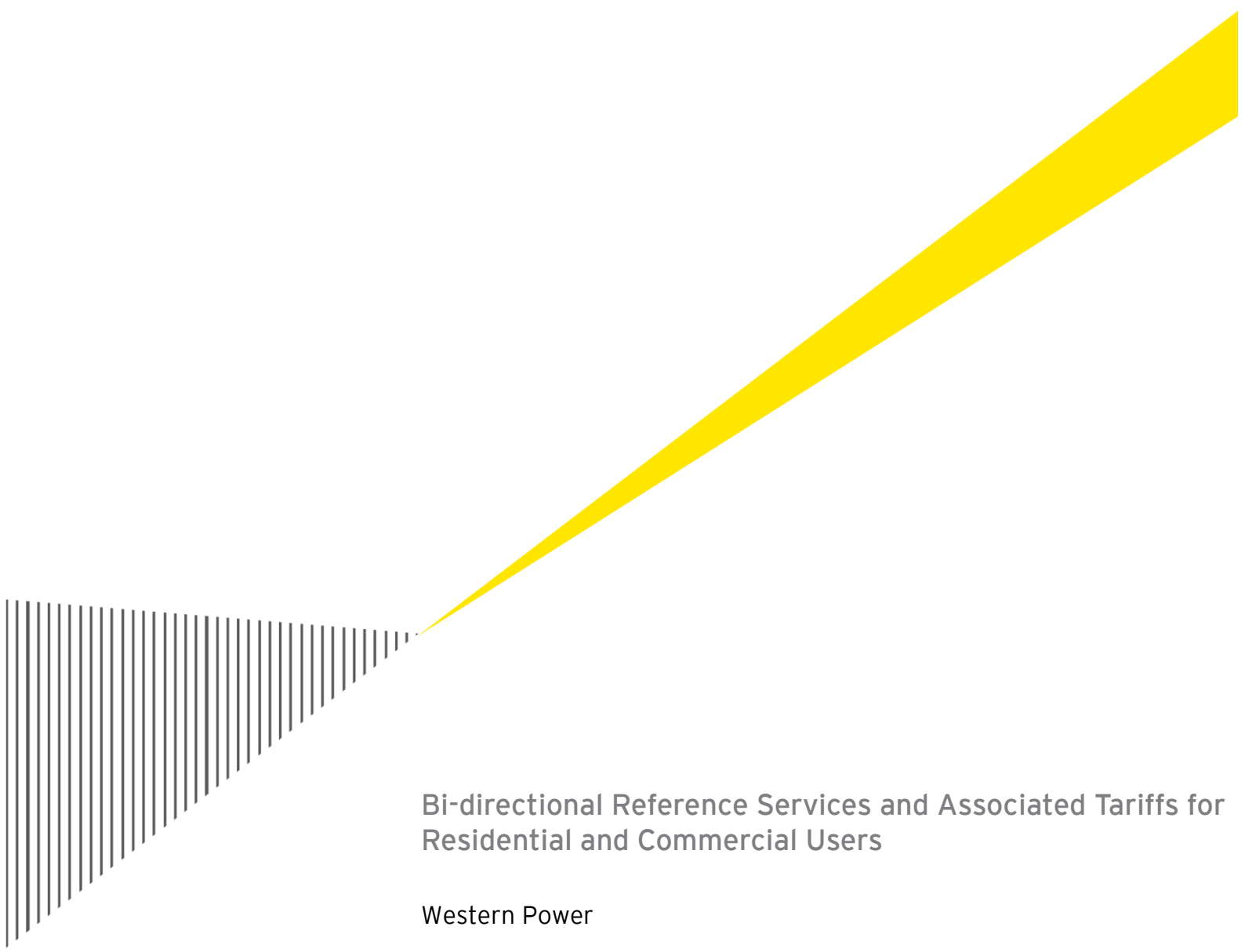

Appendix Z – Ernst & Young Report – Bi-Directional Tariff Reference Services and Associated Tariffs

September 2011





Bi-directional Reference Services and Associated Tariffs for
Residential and Commercial Users

Western Power

31 August 2011

Peter Mattner
Manager Regulation, Pricing & Access Development
Western Power
363 Wellington Street
Perth WA 6000

31 August 2011

Private and confidential

Final Report - Bi-directional Reference Services and Associated Tariffs for Residential and Commercial Users

Dear Peter,

Ernst & Young Transaction Advisory Services Limited ("**Consultant**") was engaged on the instructions of Western Power ("**Client**") to review the Bi-directional Reference Services and Associated Tariffs for Residential and Commercial Users ("**Project**"), in accordance with the engagement agreement dated 10 March 2011 including the General Terms and Conditions ("the **Engagement Agreement**").

The results of the Consultant's work, including the assumptions and qualifications made in preparing the report, are set out in the Consultant's report dated 10 June 2011 ("**Report**"). You should read the Report in its entirety including the Engagement Agreement, disclaimers and attachments. A reference to the Report includes any part of the Report. No further work has been undertaken by the Consultant since the date of the Report to update it.

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Scope of our work

Our work in connection with this assignment is of a different nature to that of an audit. Our report to you is based on inquiries of, and discussions with, management. We have not sought to verify the accuracy of the data or the information and explanations provided by management.

Our work has been limited in scope and time and we stress that a more detailed review may reveal material issues that this review has not.

If you would like to clarify any aspect of this review or discuss other related matters then please do not hesitate to contact us.

Ernst & Young Transaction Advisory Services Limited

A handwritten signature in black ink, appearing to read 'Bruce Harvey'.

