter is that it must be prevented from back-feeding into the [Distributed Network Service Provider] network if the grid supply is externally de-energised. It should also be capable of restarting within a short period after the external grid supply is restored.

Installation and Connection to Grid

Installation of the renewable energy system should always be carried out strictly in accordance with the manufacturer's recommendations, and comply with AS 4777:2002. It must also meet any requirements of your local council's planning and building departments, such as heritage regulations.

Your system installer, or another electrical contractor licensed by [insert appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading] must

carry out the electrical cabling and connection to your switchboard. The metering connection will be undertaken by

EITHER

your system installer as long as they have been appropriately trained by [Distributed Network Service Provider]

OR

[Distributed Network Service Provider] on advice from your installer that the system installation is complete. The wiring and equipment must be in accordance with the SAA Wiring Rules (AS/NZS 3000:2000) and with the [insert relevant jurisdictional regulations].

[Distributed Network Service Provider] Responsibilities

[Distributed Network Service Provider] must safeguard the safety of its employees and others who carry out work on its distribution network. [Distributed Network Service Provider] therefore reserves the right to inspect your installation by prior arrangement to ensure that it does not pose a hazard.

[Distributed Network Service Provider] may be obliged to disconnect your renewable energy system if it is causing nuisance to other customers connected to the grid. This is unlikely if an approved inverter is used.

Customer Responsibilities

The customer is responsible for the safe installation, operation and maintenance of the renewable energy system. The installation must conform to Australian standards AS/NZ 3000:2000, and AS 4777:2002. Your equipment should be regularly inspected and maintained in accordance with the manufacturer's and installer's instructions.

The customer is responsible for the safety of any person operating or maintaining generating equipment and accessories on the premises. The installer is responsible for fitting adequate protective devices to prevent damage to their renewable energy system under conditions of short circuit, voltage surge or other faults.

Metering and Fees

[Distributed Network Service Provider] requires that the meter installation for the renewable energy system must be able to EITHER measure flows to and from the grid separately OR measure the net flow of electricity to and from the grid. This means that EITHER on existing premises an additional meter will need to be installed OR your existing meter may need to be replaced with a bidirectional meter.

EITHER

At present [Distributed Network Service Provider] is able to waive the costs of grid-connection and installation of additional metering equipment.

OR

A project fee that covers connection to the grid and installation of metering equipment will need to be paid to [Distributed Network Service Provider]. If your system installer has been trained by [Distributed Network Service Provider] to connect to the grid, and supplies and installs any extra metering equipment themselves, the charge payable to [Distributed Network Service Provider] will be \$65 or as specified by the current NOES charge. However if [Distributed Network Service Provider] performs the installation the charge will be [insert as appropriate].

[Distributed Network Service Provider] will retain ownership of the metering equipment.

Insurance

Some household insurance policies do not cover the failure of electrical devices such as inverters. The renewable energy system may need to be separately specified on your insurance policy. You are advised to contact your own insurance company to check coverage. You do not need to take out public liability insurance to cover any negative impact on grid power quality. However, on the Connection Agreement, you will be required to indemnify [Distributed Network Service Provider] against any breach of relevant Guidelines, Standards and Codes, and against any loss or damage occasioned to the Distributed Network Service Provider or third parties resulting from the connection of the installation to their distribution system.

Energy Pricing, Renewable Energy Certificates, and Green Power Rights

The value to the customer of kilowatt hours (kWh) electricity generated by their renewable energy system will be determined by the relevant electricity Retailer. The agreement with the Retailer will also determine allocation and pricing of any Renewable Energy Certificates, or Green Power Rights associated with the renewable energy system.

Process for Connecting a Small-Scale Renewable Energy System to the [Distributed Network Service Provider] Grid

Step 1

When you buy a system you should be given a list of accredited installers. The installer you choose can help with all the paperwork described in the following steps.



Step 2

Your installer will provide you with these Guidelines and two copies of the Connection Agreement, or you can contact [Distributed Network Service Provider] and ask that they be mailed to you. They can also be found at [Distributed Network Service Provider's website]. This document contains all the information you need to know to arrange for connection of your system to the Grid.



Step 3

Please complete and sign the Connection Agreement and return both copies to [Distributed Network Service Provider]. If you have any questions, please contact [Distributed Network Service Provider] for clarification. You will need to arrange for your Retailer to forward to [Distributed Network Service Provider] a metering request for [Distributed Network Service Provider] to meter your installation.



Step 4

[Distributed Network Service Provider] will meter your installation once it has the following documents:

- Both Copies of the Connection Agreement
- A metering request from your Retailer

[Distributed Network Service Provider] will forward to you a counter-signed copy of the Connection Agreement for your use.

6.6.2 Full Grid-Connection Agreement

ATTACHMENT X:

SMALL SCALE RENEWABLE ENERGY GRID-CONNECTION AGREEMENT

Schedule	
1	National Metering Identifier (NMI)
2	Commencement date
3	Capacity (kW) of renewable energy system
4	Type of Renewable Energy System (PV, wind, etc.)
5	Type of metering (two unidirectional meters, single bidirectional meter etc.)
6	Grid-connection and metering fee [depending on clause 5.1]

Signature of Customer:

Name:

Date:

1 Introduction

- 1.1 This Connection Agreement is an extension of the existing Standard Customer Connection Contract.
- 1.2 This agreement sets out the terms on which [the Distributed Network Service Provider] consents to connection of the Renewable Energy System at the Premises to their Supply Network.

2 System Size Requirements

- 2.1 The Customer shall ensure that the power rating of the Renewable Energy System is no greater than 10 kW (single phase) or 30 kW (three phase).

3 Customer's Obligations

[the Distributed Network Service Provider]'s consent under this Agreement is conditional upon:

- (a) The Renewable Energy System complying with AS 4777:2002 Grid Connection of Energy Systems via Inverters.
- (b) The wiring and equipment being in accordance with the Australian/New Zealand Wiring Rules (AS/NZS 3000:2000).
- (c) The Renewable Energy System complying with [insert any relevant State or Territory jurisdictional requirements].
- (d) The Renewable Energy System having been installed by a Business Council for Sustainable Energy-accredited electrical contractor licensed by [insert the appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading], and the metering connection having been installed and checked according to the requirements of [insert the jurisdictional regulator or appropriate State or Territory Government department] prior to connection to your main switchboard.
- (e) The customer undertaking, if necessary, any changes to the wiring at the Premises required for the installation of [the Distributed Network Service Provider]'s metering equipment;
- (f) The customer shall, if the Renewable Energy System remains operational at the Premises, advise any subsequent occupant of the Premises of the requirement to enter into a new consent agreement with [the Distributed Network Service Provider].

4 Metering

- 4.1 The Customer acknowledges that Electricity Metering equipment relevant to the Renewable Energy System at the Premises is owned and shall be operated by [the Distributed Network Service Provider], and [the Distributed Network Service Provider] shall have the discretion to determine the meter type.
- 4.2 The customer shall ensure the Renewable Energy System metering is located adjacent to the existing metering for the Premises.
- 4.3 The meter installation for the Renewable Energy System shall be capable of EITHER measuring flows to and from the grid separately OR measuring the net flow of electricity to and from the grid.

5 Connection fees and costs

- 5.1 EITHER [the Utility] shall waive the costs of grid-connection and installation of additional metering equipment OR A project fee (according to schedule 6) that covers connection to the grid and installation of metering equipment by [the Utility] shall be paid by the Customer to [the Utility] OR If your system installer has been authorised by [the Utility] to connect your system to the grid and to install metering, a project fee (\$65; according to schedule 6) that covers miscellaneous costs shall be paid by the Customer to [the Utility].

6 Access

- 6.1 The Customer consents to allow [the Distributed Network Service Provider], access to disconnect the interconnection facilities, without notice, in an emergency situation.
- 6.2 The Customer consents to allow [the Distributed Network Service Provider], access to inspect protective devices on the Renewable Energy System or metering equipment.

7 Operating Procedure

- 7.1 The Renewable Energy System may be taken off-line and disconnected from the Supply Network by the Customer or [the Distributed Network Service Provider] for operational reasons or for planned maintenance.
- 7.2 In the event that the Supply Network is unable to accept electricity generated by the Customer for any reason, no compensation shall be payable by [the Distributed Network Service Provider].

8 Disconnection by [the Distributed Network Service Provider]

- 8.1 [the Distributed Network Service Provider] may disconnect the Renewable Energy System if connection would breach technical or safety requirements under the Act or this Agreement.
- 8.2 [the Distributed Network Service Provider] may disconnect the Renewable Energy System if connection would in its reasonable opinion unreasonably interfere with the connection or supply of electricity to other customers.