Bruce Harvey
Director and Representative

A handwritten signature in black ink, appearing to read 'Matthew Rennie'.

Matthew Rennie
Partner - Economics, Regulation and Policy

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1. Executive summary

Western Power has a Bidirectional Reference Service for residential distribution users with bi-directional energy flows due to small scale generation, being the "Reference Service C1 - Time of Use (Residential) - Bi-directional Service", and an associated Reference Tariff "RT12". This Reference Service was approved by the ERA as part of Western Power's second Access Arrangement, however due to concerns raised by stakeholders¹, this service and the associated Reference Tariff has not been implemented. That is, customers with small scale generation have not been assigned to this Reference Service or associated Reference Tariff and otherwise are paying the same network tariffs as they were previously.

As a result, Ernst & Young has been engaged by Western Power to review the existing Reference Service and Reference Tariff for residential distribution users with bi-directional energy flows due to small scale generation, for inclusion in Western Power's third Access Arrangement ("AA3").

In addition, Ernst & Young has been engaged by Western Power to define a new Reference Service and Reference Tariff for commercial distribution users with bi-directional energy flows due to small scale generation, for inclusion in Western Power's third Access Arrangement.

This report:

- ▶ Considers a range of Options with a view to establishing an alternative Bi-directional Reference Service and Reference Tariff for residential customers that is both economically efficient and addresses stakeholders' concerns
- ▶ Further, a range of Options have also been considered with a view to establishing a new Bi-directional Reference Service and Reference Tariff for commercial customers that is both economically efficient and addresses stakeholders' concerns

Ernst & Young gratefully acknowledges the cooperation and assistance of Western Power, its management and staff, in the preparation of this Report.

1.1 Background

In 2010, Western Power received in excess of 20,000 applications for the installation of PV systems at residential properties, taking the total number of properties with PV to in excess of 37,000. Currently, Western Power is receiving between 2,000 and 3,000 applications for the installation of PV systems per month.

At this rate of growth, the number of residential properties in the SWIN with PV systems could be between 160,000 and 280,000 by 2017. This growth would result in an installed capacity of between 466MW and 973MW, which Western Power expects to cause significant operational and technical issues in the SWIN, both at a network level and at a generation level. This growth will occur throughout the third access arrangement period, which commences on 1 July 2012 and finishes on 30 June 2017.

While there have been a number of adjustments to feed-in tariffs in recent times designed to reduce the rate of take-up of PV systems (as well as considerable criticisms on the cost effectiveness of programs to promote the use of PV systems)², there is evidence to suggest that, primarily due to the global activity in this area, the costs of PV are reducing and

¹ All concerns raised by stakeholders prior to the review were also raised during the review. See sections 3 and 4

² Australian Financial Review, "WA regulator savages power subsidy 'welfare'", 20 April 2011, page 11

closing in on grid parity.³ As such the adjustments to the feed-in tariffs may not significantly affect the uptake of PV systems.

Consequently, the Reference Services and Reference Tariffs for customers with small scale generation must cover the entire AA3 period from 1 July 2012 to 30 June 2017, with the implementation of these services expected to occur by 1 January 2013. Finally, Western Power has indicated that, at this time, there does not appear to be extra material capital investment required by the installation of PV systems.

1.2 Consultation process

First Consultation Process

To inform the development of the Options and their subsequent evaluation, Western Power and Ernst & Young consulted widely with a number of key stakeholders to determine the outstanding concerns and issues with the existing Bi-directional Reference Service and Reference Tariff, in addition to any considerations required for new tariffs.

Second (Formal) Consultation Process

Following the release of the draft report for consultation, Western Power and Ernst & Young conducted a formal consultation process which involved meeting with stakeholders in May 2011 and inviting formal written submissions. Stakeholders consulted were strongly of the view that Option 1 (incorporating a volumetric export charge) may introduce significant disincentives to the uptake of small scale generation and raise significant equity issues, with most stakeholders indicating a preference for Option 2 (the current default situation).

Following this second round of consultation, Ernst & Young refined the draft report and developed this final report. The specific issues raised by stakeholders during the formal consultation process are set out in Chapter 4 of this report.

1.3 Jurisdictional precedent review

The development of Options was undertaken in reference to a review of the treatment of bi-directional tariffs in the jurisdictions of other DNSPs. The review found that most DNSPs have applied the same network tariff to customers with small scale generation for electricity sent out to the network as would apply if the customer did not have small scale generation. The review also found that no DNSPs are charging customers with small scale generation on a demand basis, nor are they charging for electricity sent out to the network. Though it should be noted that in the NEM, unlike the SWIN, generators do not pay network charges.

In Victoria, two DNSPs have distinguished customers with feed-in tariffs by assigning them network tariffs that are different in name, but are otherwise identical to the network tariffs that would have applied if the customer did not have small scale generation. A third DNSP, SP AusNet, requires customers to shift to a new network tariff applicable only to customers with PV generation that is different to their existing network tariff in name, structure and tariff rates. Different tariffs apply if the customer is also on the Premium Feed-In Tariff.

1.4 Evaluation of Options

The Options for residential and commercial customers were evaluated in the context of the following criteria as requested by Western Power:

³ Australian Financial Review, 'Sun shines on solar industry', 11 April 2011, page 53

- ▶ Ensuring that the tariff is cost reflective with respect to both the transmission and distribution networks, as required by Chapter 7 of the Electricity Networks Access Code 2004, and that the tariff sends appropriate price signals to customers on the cost of utilising network capacity at times of peak demand
- ▶ More specifically, ensuring there are no cross subsidies in an economic sense between customers with and without small scale generation, as required by Chapter 7 of the Electricity Networks Access Code 2004
- ▶ Administrative simplicity
- ▶ Ensuring Reference Service design does not set up any unreasonable barriers to entry such as high up-front cost
- ▶ Compatibility with the REBS and residential Feed-in Tariff scheme

Further to these criteria, an additional set of criteria, which reflect the issues raised by stakeholders, have been agreed with Western Power and included in the assessment. These are:

- ▶ Ensuring the implementation issues relating to metering are addressed
- ▶ Ensuring the implementation issues relating to meter data are addressed
- ▶ Ensuring the implementation issues relating to the Billing and IT Systems are addressed
- ▶ Ensuring Transactional Costs are minimised
- ▶ Ensuring Tariff Design issues raised by stakeholders are addressed (as described in sections 3 and 4)
- ▶ Ensuring the tariffs are applied on an equitable basis⁴
- ▶ Ensuring there are no compliance issues associated with the implementation of the Reference Tariff

In evaluating each of the Options, priority was placed on those criteria relating to economic efficiency (Criteria 1 and 2), administrative simplicity (Criteria 3) and equity (Criteria 11).

1.5 Options for Commercial/Residential Tariffs

With consideration of the relevant treatment of bi-directional tariffs in other jurisdictions and having regard to the input of stakeholders, Western Power and Ernst & Young initially developed five Options for the revised residential Bi-directional Reference Tariff and for the new commercial Bi-directional Reference Tariff.

These options were identified by taking into account:

- ▶ The recommended outcome from the previous review, RT12 (Options 4 and 5)
- ▶ The current default situation (Option 2)
- ▶ The optimal tariff design in terms of network investment (Option 3)
- ▶ Comments by stakeholders (Option 1)

These are ultimately identical for the residential and commercial services and are set out below:

1. Option 1 - Design and apply a new tariff which combines:
 - a. the customer's existing Reference Tariff, which would be paid by the customer for all electricity imported from the network

⁴ In particular, stakeholders required that the recommended tariff be consistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes which requires: "assignment of tariffs to small renewable consumers should be on the basis that they are treated no less favourably than customers without small renewable but with a similar load on the network".

- b. a usage based export charge, which would be paid by the customer for all electricity exported to the network (that is, net generation)

With regard to a tariff paid for all electricity imported from the network, the customer has the option to change, at any time, to the existing anytime energy or time-of-use Reference Tariffs (RT1 and RT3)

2. Option 2 - This Option is the current default situation, charging on a consumption basis only and using the existing anytime energy (RT1) and time of use (RT3) tariffs. Thus, it is similar to Option 1 in terms of consumption. There is no charge levied on electricity exported to the network
3. Option 3 - To design and apply a demand tariff to customers at bi-directional points which is similar to other demand tariffs currently offered by Western Power, which would be paid by the customer for all electricity that is imported from, and exported to the network
4. Option 4 - To apply the existing RT12 Reference Tariff without modification which requires interval metering data for residential customers, and to create an identical Reference Tariff for commercial customers
5. Option 5 - To apply the existing RT12 Reference Tariff for residential customers, and to create an identical Reference Tariff for commercial customers. However, rather than requiring interval metering data, register data is used instead

During the second consultation process, Western Power and Ernst & Young further narrowed the range of options under consideration for the purposes of Western Power's AA3 submission from the five identified above to a choice between Option 1 and Option 2. This was because while Options 3, 4 and 5 were considered to most meet the economic efficiency criteria (ensuring that tariffs reflect cost, and limiting cross subsidies), they were unable to meet virtually any other criteria and, in particular, did not meet the important criteria of administrative simplicity and equity. Those options therefore did not resolve stakeholders' concerns.

The following table concisely summarises all of the Options considered, including the new Option 2A:

| Option | Description |
|-----------|---|
| Option 1 | The existing Reference Tariff for imported electricity with a flat-rate volumetric export charge |
| Option 2 | The existing Reference Tariff for imported electricity with no export charge |
| Option 2A | The existing Reference Tariff for imported electricity with no export charge but higher fixed and/or variable charges |
| Option 3 | Demand based tariff for imported electricity similar to other existing demand-based tariffs offered by Western Power. |
| Option 4 | The existing RT12 for imported electricity |
| Option 5 | The existing RT12 for imported electricity using register data instead of interval data |

1.6 Estimated Prices for residential customers

Based on analysis of residential customers using interval meter data which indicated that the demand for a customer with small scale generation is at least equal to the demand of a customer without small scale generation but the total imported electricity is reduced (see Section 6), the costs to be recovered from the group of customers with small scale generation were determined. Using the 2011/12 Price List as a base⁵ the charges for

⁵ The 2011/12 Price List will be published on the Economic Regulation Authority's web-site in May 2011: http://www.erawa.com.au/2/486/48/electricity_access__price_determinations.pm

Options 1, 2 and 2A were estimated. Indicative charges, based on the methodology described in Appendix B, are set out in the table below.

| Option Pricing Outcomes | Option | Option 1 | | Option 2 | | Option 2A | |
|---|--------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | Import Tariff | RT1 | RT3 | RT1 | RT3 | RT1 | RT3 |
| | Tariff Description | Anytime Energy | Time of Use | Anytime Energy | Time of Use | Anytime Energy | Time of Use |
| | Data type | Register | | Register | | Register | |
| Fixed price per day for consumption | cents/day | 36.464 | 36.464 | 36.464 | 36.464 | 36.464 | 36.464 |
| Variable price per kWh for consumption | cents/kWh | 6.863 | - | 6.863 | - | 6.863 | - |
| Variable on-peak price for consumption | cents/kWh | - | 11.513 | - | 11.513 | - | 11.513 |
| Variable off-peak price for consumption | cents/kWh | - | 2.587 | - | 2.587 | - | 2.587 |
| Variable shoulder price for consumption | cents/kWh | - | - | - | - | - | - |
| Demand c/kVA/day | c/kVA/day | - | - | - | - | - | - |
| Variable price per kWh for generation | cents/kWh | 7.000 | 7.000 | - | - | - | - |
| Additional Fixed Charge | cents/kWh | - | - | - | - | 14.000 | 14.000 |