9 Safety

The Customer shall:

- (a) install and maintain the Renewable Energy System and associated equipment in safe working order at all times that it is connected and in accordance with the requirements of this Agreement;
- (b) keep a copy of the Renewable Energy System operations manual, including detailed isolation procedures, in the main switchboard at all times; and
- (c) comply with the reasonable directions of [the Distributed Network Service Provider] in order to secure the safety and stable parallel operation of [the Distributed Network Service Provider]'s supply network and the Renewable Energy System.

10 Term and Termination

10.1 This Agreement commences on the Commencement date (schedule 2), and shall remain in operation indefinitely, or until it is earlier terminated in accordance with one of the following provisions.

- (a) If the Customer no longer wishes to participate under the terms of this Agreement, the Customer may terminate this Agreement by giving one month advance written notice to [the Distributed Network Service Provider].
- (b) [the Distributed Network Service Provider] may terminate this Agreement in the event that the Customer is in breach of this Agreement or the Customer Connection Contract, and the breach remains unremedied for one month after the Customer has been notified in writing of the breach.
- (c) [the Distributed Network Service Provider] may disconnect the Renewable Energy System at any time as permitted by law and with appropriate notice, and provision of reasonable cause, to the customer, in which case this Agreement shall terminate forthwith upon disconnection.
- (d) This Agreement may be terminated at any time upon mutual agreement between the parties.

11 Liability

11.1 The Customer acknowledges that [the Distributed Network Service Provider] shall not be liable for any breach of relevant Guidelines, Standards and Codes, nor any loss, damage or injury that may occur that is attributable to the installation and operation of the Renewable Energy System at the Premises.

11.2 The parties acknowledge that the Customer is responsible for any insurance costs associated with their obligations or possible liability under this Agreement.

12 Definitions

In this Agreement the following definitions apply.

"Act" means the *Electricity Act 1994*.

"Account Number" means the electricity account number for the premises.

"Customer Connection Contract" means the "customer connection contract" (as that term is defined in the Act) in respect of the Premises.

“Net Export/Import” means the difference between Export Electricity and Import Electricity.

"Premises" means the premises (as that term is defined in the Act), at which the Customer proposes to install the Renewable Energy System.

"Renewable Energy System" means a renewable energy system, comprising one or more inverters, one or more energy sources and controls, connected to a low-voltage electricity distribution network and having an installed capacity of up to 10 kVA single phase or 30 kVA three phase.

"Schedule" means the schedule at the start of this Agreement.

"Supply" means the supply of electricity from the Supply Network to the premises under standard tariff conditions.

"Supply Network" has the meaning given to the term ‘supply network’ in the Act.

12.1 **EXECUTED** as an agreement

SIGNED for & on behalf of **[the Distributed Network Service Provider]**

by: _____

Signature: _____

Name: _____

Date: _____

Signature of witness

Name of witness

SIGNED by the Customer

Signature: _____

Name: _____

Date: _____

Signature of witness

Name of witness

6.7 Full Utility Documents

6.7.1 Full Guidelines for Grid-Connection and Selling Electricity

Customer Guidelines for Grid-Connection of a Small-Scale Renewable Energy System and Sale of Exported Electricity

Introduction

These guidelines cover private renewable energy systems up to 10 kilowatts (kW) single phase, or 30 kilowatts (kW) three phase, which customers wish to connect to the [Utility] grid via electronic DC/AC inverters. Note that systems should be appropriately sized to meet demand, and grid restraints at the site of connection may limit systems to sizes below the above levels. The guidelines do not cover engine-driven generators.

Purpose

- It is intended that such renewable energy systems be allowed to be connected to the grid on the basis that you still require a supply of electricity from the [Utility] grid (i.e. not a stand-alone system).

The guidelines have been prepared in order to:

- Promote customer installations which are safe for both the customer and for [Utility] line maintenance personnel
- Protect customer installations against damage under fault conditions
- Ensure that other [Utility] customers are not exposed to hazards or to disruptions of supply.
- Promote customer installations that increase the amount of electricity generated from renewable sources supplied to the grid
- Define the billing arrangements including the value of exported electricity to the customer
- Define the treatment of Renewable Energy Certificates and Green Power Rights.

The primary concern of [Utility] is with the mains wiring and inverter, which provide the interface with the [Utility] grid, and which must be approved by [Utility]. The DC wiring of the renewable energy system and any batteries are the customer's responsibility, but must meet relevant Australian standards and be installed by accredited personnel.

For larger systems up to 1000kVA in capacity and all engine-drive generators, refer to a companion document that has been produced by [Utility].

[Utility] Policy

[Utility] recognises that many environmentally conscious customers wish to play their part in reducing the nation's greenhouse gas emissions, much of which are attributable to large coal-burning power stations. One way that some customers seek to contribute is by installing small renewable energy systems at their residences or premises.

Connection to the grid allows system owners to maximise the output of their system by ensuring generation in excess of immediate requirements is not wasted, while avoiding battery purchase and maintenance costs. System owners also benefit financially through

the sale of electricity exported to the grid, and from the sale of Renewable Energy Certificates.

Application

Customers seeking to install inverter-connected renewable energy systems and sell electricity to the grid must sign a Small Scale Renewable Energy Electricity Connection and Purchase Agreement. Your installer will need to provide a sketch of the electrical wiring changes proposed.

Renewable Energy System Types

The types of renewable energy systems covered by these guidelines include:

- Solar (photovoltaic) arrays
- Small wind generators
- Micro hydro generators

All of these generally produce DC (direct current) electricity and must transmit their generated electricity via DC-to-AC (alternating current) sine wave inverters.

Planning and Selection

[Utility]'s main involvement with local generation is with the mains wiring and the sine wave inverter, which provides the interface with the grid. [Utility] is not able to offer assistance in the planning and selection of your proposed renewable energy system other than the inverter. The Business Council for Sustainable Energy (www.bcse.org.au) has details of Accredited Installers, Suppliers, and Consultants who are experienced in this area.

Relevant Standards and Guidelines

- [insert relevant State or Territory jurisdictional requirements]
- AS/NZS 3000:2000 – SAA Wiring Rules, published by Standards Australia
- Australian Standard AS 4777:2002 Grid Connection of Energy Systems via Inverters
 - AS 4777.1-2002 Part 1: Installation requirements
 - AS 4777.2-2002 Part 2: Inverter requirements
 - AS 4777.3-2002 Part 3: Grid protection requirements

Inverter Requirements

The electronic sine wave inverter must be of the grid-interactive type, and of good quality and performance in order to avoid malfunction or damage to your household electrical appliances. Your inverter must generate an AC voltage having a good quality sinusoidal wave form with low harmonic distortion. Only [Utility]-approved models which satisfy the Australian Standard AS 4777:2002 may be connected to the grid.

An important safety requirement for the inverter is that it must be prevented from back-feeding into the [Utility] network if the grid supply is externally de-energised. It should also be capable of restarting within a short period after the external grid supply is restored.

Installation and Connection to Grid

Installation of the renewable energy system should always be carried out strictly in accordance with the manufacturer's recommendations, and comply with AS 4777:2002. It must also meet any requirements of your local council's planning and building departments, such as heritage regulations.

Your system installer, or another electrical contractor licenced by [insert appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading] must carry out the electrical cabling and connection to your switchboard. The metering connection will be undertaken by

EITHER

your system installer as long as they have been appropriately trained by [Utility]

OR

[Utility] on advice from your installer that the system installation is complete. The wiring and equipment must be in accordance with the SAA Wiring Rules (AS/NZS 3000:2000) and with the [insert relevant jurisdictional regulations].

[Utility] Responsibilities

[Utility] must safeguard the safety of its employees and others who carry out work on its distribution network. [Utility] therefore reserves the right to inspect your installation by prior arrangement to ensure that it does not pose a hazard.

[Utility] may be obliged to disconnect your renewable energy system if it is causing nuisance to other customers connected to the grid. This is unlikely if an approved inverter is used.

[Utility] is responsible for reading the customer's electricity meters, calculating the net amount either owed to [Utility] by the customer or to the customer by [Utility], and all billing administration including treatment of Goods and Services Tax, Renewable Energy Certificates and Green Power Rights.

[Utility] is also responsible for honouring any amounts owed to the customer.

Customer Responsibilities

The customer is responsible for the safe installation, operation and maintenance of the renewable energy system. The installation must conform to Australian standards AS/NZ 3000:2000, and AS 4777:2002. Your equipment should be regularly inspected and maintained in accordance with the manufacturer's and installer's instructions.

The customer is responsible for the safety of any person operating or maintaining generating equipment and accessories on the premises. The installer is responsible for fitting adequate protective devices to prevent damage to their renewable energy system under conditions of short circuit, voltage surge or other faults.

The customer is responsible for allowing ready access to any electricity meters related to electricity covered by the Sales Agreement between [Utility] and the customer.

Metering and Fees

[Utility] requires that the meter installation for the renewable energy system must be able to EITHER measure flows to and from the grid separately OR measure the net flow of electricity to and from the grid. This means that EITHER on existing premises an additional meter will need to be installed OR your existing meter may need to be replaced with a bidirectional meter.

EITHER

At present [Utility] is able to waive the costs of grid-connection and installation of additional metering equipment.

OR

A project fee that covers connection to the grid and installation of metering equipment will need to be paid to [Utility]. If your system installer has been trained by [Utility] to connect to the grid, and supplies and installs any extra metering equipment themselves, the charge payable to [Utility] will be \$65 or as specified by the current NOES charge. However if [Utility] performs the installation the charge will be [insert as appropriate].

[Utility] will retain ownership of the metering equipment.

Energy Pricing

[Utility] applies net billing to all electricity exported to the grid. This means that for all electricity exported to the grid, [Utility] will pay the customer a rate equal to the retail rate paid by the customer for electricity they import from the grid, unless the customer is on Green Power. This applies whether there is net export or net import over the billing period. If the customer is on Green Power, [Utility] will pay only the equivalent non-Green Power tariff for net exported electricity.

The billing period is three months. If there is net import from the grid over this period the customer will be sent a bill for that amount plus the standard Service to Property [or equivalent] charge. If there is net export to the grid over this period, and its value is greater than \$50 after subtracting the standard Service to Property [or equivalent] charge, the customer will be paid this amount. If its value is not over \$50, the amount will be credited to the next billing period.

Goods and Services Tax

If the electricity imported from the grid and exported to the grid are metered separately, the customer must pay Goods and Services Tax on all electricity imported from the grid (gross import), not just the net import (gross import minus gross export). If the exported and imported electricity are not metered separately, the customer will pay Goods and Services Tax only on net import (if any).

If the customer is registered for Goods and Services Tax, and the production of electricity earns revenue for their business enterprise, they must charge [Utility] Goods and Services Tax. If imported and exported electricity are metered separately, [Utility] must pay Goods and Services Tax on any gross export. If the exported and imported electricity are not metered separately, the [Utility] will pay Goods and Services Tax only on the net export (if any).

Renewable Energy Certificates and Green Power Rights

[Utility] offers to buy the full deemed amount of Renewable Energy Certificates generated by the customer's renewable energy system according to the Office of the Renewable Energy Regulator deeming formula. The price offered for each Renewable Energy Certificate is typically \$37 but may vary with time and will be stated on the Connection and Sales Agreement. The customer may choose to sell their Renewable Energy Certificates elsewhere.

[Utility] will assume ownership of any Green Power Rights generated by the customer's renewable energy system, without compensation to the customer. This will occur regardless of whether the customer is purchasing Green Power.

Insurance

Some household insurance policies do not cover the failure of electrical devices such as inverters. The renewable energy system may need to be separately specified on your insurance policy. You are advised to contact your own insurance company to check coverage. You do not need to take out public liability insurance to cover any negative impact on grid power quality. However, on the Connection Agreement, you will be required to indemnify [Utility] against any breach of relevant Guidelines, Standards and Codes, and against any loss or damage occasioned to the Utility or third parties resulting from the connection of the installation to their distribution system.

Process for Connecting a Small-Scale Renewable Energy System to the [Utility] Grid

Step 1

When you buy a system you should be given a list of accredited installers. The installer you choose can help with all the paperwork described in the following steps.



Step 2

Your installer will provide you with these Guidelines and two copies of the Connection and Electricity Sales Agreement, or you can contact [Utility] and ask that they be mailed to you. They can also be found at [Utility's website]. This document contains all the information you need to know to arrange for connection of your system to the Grid.



Step 3

Please complete and sign the Connection and Electricity Sales Agreement and return both copies to [Utility]. If you have any questions, please contact [Utility] for clarification.



Step 4

[Utility] will meter your installation and buy your exported electricity once it has both copies of the Connection and Electricity Sales Agreement. [Utility] will forward to you a counter-signed copy of the Connection and Electricity Sales Agreement for your use.

6.7.2 Full Grid-Connection and Electricity Sales Agreement

ATTACHMENT X:

SMALL SCALE RENEWABLE ENERGY GRID-CONNECTION AND ELECTRICITY SALES AGREEMENT

Schedule	
1	National Metering Identifier (NMI)
2	Commencement date
3	Capacity (kW) of renewable energy system
4	Type of Renewable Energy System (PV, wind etc.)
5	Type of metering (two unidirectional meters, single bidirectional meter etc.)
6	Grid-connection and metering fee [depending on clause 5.1]
7	Tariff for exported electricity
8	Deemed number of Renewable Energy Certificates
9	Value of each deemed Renewable Energy Certificate

Signature of Customer:

Name:

Date:

1. Introduction

- 1.1. This Agreement is an extension of the existing Standard Customer Contract.
- 1.2. This agreement sets out the terms on which [the Utility] consents to the connection of the Renewable Energy System at the Premises to their Supply Network, and the terms on which [the Utility] consents to credit any electricity exported by the Renewable Energy System at the Premises, as well as any related credits such as Renewable Energy Certificates or Green Power Rights.

2. System Size

- 2.1. The Customer shall ensure that the power rating of the Renewable Energy System is no greater than 10 kW (single phase) or 30 kW (three phase).

3. Customer's Obligations

[the Utility]'s consent under this Agreement is conditional upon:

- (a) The Renewable Energy System complying with AS 4777:2002 Grid Connection of Energy Systems via Inverters.
- (b) The wiring and equipment being in accordance with the Australian/New Zealand Wiring Rules (AS/NZS 3000:2000).
- (c) The Renewable Energy System complying with [insert any relevant State or Territory jurisdictional requirements].
- (d) The Renewable Energy System having been installed by a Business Council for Sustainable Energy-accredited electrical contractor licensed by [insert the appropriate State or Territory Government department eg. in NSW is the Dept. of Fair Trading], and the metering connection having been installed and checked according to the requirements of [insert the jurisdictional regulator or appropriate State or Territory Government department] prior to connection to your main switchboard.
- (e) The customer undertaking, if necessary, any changes to the wiring at the Premises required for the installation of [the Distributed Network Service Provider]'s metering equipment;
- (f) The customer shall, if the Renewable Energy System remains operational at the Premises, advise any subsequent occupant of the Premises of the requirement to enter into a new consent agreement with [the Distributed Network Service Provider].

4. **Metering**

- 4.1. The Customer acknowledges that electricity Metering relevant to the Renewable Energy System at the Premises is owned and shall be operated by [the Utility], and [the Utility] shall have the discretion to determine the meter type.
- 4.2. The customer shall ensure that the Renewable Energy System metering is located adjacent to the existing revenue metering for the Premises.
- 4.3. The meter installation for the Renewable Energy System shall be capable of EITHER measuring flows to and from the grid separately OR measuring the net flow of electricity to and from the grid.

5. **Connection fees and costs**

- 5.1. EITHER [the Utility] shall waive the costs of grid-connection and installation of additional metering equipment OR A project fee (according to schedule 6) that covers connection to the grid and installation of metering equipment by [the Utility] shall be paid by the Customer to [the Utility] OR If your system installer has been authorised by [the Utility] to connect your system to the grid and to install metering, a project fee (\$65; according to schedule 6) that covers miscellaneous costs shall be paid by the Customer to [the Utility].

6. **Access**

- 6.1. The Customer consents to allow [the Utility] access to disconnect the interconnection facilities, without notice, in an emergency situation.
- 6.2. The Customer consents to allow [the Utility] access to inspect protective devices on the Renewable Energy System or metering equipment.

7. **Exported Electricity**

- 7.1. If the amount of Export Electricity, averaged over a Billing Period, exceeds 60 kWh per day for a single phase system or 180 kWh per day for a three-phase system, [the Utility] is under no obligation to provide credits to the Customer for the portion of Export Electricity exceeding this limit.

8. **Export Credits**

- 8.1. Export Credits shall be applied on the basis that Export Electricity for each Billing Period shall be offset against Import Electricity for that Billing Period ("Net Billing").
- 8.2. If the Import Electricity exceeds the Export Electricity, the electricity charge to be paid shall be calculated according to the Standard Customer Contract.
- 8.3. If the Export Electricity exceeds the Import Electricity:
 - (a) the Customer's bill for Import Electricity for that Billing Period shall be zero;
 - (b) the amount by which the Export Electricity exceeds Import Electricity shall be valued by multiplying that amount by the relevant Tariff (according to schedule 7, and equal to the retail Tariff paid by the Customer for electricity they import from the grid under the Standard Customer Contract, unless the Customer is on Green Power) ("Export Credit"). If the Customer is on Green Power, [the Utility] shall pay only the equivalent non-Green Power tariff for net exported electricity (according to schedule 7); and

- (c) if the cumulative Export Credit is greater than \$50 it shall be paid to the Customer, but otherwise shall be carried forward to the credit of the Customer to subsequent Billing Periods until it is expended by applying it in accordance with clauses 8.1 and 8.2, or until it increases the current Billing Period's Export Credit to greater than \$50 at which time the Export Credit shall be paid to the Customer.