1.7 Conclusions

This report documents a process that Western Power has undertaken with the assistance of Ernst & Young. Consistent with the previous review in 2009, each Option for the Reference Tariff to apply at the residential and commercial customer's bi-directional point has been assessed against particular criteria and via a two stage consultation process as requested by Western Power.

As a result of the first and second round of consultation, Option 2 (i.e. identical to the existing residential RT1 (anytime energy) and RT 3 (time of use) Reference Tariff in structure and design) is proposed for incorporation in Western Power's AA3 submission. This is because it:

- ▶ Has precedent in most other jurisdictions across Australia
- ▶ Is the most equitable option and is supportive of the Western Australian's Government policies in respect of encouraging the uptake of small scale generation, even though

those policies have been modified in recent times. Unlike Options 1 and 2A, it does not risk imposing a material disincentive to the uptake of small scale generation

- ▶ Is the most administratively simple option
- ▶ Is identical to Option 1 and Option 2A in terms of consumption price signalling and therefore has similar merits from an economic efficiency perspective
- ▶ Would avoid price shocks to customers with small scale generation. By contrast, the export charge in Option 1, and the higher fixed and/or variable charge in Option 2A may give rise to price shocks for customers with small scale generation
- ▶ Has the lowest implementation cost
- ▶ Introduces a new tariff that could be varied over time if and as the needs arises, as the uptake of small scale generation increases and more is learnt about its impact on electricity networks. This is important as AA3 provides the only opportunity in the next five years to enable Western Power to introduce more appropriate tariffs for customers with small scale generation if required

However, Option 2 arguably introduces anomalies compared to Western Power's accepted cost recovery principles, which could ultimately result in the basis of those principles being undermined. These anomalies include that:

- ▶ It is not as cost reflective, because the tariff has no means of compensating for the reduction in network charges paid by individual small generation customers compared to those without small scale generation. As a result, the network charge paid by customers with small scale generation may not reflect the average cost of supply⁶, and this may result in some cross-subsidy. At present, however, analysis by Western Power indicates that the extent of cross-subsidisation is modest
- ▶ Over time it is possible that this approach might prove to be unsustainable (for example if the rapid uptake of small scale generation continues), because it would embed an ever increasing cost recovery problem. Stakeholders have indicated an alternative longer term solution to this potential problem, which is to introduce smart meters that would enable all customers to be charged for the use of their network in more direct proportion to their use of the network at peak times

As Western Power is proposing a broader review of all tariffs prior to AA4, these anomalies are considered acceptable for the present.

Therefore, on balance, it is considered appropriate that Option 2 be proposed for incorporation in AA3 because it provides the simplest and lowest cost means of implementing a bi-directional reference service and reference tariff, and it does not introduce substantial equity issues or disincentives to the uptake of small scale generation that are inconsistent with government policy.

It should be emphasised that the recommended commercial bi-directional Reference Services and Reference Tariffs are similar in structure and composition to the recommended residential bi-directional Reference Services and Reference Tariffs. This is for two reasons. First, this is to maintain consistency between residential and commercial options. Secondly, due to a lack of data for commercial customers there is no basis for an alternate approach.

Finally, it should be noted that the ERA will assess the merits of this proposal when it conducts its assessment of Western Power's AA3 submission against the requirements of the *Electricity Network Access Code* (2004). This will provide another opportunity for

⁶ As indicated in section 6, initial analysis has shown that, on average, the maximum demand for a customer with small scale generation is at least equal to the demand of a customer without small scale generation but the total imported electricity is reduced.

stakeholders to contribute views in respect of the merits of this proposed reference service and reference tariff.

2. Introduction

2.1 Glossary

| Term | Definition |
|---|--|
| Access Arrangement | As defined in the Electricity Networks Access Code 2004 |
| Accumulation Meter | As defined in the Electricity Industry Metering Code 2005 |
| AS 3000 | Australian Standard (Electrical Wiring) |
| AS 4777 | Australian Standard (Grid Connection of Energy Systems via Inverters) |
| CEEM | Centre for Energy and Environmental Markets |
| Connection Point | As defined in the Electricity Networks Access Code 2004 |
| CSO | Community Service Obligation |
| DNSP | Distribution Network Service Provider |
| DUoS | Distribution Use of Service |
| Embedded Generation (or Embedded Generating Unit) | As defined in the Western Power Technical Rules 2007 |
| ERA | Economic Regulation Authority |
| ENA | Energy Networks Association |
| Exported Electricity | Electricity generated by the customer that is surplus to the customer's requirements and is sent out to the network from the customer's connection point (i.e. net generation) |
| Feed-in Tariff | This is a premium tariff rate paid for typically renewably generated electricity that is fed back into the electricity grid. |
| GWh | Gigawatt Hour |
| HV Network | High Voltage Network |
| Imported Electricity | Electricity consumed by the customer that is drawn from the network from the customer's connection point |
| Interval Meter | As defined in the Electricity Industry Metering Code 2005 |
| kVA | Kilovolt Ampere |
| kVArh | Kilovolt Ampere Reactive Hours |
| kW | Kilowatt |
| kWh | Kilowatt Hour |
| LGP | Landfill Gas and Power |
| LV Network | Low Voltage Network |
| MBS/NetCIS | Western Power's internal billing IT system |
| MMA | McLennan Magasanik Associates |
| MRIM | Manual Read Interval Meter |
| MVA | Megavolt Amperes |
| MW | Megawatt |
| NEM | National Electricity Market |
| NUoS | Network Use of Service |
| PFIT | Premium Feed-in Tariff (Victoria) |
| PV | Photovoltaic |
| Reference Service | As defined in the Electricity Networks Access Code 2004 |
| Reference Tariff | As defined in the Electricity Networks Access Code 2004 |
| Register | Measures of information as stored by different types of metering |
| RT12 | The recommended option from the review in 2009 |
| REBS | Renewable Energy Buyback Scheme |
| SEA | Sustainable Energy Association of Australia |
| SFIT | Standard Feed-in Tariff (Victoria) |
| SmartPower Meter | As defined by Synergy's website |
| SWIN | South West Interconnected Network |
| Technical Rules | Western Power Technical Rules 2007 |
| ToU | Time of Use |
| TUoS | Transmission Use of Service |