8.4. The standard Service to Property [or equivalent] charge still applies.

8.5. Goods and Services Tax shall be applied to the measurable flow of electricity according to law.

9. **Renewable Energy Certificates**

9.1. The parties agree that all right, title and interest in and to any Renewable Energy Certificates issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be retained by the Customer for their unconditional absolute use and benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

9.2. [the Utility] offers to purchase, from the Customer, all Renewable Energy Certificates generated by the Renewable Energy System according to the deeming formula used by the Office of the Renewable Energy Regulator on the date this Agreement is signed by the Customer (as per schedule 8). This purchase shall occur without the Customer having to register their Renewable Energy System with the Office of the Renewable Energy Regulator.

9.3. Each Renewable Energy Certificate purchased by [the Utility] from the Customer shall have the value stated in schedule 9.

9.4. The Customer reserves the right to sell the Renewable Energy Certificates generated by their Renewable Energy System to any other party as determined by law.

10. **Green Power Rights**

10.1. The Customer shall obtain, with [the Utility]'s reasonable assistance, National Green Power Accreditation Program approval of the Renewable Energy System and:

- (a) maintain the National Green Power Accreditation Program approval during the term of this Agreement;
- (b) allow [the Utility] to publish descriptions from time to time (including by way of specific reference to the Renewable Energy System by name) of the means by which electricity is generated by the Renewable Energy System;
- (c) authorise the National Green Power Accreditation Program to provide from time to time to [the Utility], independent confirmation that you hold the National Green Power Accreditation Program Approval with respect to the Renewable Energy System; and

10.2. The parties agree that once the National Green Power Accreditation Program approval referred to in clause 10.1 has been obtained, all right, title and interest in and to any Green Power Rights issued to, held by or entitled to be held by, the Customer in respect of the generation of electricity from the Renewable Energy System during the Term, shall be transferred to [the Utility] for no consideration for [the Utility]'s unconditional absolute use and

benefit as and when they are issued or when they otherwise vest in or accrue to the Customer.

11. Statements of Account

11.1. The amount of Export Credits (if any) applied to bills rendered by [the Utility] to the Customer during each Billing Period pursuant to clause 8 shall be recorded and accounted for in the invoices issued by [the Utility] to the Customer for such Billing Period under the Standard Customer Contract.

12. Operating Procedure

12.1. The Renewable Energy System may be taken off-line and disconnected from the Supply Network by the Customer or [the Utility] for operational reasons or for planned maintenance.

12.2. In the event that the Supply Network is unable to accept electricity generated by the Customer for any reason, no compensation shall be payable by [the Utility].

13. Disconnection by [the Utility]

13.1. [the Utility] may disconnect the Renewable Energy System if connection would breach technical or safety requirements under the Act or this Agreement.

13.2. [the Utility] may disconnect the Renewable Energy System if connection would in its reasonable opinion unreasonably interfere with the connection or supply of electricity to other customers.

14. Safety

The Customer shall:

- (a) install and maintain the Renewable Energy System and associated equipment in safe working order at all times that it is connected and in accordance with the requirements of this Agreement;
- (b) keep a copy of the Renewable Energy System operations manual, including detailed isolation procedures, in the main switchboard at all times; and
- (c) comply with the reasonable directions of [the Utility] in order to secure the safety and stable parallel operation of [the Utility]'s supply network and the Renewable Energy System.

15. Term and Termination

15.1. This Agreement commences on the Commencement date (schedule 2), and shall remain in operation indefinitely, or until it is earlier terminated in accordance with one of the following provisions:

- (a) If the Customer no longer wishes to participate under the terms of this Agreement, the Customer may terminate this Agreement by giving one month advance written notice to [the Utility].
- (b) [the Utility] may disconnect the Renewable Energy System at any time as permitted by law and with appropriate notice, and provision of reasonable cause, to the customer, in which case this Agreement shall terminate forthwith upon disconnection.

- (c) [the Utility] may terminate this Agreement in the event that the Customer is in breach of this Agreement or the Customer Connection Contract, and the breach remains unremedied for one month after the Customer has been notified in writing of the breach.
- (d) This Agreement may be terminated at any time upon mutual agreement between the parties.

16.2 If this Agreement is terminated, all accumulated Export Credits shall be paid in full to the Customer.

16. Liability

16.1. The Customer acknowledges that [the Utility] shall not be liable for any breach of relevant Guidelines, Standards and Codes, nor any loss, damage or injury that may occur that is attributable to the installation and operation of the Renewable Energy System at the Premises.

16.2. The parties acknowledge that the Customer is responsible for any insurance costs associated with their obligations or possible liability under this Agreement.

17. Definitions

In this Agreement the following definitions apply.

"Act" means the *Electricity Act 1994*.

"Account Number" means the electricity account number for the premises.

"Billing Period" means the period for the billing of electricity sales by [the Utility] to the Customer under the Standard Customer Contract. Unless otherwise stated the Billing Period is three months.

"Customer Contract" means the "customer contract" (as that term is defined in the Act) in respect of the Premises.

"Export Electricity" means the quantity of electricity generated from the Renewable Energy System at the Premises which is exported into the Supply Network.

"Green Power" means the Green Power Scheme as defined by the most recent version of the "National Green Power Accreditation Program Accreditation Document".

"Green Power Right" means the Green Power Right as defined by the most recent National Green Power Accreditation Program Accreditation Document.

"Import Electricity" means the quantity of electricity sold by [the Utility] to the Customer under the Standard Customer Contract.

"Net Export/Import" means the difference between Export Electricity and Import Electricity.

"Premises" means the premises (as that term is defined in the Act), at which the Customer proposes to install the Renewable Energy System.

"**Renewable Energy Certificate**" means the Renewable Energy Certificate as defined by the Commonwealth *Renewable Energy (Electricity) Act 2000* that relates to the Mandatory Renewable Energy Target.

"**Renewable Energy System**" means a renewable energy system, comprising one or more inverters, one or more energy sources and controls, connected to a low-voltage electricity distribution network and having an installed capacity of up to 10 kVA single phase or 30 kVA three phase.

"**Schedule**" means the schedule at the start of this Agreement.

"**Supply**" means the supply of electricity from the Supply Network to the premises under standard tariff conditions.

"**Supply Network**" has the meaning given to the term 'supply network' in the Act.

"**Tariff**" means the retail Tariff paid by the Customer for electricity they import from the Supply Network.

"**Term**" is the period of time set out in clause 16.1.

17.1. **EXECUTED** as an agreement

SIGNED for & on behalf of **[the Utility]** by:

Signature: _____

Name: _____

Date: _____

Signature of witness

Name of witness

SIGNED by the Customer

Signature: _____

Name: _____

Date: _____

Signature of witness

Name of witness

6.8. Goods and Services Tax (GST)

The following is extracted from the report 'Development of a Standard Connection Agreement for Small Grid-Connected Renewable Energy Systems: Discussion Paper' (Passey *et al.*, 2004).

The goods and services tax (GST) was introduced on 1 July 2000. It is a broad-based tax of 10% on the sales or supplies of most goods, services, or other items sold or consumed in Australia. For grid-connected renewable energy systems, the type of metering and billing system can affect the amount of GST paid by the system owner.

The situation currently faced by grid-connected systems is well illustrated by the private ruling received from the Australian Tax Office (ATO) by Energex in 2001. This stated that GST should be paid by the customer (system owner) only on the net amount of electricity imported. This was because under Energex's billing arrangements at that time it was not possible to measure the gross export (usage by Energex), or gross import (usage by system owner). However, if metering systems were installed that could;

“accurately measure the flow of electricity from the network to the customer and vice versa, then Energex will have to account for its GST liability based on the actual quantity of electricity supplied to the customer. Similarly, the customers who are registered [for GST] will have to account for their GST liability based on the actual quantity of electricity supplied to the network.”

In short, GST should be charged on gross imports or exports of electricity, but only if they can be calculated or measured. If gross imports or exports cannot be calculated or measured, GST is charged on the net import or export. For this situation, Table 3 explains how GST would be applied to the various metering schemes as defined in the Discussion Paper (Passey *et al.*, 2004). These have not been officially confirmed by the ATO and so should be used as a guide only.

Table 3 Likely application of GST to different metering schemes

Metering Scheme	Type of Supply	Calculation of Supply where GST Paid by System Owner	Calculation of Supply where GST Paid by Retailer ⁱ
1	net	net meter	net meter
2a/2b	gross	gross import meter	gross export meter
3a/3b	net	consumption meter – generation meter	generation meter – consumption meter
4a/4b	net	net meter	net meter
5a/5b	gross	gross import meter	gross export meter
6a	gross	consumption meter – generation meter + gross export meter	on gross export meter
6b	gross	gross import meter	gross import meter + generation meter – consumption meter

ⁱ Only if owner registered for GST, and electricity production is part of their business enterprise

Although the above ATO ruling seems to imply that a system owner registered for GST will have to charge the retailer GST for electricity exported to the grid, this is only true if the supply of electricity is made in the course or furtherance of the enterprise for which the supplier is registered for GST. A system owner is not required to register unless their 'enterprise' has an annual turnover exceeding \$50,000; a limit impossible to exceed with a single renewable energy system restricted to a 30 kVA inverter limit. Hence unless a system owner operates their renewable energy system as part of a larger enterprise, they are not required to charge GST. They can, however, voluntarily register for GST regardless of their circumstances, although for most system owners the administrative burden would likely outweigh the small financial gains. Thus the majority of residential system owners will not have to charge their retailer GST.

6.9. Responses to Issues Raised in Discussion Paper

Issue	Organisation/Individual	Comments
General		
	Powerdirect	See no issues with the proposal
	Origin Energy	Have read the document and have nothing further to add, and are happy with the recommendations.
	Ergon Energy	<p>Does not support quite of number of the recommendations, specifically where they start to dictate commercial arrangements. Our views are that light-handed regulation should prevail and dictating matters such as the minimum price, export cap amounts, timing of payment, contract duration and the treatment of RECs, NGACs and Green Power rights should be left to retailers to determine through negotiations with their customers. Having such matters set by a regulator may simply lead retailers towards not offering any buyback arrangements.</p> <p>Clearly, your report indicates that this may only be a voluntary approach, in which case the impact is minimal and I have no strong objections to recommendations if they are to be voluntary.</p> <p>Ergon Energy has some very clear reasons for not supporting the recommendations I've mentioned above (should the intent be for them to become compulsory). Some are general contractual/commercial issues, whilst other aspects are driven by the tariff structures which operate in Queensland, making the recommendations simply non-commercial and would remove any incentive for us to continue the program.</p>
	Dave Keenan	<p>An ultra-lite-weight "agreement" could be used where no net electricity would be sold by the customer (as is the case for most systems in Australia). A suitable system size for this sort of agreement could be 2.4kW since it is the maximum power level for plug-in appliances (for which no agreement or notification is required), and is the typical power consumption of an electric hot water system (up to 3.6kW for off-peak). Adding a 2.4kW renewable energy system is little different to removing a 2.4kW load (eg by converting from electric to solar hot water). For such an ultra-lite-weight "agreement", the customer would simply inform their retailer that an AS4777-compliant system of capacity such-and-such has been installed at such-and-such an address/electricity account. If a customer has a net export in a billing period, the retailer would not record the actual meter reading on the bill, but would record a reading the same as the previous final reading, giving zero net consumption. The electricity credit would still be tracked on the meter, and the customer would not be charged for energy consumption again until the meter reads higher than the last reading before it started to go net-backwards. If such a customer finds they have a significant net export over a long period, they may then seek to enter into a more complicated agreement to sell this excess if they wish.</p>
	Trevor Toomer	<p>I would propose that small systems, say less than 2kW, that are not expected to be net exporters, should be treated as any other type of electrical appliance. Simply connected by a licensed electrician, and allowed to do its job of reducing the net electricity bill, without any additional regulations except for those required for safety. Within the limits of a small number of reasonable sized systems, and adequate local grid characteristics, there are no real costs associated with this system. There is an actual benefit to the grid in reduced loads on the transmission and distribution systems. It is only if there are net exports that it should be necessary for any formal agreement with the electricity retailer to buy the surplus.</p>

1 Upper limit on system size	
ETSA	<p>ETSA Utilities has rewritten its customer guidelines to reflect the relevant Australian Standard, AS4777. The customer guidelines now reflect the size of the grid connected inverter systems 0-10kVA single phase units and 0-30kVA 3 phase units as per the standard.</p> <p>It is not envisaged, at this time, that there will be sufficient PV Grid Connected Inverter system installations to impact on the capacity of the network requiring constraints to be applied to the number of connections. However, there may well be a need, in the future, that the DNSP has the option with the proposed connection agreement to limit the numbers and size of Grid Connected Inverter systems to local grid characteristics. As recommended within the discussion paper, this may be best serviced by including a caveat within the connection agreement.</p>
TXU Networks	Is reasonable provided the connection is inverter based and that it could be limited by local grid characteristics.
EnergyAustralia	Agree with recommendation.
Trevor Toomer	I note that you propose an upper size limit of 30kW for 3 phase systems. I would propose provision of another class of system, that might be co-operatively owned. I would propose here that the exports from a cooperative system, probably a wind turbine, might be credited against the imports of its owners. This may be outside the scope of your discussion paper.
2 Type of metering scheme	
TXU Networks	Support Metering scheme proposed.
United Energy	Are concerned that metering scheme 3 is required to accurately measure the number of RECs generated. Schemes 3a and 3b can be used to calculate what would have been metered with schemes 2a and 2b, and the meter costs would be the same. Support the use of interval meters which they say would increase metering costs from about \$150 to \$200 excluding overheads and GST. Believes that the paper should at least recommend the installation of interval meters if the full value of embedded generation is to be recognised.
EnergyAustralia	Agree that metering scheme 2a or 2b is preferred. This is consistent with EA's current policy.
Trevor Toomer	In other countries, where Greenhouse gas emissions seem to be taken more seriously, there seems to be a preference to legislate for net metering systems. The trend in Jurisdictional regulation in Australia would therefore appear to be contrary to trends elsewhere. Metering system type 1 would be lower cost, and would compel the application of net metering. 2a or 2b would be more accurate, and so may be appropriate in larger systems. Provided a type 1 meter does not overestimate exports relative to imports, it should be acceptable. If the system is small, and the customer is not a net exporter then Type 1 metering could eliminate the need for any agreement with the electricity retailer (reducing administrative as well as installation costs).
Dave Keenan	Net metering using a single bidirectional meter is all that is needed. A 5 year agreement that guarantees that one will not be forced to sell one's exports (or generation) for less than what one buys it back for, is simply not good enough for someone making a 20+ year investment in a PV system. Believes that electricity meters only have to be accurate to within 2%, and so running a meter backwards should only be illegal if the resultant error is greater than 2%. UNSW should perform more reverse meter tests like that of Pacific Solar, on behalf of the AGO.
Glen George	2b is fine. Western PowerSmart meters use time of use meters. Why not all meters be time of use?
Geoff Stapleton	From an installers point of view it is important that the actual energy from

the PV system is measured - to prove the system is working. Fortunately many of the inverters now have this function but some installers do install a separate mechanical meter.

3 Additional technical connection requirements	
ETSA	ETSA Utilities does not have any specific additional requirements for the installation of the grid connected inverter systems above the relevant Australian Standards and ESCOSA Codes.
EnergyAustralia	Disagree. EnergyAustralia views that the DNSP may impose technical connection requirements in accordance with the discretion allowed it under the Australian Standards and jurisdictional regulators for reasons of system performance and National Electricity Code obligations.
Trevor Toomer	Provided the system uses an inverter of a type that has been adequately tested and approved, I see no reason that this should be treated any differently than any other electrical appliance that is permanently wired in.

4 Requirement for specially certified or accredited electricians	
ETSA	ETSA Utilities does not have any specific requirement for specially certified or accredited electricians to undertake the installation of the grid connected inverter systems other than that they are suitably licensed. However it is ETSA Utilities understanding that for the government (Energy SA) subsidy to be provided, the installer must be an accredited installer with an SEI (Sustainable Energy Industry) endorsement.
Powercor	Powercor does not allow third party contractors to install type 5 (manual) and type 6 (interval) meters. These installations are completed by our own staff or our own sub contractors.
Western Power	Can the authors expand further on why the DNSP should not require specially certified or accredited electricians. Who would certify the renewable energy installer? Who will manage the register & update & keep track of the register of changes?
EnergyAustralia	Do not agree with recommendation. The NSW Electricity Supply Act states that a customer may elect to have any required electrical or other goods or services provided by the DNSP or any other accredited ⁴ person, and EnergyAustralia (or DNSPs in NSW?) requires that all employees of accredited persons working on or near EnergyAustralia's transmission and/or distribution system must be authorised by EnergyAustralia. This applies to the connection of the customer's installation to the DNSP's network and to the installation of meters. EA does not require specially certified or accredited electricians to work within the customers own installation (except for meter installation). Authorisation is available to suitably qualified employees of accredited Service Providers (ASP's). EnergyAustralia document <i>ES4 Service Provider Authorisation</i> details the requirements needed to obtain EnergyAustralia Authorisation and outlines the scope of work Service Providers are permitted to carry out under that authorisation.
Trevor Toomer	Any competent licensed electrician should be able to install a system that uses a type approved inverter, although some extra training in renewable energy and inverter systems may be desirable.
Geoff Stapleton	The current PVRP does request a designer be accredited by BCSE. The final wiring from the inverter to the switchboard and the PV array if LV, must be done by a licensed electrical contractor. The licensed electrical contractor could either be accredited themselves or be overseen by an

⁴ Accreditation is obtained from the Department of Energy, Utilities and Sustainability

accredited designer (project manager).
Note there are a number of PV installers who are electrical contractors who are not accredited to install meters. Some of the DNSP's do not now install meters themselves so you can pay \$100 plus to get an accredited meter person to install the meter.