| Term | Definition |
|----------------------------|---|
| WA Electrical Requirements | Western Australia Electrical Rules 2008 |

2.2 Background

Previous work undertaken for Western Power in 2009 considered defining a Reference Service and Reference Tariff for residential distribution users with bi-directional energy flows due to small scale embedded generation. This arrangement was prepared in order to be included in Western Power's previous Access Arrangement. In particular, this involved consideration of:

- ▶ The then-current arrangements in Western Australia for bi-directional supply
- ▶ The requirements of the *Electricity Networks Access Code 2004*
- ▶ Western Power's Technical Rules
- ▶ The current Reference Services and feed-in-tariffs on offer in the SWIN (primarily the REBS currently offered by retailer Synergy)
- ▶ Western Power's proposed Access Arrangement
- ▶ Synergy's submission to the ERA regarding Western Power's Reference Services
- ▶ The requirements of the ERA's required draft decision amendment
- ▶ The likely impact on the REBS
- ▶ Western Power's current bi-directional services

This previous work focussed on the strong benefits associated with the creation of the new tariff, specifically to have regard for the perceived increased costs to Western Power from embedded generation, the reductions in revenue generated from customers using roof-top PV and the lack of effective price signalling in conventional network tariffs. It recommended the implementation of a new bi-directional time-of-use tariff.

Whilst accepted by ERA as part of Western Power's second Access Arrangement period, issues raised by stakeholders halted the implementation of the new tariff. Subsequently, Western Power has sought to review the existing Bi-directional Reference Service and Reference Tariff (RT12) and establish a new, separate Bi-directional Reference Service and Reference Tariff for commercial customers.

2.3 Existing situation

In 2010, Western Power received in excess of 20,000 applications for the installation of PV systems, taking the total number of residential properties with PV to in excess of 37,000. Currently, Western Power is receiving between 2,000 and 3,000 applications for the installation of PV systems per month.

At this rate of growth, the number of residential properties in the SWIN with PV systems could be between 160,000 and 280,000 by 2017. This growth would result in an installed capacity of between 466MW and 973MW, which is expected to cause significant operational and technical issues in the SWIN, both at a network level and at a generation level. This growth will occur throughout the third access arrangement period, which commences on 1 July 2012 and finishes on 30 June 2017.

While there have been a number of adjustments to feed-in tariffs in recent times designed to reduce the rate of take-up of PV systems (as well as considerable criticisms on the cost effectiveness of programs to promote the use of PV systems)⁷, there is evidence to suggest that, primarily due to the global activity in this area, the costs of PV are reducing and

⁷ Australian Financial Review, 'WA regulator savages power subsidy 'welfare'', 20 April 2011, page 11

closing in on grid parity.⁸ As such the adjustments to the feed-in tariffs may not significantly affect the uptake of PV systems.

Consequently, the Reference Services and Reference Tariffs for customers with small scale generation must cover the entire AA3 period from 1 July 2012 to 30 June 2017, with the implementation of these services expected to occur by 1 January 2013.

2.4 Existing Bi-directional Reference Service

Western Power's current Bi-directional Reference Service for customers with small scale generation is called "Reference Service C1 - Time of Use (Residential) - Bi-directional Service". This Reference Service was approved by the ERA as part of the second Access Arrangement, however due to concerns raised by stakeholders, this service was never implemented.

The definition of the Bi-directional Reference is set out in the table below:

| | |
|---|---|
| Reference Service Description: | A <i>bi-directional service</i> combined with a <i>connection service</i> and a standard meter service at a <i>bi-directional point</i> on the low voltage (415 volts or less) <i>distribution system</i> |
| Technical Eligibility Criteria: | Users are eligible to use this service if: The <i>bi-directional point</i> is located at a residential premise with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three phase connections The consumer's inverter system must comply with the requirements of AS 4777 and the Technical Rules The <i>consumer's facilities and equipment</i> comply with the Technical Rules, the WA Electrical Requirements and AS 3000 |
| Metering Criteria: | Installation at the bi-directional point of an interval meter supplied or provided by Western Power having capability for import and export channels and five register information collection |
| Applicable Reference Tariff: | The applicable Reference Tariff is RT12 (a new time of use tariff) |
| Applicable Standard Access Contract: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

Western Power considered that this Bi-directional Reference Service:

- ▶ Resulted in a stronger relationship between usage and cost than the other Reference Tariffs at the time
- ▶ Was likely to reduce cross subsidisation of embedded generators by consumers without generators
- ▶ Imposed no undue administrative burden, with no change to existing practices in the approval of the connection application was required, nor changes to metering and meter data collection processes
- ▶ Had limited impact on barriers to entry given that no metering changes were required outside of existing practices, although there was a reduced financial incentive to install embedded generators

⁸ Australian Financial Review, 'Sun shines on solar industry', 11 April 2011, page 53

2.5 Existing Bi-directional Reference Tariff

The existing Reference Tariff associated with the Bi-directional Reference Service that was approved by the Economic Regulation Authority (ERA) is a time of use tariff (RT12) that consists of:

- ▶ A fixed use of system charge which is payable each day
- ▶ An on-peak use of system variable charge calculated by multiplying the on-peak energy price by the quantity of on-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ An off-peak use of system variable charge calculated by multiplying the off-peak energy price by the quantity of off-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ A fixed metering charge which is payable each day
- ▶ An on-peak variable metering charge calculated by multiplying the on-peak variable price by the quantity of on-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ An off-peak variable metering charge calculated by multiplying the off-peak variable price by the quantity of off-peak electricity imported at the bi-directional point (expressed in kWh)
- ▶ The time periods for the shoulder, peak and off-peak periods are defined as follows:
 - ▶ Off-peak is from 10pm to 7am everyday
 - ▶ Shoulder is from 7am to 2pm and 8pm to 10pm during working weekdays and from 7am to 10pm on weekends and public holidays
 - ▶ On-peak is from 2pm to 8pm on working weekdays

The existing Reference Tariff was developed on the assumption that a customer on the RT12 tariff would import less electricity from the network than a non-exporting customer, as a result of the small scale generator supplying some of the customer's load. Under this assumption, a customer with small scale generation installed would pay less in network charges than a customer without small scale generation, even though both customers have the same peak demand on the network. Consequently, the tariff was designed such that a customer with small scale generation installed would pay more for the energy used during the peak period than a customer without an embedded generator installed, on the basis that peak demand would remain unchanged, to compensate for the reduction in the network charges recovered from those customers.

2.6 Justification for the need to review the existing Bi-directional Reference Service and Reference Tariff

Despite having been approved by the ERA for implementation during Western Power's second Access Arrangement, Western Power has sought to re-examine the existing Bi-directional Reference Service and Reference Tariff (RT12) in light of a range of issues raised by key stakeholders. The issues, which are set out in detail in the following chapter, include:

- ▶ The need to alter existing metering arrangements
- ▶ The extent of the additional implementation and transaction costs and who should pay for these costs
- ▶ That the Bi-directional Reference Service and Reference Tariff may be perceived to be contrary to Western Australian Government policy position on PV generation, particularly as it may act as a disincentive to customers to take up PV
- ▶ The Reference Tariff is inconsistent with the national preference for flat tariff arrangements

- ▶ The need for a Bi-directional Reference Service and Reference Tariff for commercial customers

Whilst Western Power maintains that the existing RT12 tariff structure represents the most economically efficient outcome for residential customers with small scale generation connected to the network via a Bi-directional point, it recognises the need to have greater regard for the issues raised by stakeholders, the practical issues associated with the implementation of the Reference Tariff as well as regard for precedent in other Australian jurisdictions.

As such, a range of Options have been considered with a view to establishing an alternative Bi-directional Reference Service and Reference Tariff for residential customers that is both economically efficient and addresses stakeholders' concerns. Further, a range of Options have also been considered with a view to establishing a new Bi-directional Reference Service and Reference Tariff for commercial customers that is both economically efficient and addresses stakeholders' concerns. These Options for residential and commercial customers with small scale generation are set out in detail in section 7 of this report.

2.7 Purpose and Structure of this Report

Ernst & Young was engaged by Western Power to assist in the defining of Reference Services and developing associated Reference Tariffs for bi-directional energy flows for small scale generation (up to 10kVA per phase for residential and up to a total of 1 MVA for commercial).

In accordance with the scope defined in Western Power's request for tender, this report documents a process that Western Power has undertaken with the assistance of Ernst & Young. Consistent with the previous review in 2009, each Option for the Reference Tariff to apply at the residential and commercial customer's bi-directional point has been assessed against particular criteria and via a two stage consultation process as requested by Western Power.

Consultation Process

First Consultation Process

To inform the development of the Options and their subsequent evaluation, Western Power and Ernst & Young consulted widely with a number of key stakeholders to determine the outstanding concerns and issues with the existing Bi-directional Reference Service and Reference Tariff, in addition to any considerations required for new tariffs. Primary issues raised during the first consultation process in April 2011 included:

- ▶ The difficulties and costs involved in altering existing metering arrangements
- ▶ The extent of the additional implementation and transaction costs and who should pay for these costs
- ▶ That the Bi-directional Reference Service and Reference Tariff may be perceived to be contrary to Western Australian Government policy position on PV generation, particularly as it may act as a disincentive to customers to take up PV
- ▶ RT12 may be inconsistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments, whereby the "assignment of tariffs to small renewable consumers should be on the basis that they are treated no less favourably than customers without small renewable but with a similar load on the network". However, this definition appear to focus on demand, rather than energy consumption, which would mean that RT12 is consistent with the National Principles
- ▶ The need for a Bi-directional Reference Service and Reference Tariff for commercial customers

Second (Formal) Consultation Process

Following the release of the draft report, Western Power and Ernst & Young conducted a formal consultation process which involved meeting with stakeholders in May 2011 and inviting formal written submissions. Stakeholders consulted were strongly of the view that Option 1 (incorporating a volumetric export charge) may introduce significant disincentives to the uptake of small scale generation and raise significant equity issues, with most stakeholders indicating a preference for Option 2 (the current default situation).