5 Metering costs	
ETSA	The ESCOSA Metering Code requires the installation of import / export meters for PV grid connected inverter systems. ETSA Utilities requires reimbursement of costs associated with the installation of the import / export meter for the PV grid connected inverter systems connection. The current costs for the provision and installation of an import / export meters single phase installations is \$345 + GST and for 3 Phase installations the price will be on application to suit the installation.
Powercor	The Network should not have to provide this connection at a rate where it costs the Network more to do so. The ESC Regulator has looked at interval meters for small embedded generators and has come up with the following draft ruling. Subject to the Commission's wider review of the benefits of interval metering, the Commission perceives no value in mandatory interval metering at small embedded generation sites. Future benefits identified by distributors may not be realised, so mandating interval meters may impose additional costs without having offsetting benefits.
Western Power	Have the authors taken into consideration the costs of "Time of Use" meters?
TXU Networks	TXU will continue to recover these out of pocket costs requested by the customer or Retailer. The cost for the service is a Standard Service charge approved by the ESC.
EnergyAustralia	(i) Agree. EnergyAustralia is working towards allowing bi-directional meter installation work to also be performed by ASP's. (ii) Setting a maximum charge is neither appropriate nor necessary in NSW. Competition in the installation of meters and connections to the network should regulate installation costs. (iii) Currently in the EnergyAustralia Network, the standard meter installed at these premises is an interval capable meter.
TXU Retail	The agreement should recognise disadvantages to standardised metering arrangements, particularly the extra costs faced by participants to change from established procedures - noting that retailers already have adjusted to work with the diverse metering arrangements in place in the different States. If the benefit/cost analysis supports standardised metering then the challenge is to identify the transition path to implementation. No substantive case is presented to support the installation of interval meters. The achievement of the stated benefits of installing interval meters requires far more effort and cost than just installing the meters.
United Energy	United Energy believes that contestability of metering services should be left to jurisdictional regulator to assess and regulate. The regulator will take into consideration matters such as safety, technical feasibility, and effective and potential competition before deciding on whether a service such as metering should be made contestable. United Energy believes that it is not appropriate for the paper to recommend a maximum standard charge of \$200 for metering. There are a lot of factors that contribute to metering costs, including, one or two meters, single phase or multi phase, urban or a rural area. United Energy believes the labour rate is closer to \$60 per hour and we estimate it would take a minimum of four hours for a contactor to pick up a new meter from our depot, install the meter and return the old meter. Charges for metering should be left to the jurisdictional regulator to determine what is a fair and reasonable charge. The jurisdictional regulators regulate metering costs in Victoria by approving standard prices and issuing

	metering codes such as the Electricity Customer Metering Code in Victoria. United Energy believes that interval meters should be installed now and not in the longer term, considering the obvious advantages of interval meters.
Trevor Toomer	If the meter requires replacement, it should be at the cost of the system owner, but should be able to be installed by an approved RE system installer.
Glen George	(iii) Interval (Time of use) NOW not in the longer term. The installation of extra meters benefits no-one. One time of use dual -element electronic meter will do the job perfectly.

6 Retail and reference rates

Western Power	Why not? Company cost of generation, energy from net export is expensive.
TXU Retail	As it is an open and contestable market, the reference rates and the retail rates should be positioned however the retailer and system owner deems appropriate. The retailer should be able to price the reference rate lower, higher and equal to the retail rate, whichever option will best suit the cost structure for each individual customer. It is presumptuous for third parties to expect to influence commercial arrangements that are subject to bilateral market agreements/contracts. Discussion could outline all pros and cons for different considerations but should stop short of making recommendations on commercial arrangements.

7 Cap on net exported electricity

TXU Retail	TXU does not currently place a cap on net exported electricity. Retailers and system owners should have the flexibility to agree a cap on net exported electricity if the situation in the market changes in order to minimise risk. The cap should be available on both an amount basis as well as a period of credit basis to allow further flexibility.
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8 Payment for net export

TXU Retail	How credit for net export is allocated should be at the discretion of the contracting parties. If guidelines are imposed as to how the credit should be treated, then there will be repercussions and potentially higher costs that will inevitably be borne by the customer. These include costs in changing the billing system to accommodate the difference in credit payment which will result in an increase in the customer's rates to recoup costs.
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9 Duration of contract, notice for termination, and disconnection process

ETSA	The proposed recommendations are agreed.
Western Power	The agreement should be assigned to the new owner without having to have a "new" agreement ie previous contract terms and conditions carried over to new owner.
TXU Networks	Disconnection procedures between Retailers and DNSP's are covered by the ESC. Disconnection for technical reasons and non-compliance together with length of Agreement need to be covered by the Connection Agreement. Termination on 24 hours notice by either party rather than one month, except for issues that are covered by the Distribution Code.
EnergyAustralia	EnergyAustralia (networks) disagreed with recommendations (i), (ii) and (iii) because they do not require any agreement in addition to the Standard Form Customer Connection Contract (SFCCC) (unless the customer has entered into a separate negotiated customer connection contract), and although the SFCCC includes no provisions regarding duration of the contract, it outlines the circumstances under which a customer's premises

	can be disconnected, and conditions of notice required. They agree with recommendation (iv).
TXU Retail	Analysis should distinguish contract duration terms between agreements to purchase grid energy and agreements to sell embedded generation energy and any dependencies between these agreements. The Paper should also contemplate rights and obligations should the system owner require termination of the contract.
Trevor Toomer	In view of the very long cost recovery times for most RE systems, a contract that may be subject to review after 5 years does not provide security for the required investment. There is a need for the electricity retailer to be committed to purchase any net exports for the life of the system, at a price that is indexed to the retail price. This might be terminated at the discretion of the system owner, Otherwise only in exceptional circumstances, (such as disconnection of supply).

10 Treatment of Renewable Energy Certificates

TXU Retail	Agree that system owners should have the option of transferring the RECs to an agent however it should be up to the retailer to advise customers which agents the system owner has the option of transferring their RECs to. This prevents any additional costs being accrued to set up a system to allow for RECs being transferred to other agents if the processes are not already in place. This is a matter for contract negotiations.
EnergyAustralia	Agree – Customer can sell RECs to whomever they choose.
Dave Keenan	The retailer should be required to buy all the deemed RECs relating to the system, if the customer wishes to sell them.

11 Treatment of Greenhouse Gas Abatement Certificates

Country Energy	NGACs shouldn't be included in the agreement, as it is unlikely that small scale renewables will generate them. Whilst this may be the case at present, there could come a time in the future where NGAC creation may be possible.
EnergyAustralia	Agree – not relevant.
TXU Retail	If we are discussing Photovoltaic generation then it is correct to assume that the NSW Greenhouse Gas Abatement Certificates will not be generated due to the small scale of the generators. However if larger grid-connected systems are included in the discussion paper, this issue will need to be addressed.

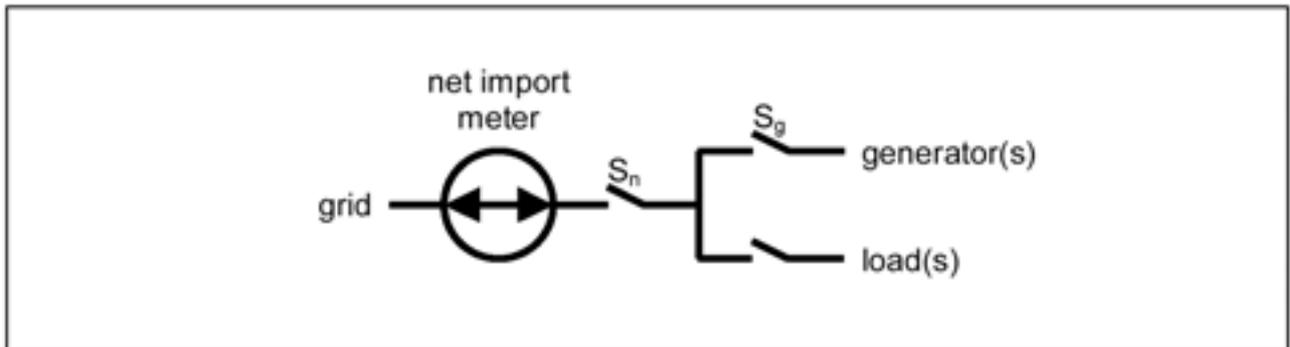
12 Treatment of Green Power Rights

TXU Retail	The implication of the recommendations regarding Green Power Rights is major changes to the billing system to incorporate Green Power tariffs as part of Photovoltaic. These costs incurred will need to be recouped. The retailer should have the discretion to determine whether the exports and imports to the system owner are deemed green energy.
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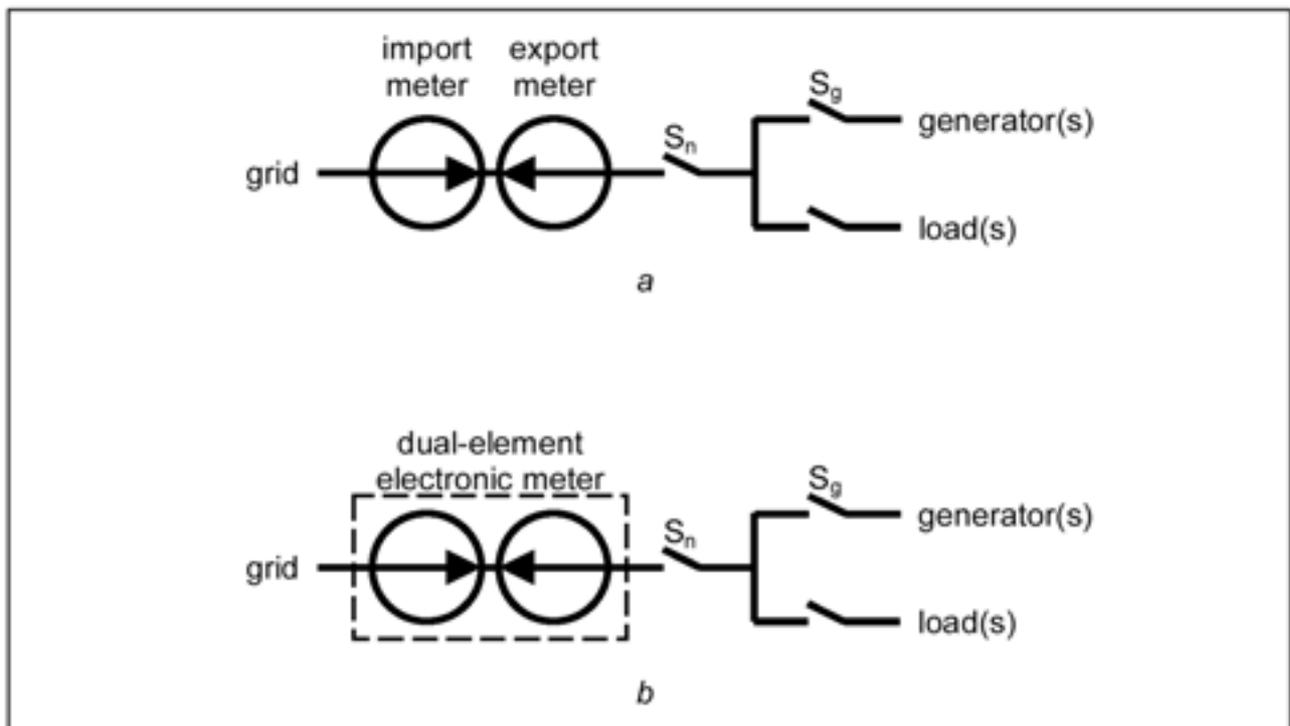
6.10. Explanation of Metering Schemes

The following describes a number of possible metering schemes. It is extracted from *Metering of embedded generators in Australia*, a report prepared for the Australian Greenhouse Office by Roche (2001). It includes a more detailed description of these schemes.

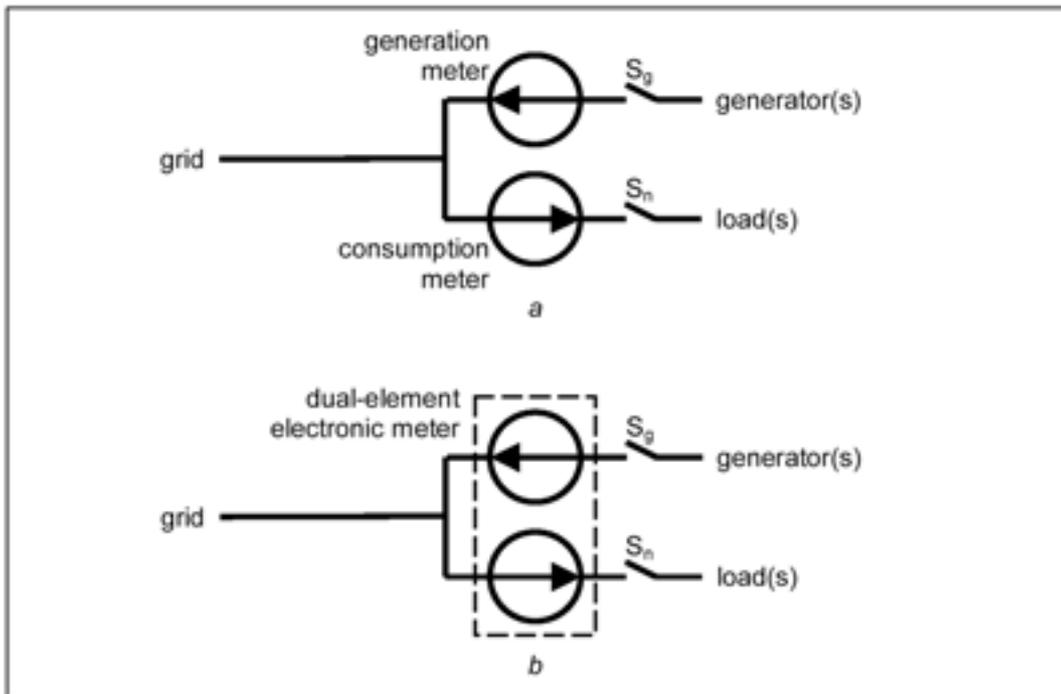
S_n : normal supply main switch; S_g : embedded generator main switch.



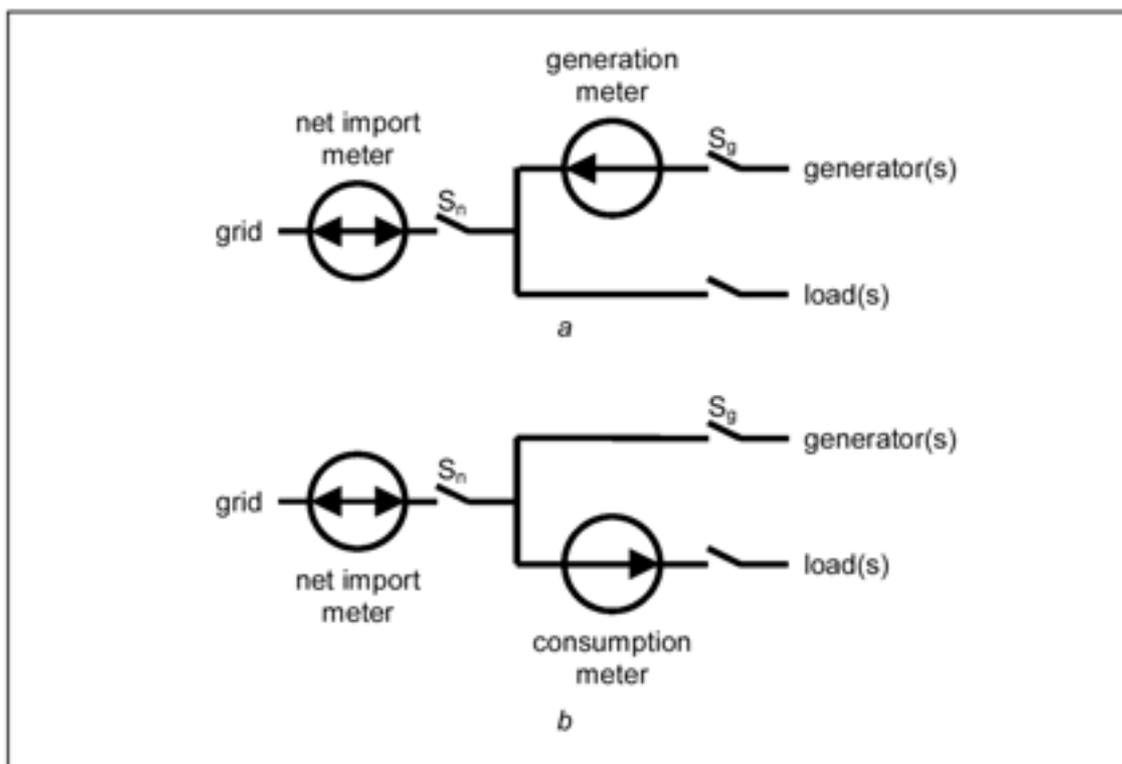
Metering scheme 1: A single bidirectional meter measures net flow of electrical energy between the grid and customer.