The specific issues raised by stakeholders during the formal consultation process are set out in Chapter 4 of this report.

Report Structure

This report sets out the following:

- ▶ The results of the initial and second stakeholder consultation process (sections 3 and 4)
- ▶ A review of the practices in other jurisdictions of the network service and network tariff structure for distribution users with bi-directional energy flows due to small scale embedded generation (section 5)
- ▶ An assessment of Western Power's capability to deliver Reference Services to distribution network users with bi-directional energy flows due to small scale embedded generation, having regard for:
 - ▶ Western Power's metering capabilities (as per Assessment Criteria 6 in section 8)
 - ▶ Compliance issues against technical rules as set out in the *Electricity Networks Access Code 2004* and the *Electricity Industry Metering Code 2005*, and any other relevant legislation (as per Assessment Criteria 12 in section 8)
 - ▶ Western Power's data sources, billing systems and tariff modelling capabilities (as per Assessment Criteria 8 in section 8)
- ▶ A financial analysis of any proposed change to accommodate the Reference Service tariff (section 9.3 and section 10.3)
- ▶ The identification of Options for a residential and non-residential service, having regard for other jurisdictional arrangements (section 7)
- ▶ Recommendations for action to be undertaken by Western Power to implement the proposed Reference Services. The recommendations include a detailed description of the Options available, and rationale underpinning the preferred Option (per section 9 and 10)

3. Issues raised in First-Round Consultations on Existing Bi-directional Reference Service and Reference Tariff

3.1 Purpose of this section

The purpose of this section is to present the issues raised by stakeholders as part of the first round of the consultation process in April 2011, and categorise these issues into six key categories.

Specifically:

- ▶ Section 3.2 sets out an overview of the consultation process, the stakeholders consulted and the six issue categories
- ▶ Section 3.3 sets out the issues raised by Western Power's internal business units, and categorises each issue into the six issue categories identified in section 3.2
- ▶ Section 3.4 sets out the issues raised by Synergy and other organisations consulted, and categorises each issue into the six issue categories identified in section 3.2
- ▶ Section 3.5 sets out the issues raised by the Western Australian Office of Energy, and categorises each issue into the six issue categories identified in section 3.2

3.2 Overview of consultation process

As part of the stakeholder consultation process, Western Power and Ernst & Young consulted widely with a number of key stakeholders to determine the outstanding concerns and issues with the existing Bi-directional Reference Service and Reference Tariff. The external stakeholders who participated in the consultation process include:

- ▶ The Western Australian Office of Energy
- ▶ Synergy
- ▶ Perth Energy
- ▶ Alinta
- ▶ Landfill Gas and Power
- ▶ SunPower

In general, the issues raised by stakeholders in relation to the existing RT12 Reference Tariff were:

- ▶ Metering Issues
- ▶ Meter Data Issues
- ▶ Billing and IT System Issues
- ▶ Transactional Costs Issues
- ▶ Tariff Design Issues
- ▶ Equity Issues

A detailed description of each of the issues raised by each stakeholder is set out below. Further, each issue is categorised as per the six categories listed above. Appropriate commentary is provided wherever an issue does not align with the categories above, or has been resolved prior to the development of the Options set out in section 7.

3.3 Issues raised internally within Western Power

Most of the issues raised in discussions with Western Power’s internal business unit related to the design of the existing RT12 Reference Tariff, meter replacement and reprogramming issues, meter data issues and outstanding changes required to the billing and IT systems to implement the bi-directional Reference Tariff. The main issues raised by Western Power’s internal business units are set out in the table below, and are categorised according to the six issue categories identified in section 3.2:

| Issue Number | Issue | Issue Category |
|--------------|---|--|
| 1 | Substantial changes to MBS/NetCis are required to allow collection of interval meter data. This will involve seeking funding to implement these changes. Further, Western Power will require a minimum of 6 months to test the changes across its systems before "go-live" | Billing and IT System Issue and Meter Data Issue |
| 2 | Western Power’s other tariffs do not have a shoulder period and the RT12 time bands for peak and off-peak do not align with existing time of use tariffs | Tariff Design Issue |
| 3 | SmartPower meters are accumulation meters programmed with time bands which need to align with retail tariff time bands to be effective | Tariff Design Issue |
| 4 | There may be a need to develop an average kW per consumer figure for residential and commercial customers to enable the capacity limits to be checked for compliance purposes. This is because demand cannot be measured for these customers by the existing meter arrangements | Tariff Design Issue and Metering Issue |
| 5 | New definitions based on ENA for embedded systems include systems of up to 1 MW in capacity. Unclear as to whether this should be adopted or not | The commercial bi-directional Reference Tariff will align with the ENA definition for commercial customers |
| 6 | A Reference Service is required for non-residential customers with small scale generation. To date, connection agreements have been signed allowing connection of system but prohibiting export. | This issue will be resolved through the introduction of the commercial bi-directional Reference Tariff |
| 8 | Rather than implement a new RT12 tariff (and an equivalent commercial tariff), an alternative could be to consider re-defining the existing entry and exit services to encompass bi-directional flows | This was not investigated further, as the RT12 Reference Tariff already exists |
| 9 | Alternative Options must consider whether Western Power requires influence over retailer/customer behaviour through price signals, that is whether Time of Use tariffs are required | Tariff Design Issue |