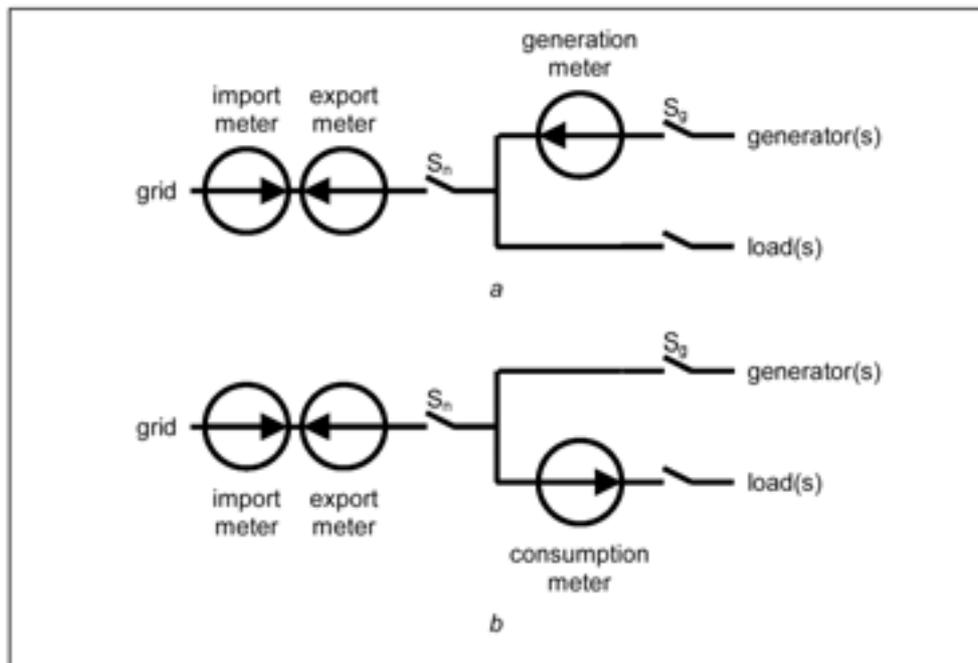
Metering schemes 2a and 2b: Gross imports and exports are separately metered by (a) two unidirectional meters wired in opposite polarity or (b) a dual-element electronic meter.



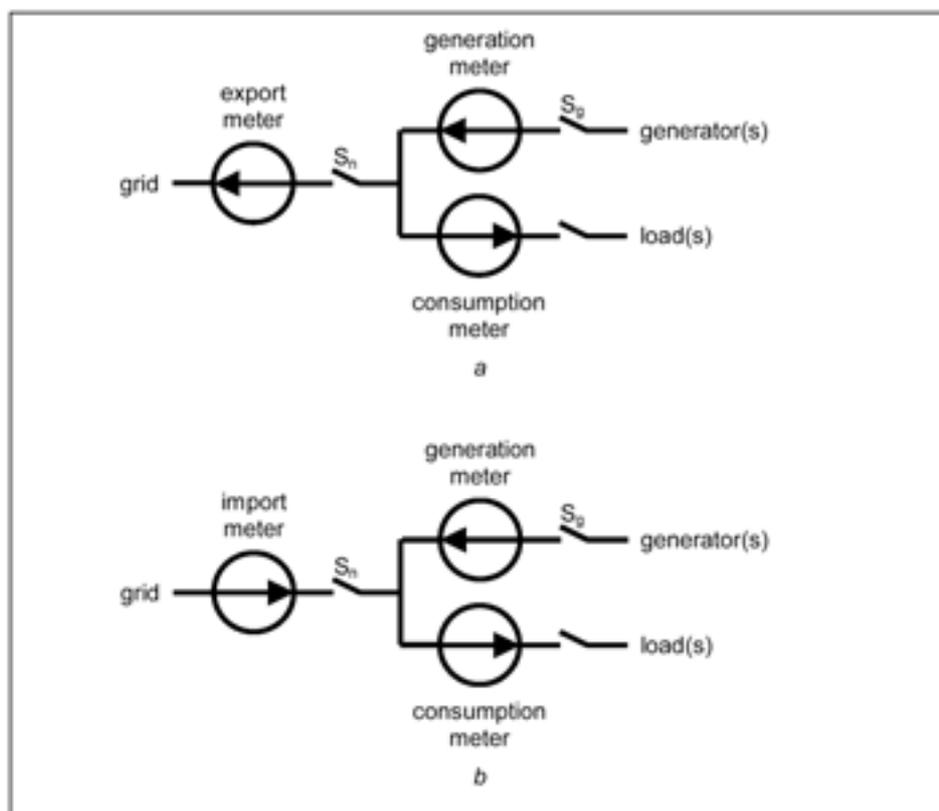
Metering schemes 3a and 3b: Generation and gross consumption are separately metered by (a) two unidirectional meters, one on the generator leg and one on the load leg, or (b) a dual-element electronic meter with one element on the generator leg and the other on the load leg. In some instances, the normal supply main switch is placed on the grid side of the common point.



Metering schemes 4a and 4b: One bidirectional meter is used to measure net imports and a separate unidirectional meter is used to measure (a) generation or (b) gross consumption.



Metering schemes 5a and 5b: One unidirectional meter is used to measure gross imports, another is used to measure exports and a third is used to measure (a) generation or (b) gross consumption.



Metering schemes 6a and 6b: One unidirectional meter is used to measure generation, another is used to measure gross consumption and a third is used to measure (a) exports or (b) gross imports.

7. Glossary of Acronyms and Units

AGO	Australian Greenhouse Office
AS	Australian Standard
ATA	Alternative Technology Association
ATO	Australian Taxation Office
AusWEA	Australian Wind Energy Association
BCSE	Business Council for Sustainable Energy
DC	Direct Current
DEUS	Department of Energy Utilities and Sustainability
DNSP	Distributed Network Service Provider
DUOS	Distribution Use Of System
GPR	Green Power Right
GST	Goods and Services Tax
kVA	kilovolt-ampere
kWh	kilowatt-hour
kW _p	kilowatt-peak
MRET	Mandatory Renewable Energy Target
MWh	megawatt-hour
NEC	National Electricity Code
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NGAC	NSW Greenhouse Abatement Certificate
NPER	National Professional Engineers Register
NT	Northern Territory.
ORER	Office of the Renewable Energy Regulator
PV	Photovoltaic.
PVRP	Photovoltaic Rebate Program
REC	Renewable Energy Certificate
SEDA	Sustainable Energy Development Authority
SEI	Sustainable Energy Industry
TUOS	Transmission Use Of System
UNSW	University of New South Wales
VESC	Victorian Essential Services Commission

8. Glossary of terms

Accumulation meter: A meter capable of measuring only the total energy flow: see interval meter.

Argon discussion list: An email discussion list focussing on small-scale renewable energy systems connected to the electricity grid. See <http://groups.yahoo.com/group/ARGON/>

Bidirectional meter: A meter capable of recording net energy flow by monitoring flows in both a forward and reverse direction.

Detented meter: A (unidirectional) meter, which is prevented from operating in a reverse direction by some mechanical or electronic means.

Embedded generator: A small electricity generator installed within an electricity distribution network.

Generation: The total flow of electrical energy out of a customer's embedded generator.

Grid: An alternative term for an electricity distribution network.

Gross export: The total unidirectional flow of electrical energy from a customer's electrical system (loads & generator) into a grid.

Gross imports: The total unidirectional flow of electrical energy from a grid into a customer's electrical system (loads & generator).

Interval meter: A meter capable of measuring how the energy flow changes with time: see accumulation meter.

Inverter: A device that can transfer power from a DC source to an AC load. Some inverters may also operate in the reverse direction and transfer power from an AC source to a DC load.

kVA (kilovolt-ampere): A unit of (both real and reactive) power.

kWp (kilowatt-peak): A unit of power used in the rating of photovoltaic arrays, corresponding to a DC output of 1000 watts under a set of standard test conditions.

Load: Any device that draws electrical energy from a grid.

MWh (megawatt-hour): A unit of energy equal to 10^6 watt-hours or 3.6×10^9 joules.

Net billing: When the customer's bill is based only on the net export or import.

Net export: Gross exports less imports. This equals net production.

Net imports: Gross imports less exports. This equals net consumption.

Net metering: When the meter records only the net export or import. It does not record the gross export and imports separately.

Photovoltaic: A term describing devices that convert light energy into electrical energy via a particular quantum-mechanical process.