3.4 Issues raised by Synergy and other consulted parties

Most of the issues raised in discussions with Synergy and other consulted parties were related to the design of the existing RT12 Reference Tariff, the cost associated with meter replacement and reprogramming and transactional costs, meter data issues and outstanding changes required to the billing and IT systems to implement the bi-directional Reference Tariff. The main issues raised by these parties are set out in the table below, and are categorised according to the six issue categories identified in section 3.2:

| Issue Number | Issue | Issue Category |
|--------------|--|--|
| 1 | Substantial changes to billing/data systems would be required to allow collection of interval meter data | Billing and IT System Issue |
| 2 | It will take 6-8 months to implement the necessary systems changes to deal with the expected volume of interval data given the expected uptake of PV, although all metering and interval data issues were considered resolvable | Meter Data Issue |
| 3 | The price for meter changeover/reprogramming of 15,000 meters (as at 2009) is expected to be in the order of \$1M (mandated if RT12 implemented) | Metering Issue |
| 4 | RT12 does not align with any of the current retail tariffs | Tariff Design Issue |
| 5 | The potential exists for price shocks as a result of the RT12 and the equivalent commercial tariff | Equity Issue |
| 6 | Need to consider the flow-on costs in the supply chain of implementing RT12 and the equivalent commercial tariff | Transactional Costs Issue |
| 7 | It was considered that the reduced financial incentive for PV systems would negatively impact PV take-up | Equity Issue |
| 8 | Interval data issues were raised, particularly with regard to missing data. Thus, it was suggested unwise to roll out a Reference Service that is more dependent on interval meters until such time as these issues are resolved | Meter Data Issue |
| 9 | There will be additional costs that arise from the implementation of the RT12 and the equivalent commercial tariff. For residential customers, these will need to be either passed on to customers through the tariff or made up for by additional CSO payments from the government. Neither option is desirable | Transactional Costs Issue |
| 10 | Clarification was required as to whether the Reference Service also applies to customers with battery storage | Reference Service definition will include reference to customers with battery storage |
| 11 | There was a perceived need to set out the eligibility for commercial Reference Service, having regard for metering requirements, technical rule requirements and connection voltages etc | This issue will be resolved through the introduction of the commercial bi-directional Reference Tariff |
| 12 | Due to liability issues for PV systems, a non-Reference Service was not favoured. | This issue will be resolved through the introduction of the commercial bi-directional Reference Tariff |
| 13 | There are a number of contestable customers that are currently on regulated retail tariffs (this can occur for any customer consuming between 50-160MWh per annum). Consideration needs to be given to this segment of commercial customers when designing the commercial Reference Tariff | Tariff Design Issue |
| 14 | It was noted that they were experiencing significant demand for PV systems of a capacity greater than 30kVA | This issue will be resolved through |

| Issue Number | Issue | Issue Category |
|--------------|-------|--|
| | | the introduction of the commercial bi-directional Reference Tariff |

3.5 Issues raised by the Office of Energy

Most of the issues raised in discussions with the Office of Energy were related to the design of the existing RT12 Reference Tariff, the cost associated with meter replacement and reprogramming and transactional costs, equity issues relating to the costs borne by customers and the need to apply a different tariff structure to customers with PV generation and policy concerns. The main issues raised by the Office of Energy are set out in the table below, and are categorised according to the six issue categories identified in section 3.2:

| Issue Number | Issue | Issue Category |
|--------------|--|---------------------------------|
| 1 | RT-12 would require the replacement or reprogramming of all households with RE systems | Metering Issue |
| 2 | The metering code specifies 30 minute intervals. However, it is understood that Western Power has been using 15 minute intervals for systems installed prior to 1 July 2010. It is understood that this is the reason why the meters need re-programming | Metering Issue |
| 3 | The Office of Energy is cautious about a charge for customers to replace or reprogram meters | Metering Issue |
| 4 | Reprogramming has the same \$66 fee irrespective of whether Western Power has to visit the premises or do a 'desktop' reprogram. If charges are passed through to the customer, this pricing would appear unreasonable | Metering Issue and Equity Issue |
| 5 | When Synergy creates a 'service order request' for the replacement or reprogramming of a meter this automatically charges the customer. This problem would need to be overcome if it is determined that the customer would not pay for meter replacement/ reprogramming | Metering Issue |
| 6 | The Office of Energy considered that, in its initial work on RT12, Western Power did not adequately justify its position that it was under-recovering from households with PV. For instance, Western Power did not show that the amount of energy purchased from Synergy was, on average, any different for households with PV systems compared to non-PV households. | Tariff Design Issue |
| 7 | Assuming PV households do, on average, purchase less energy, Western Power should show why it is that these households must make the same absolute contribution as non-PV households to network cost recovery. The argument that such households make the same contribution to peak demand and hence growth, appears to consider only part of the basis on which all customers are currently charged for network usage | Tariff Design Issue |
| 8 | The Office of Energy suggested that Western Power should be explicit about the principles it will apply in determining what is a fair and reasonable contribution to network costs. Then the quantitative methods identified by Western Power for calculating a fair contribution should reflect those principles | Equity Issue |
| 9 | Ideally, Western Power would consider several approaches to assessing the absolute contribution PV households should make to network costs. RT12 currently reflects one approach. Further approaches may warrant consideration | Tariff Design Issue |
| 10 | Two consultancies (MMA and CEEM) concluded there were network benefits associated with PV installation. Any network benefits should be | Tariff Design Issue |

| Issue Number | Issue | Issue Category |
|--------------|---|---------------------|
| | recognised in the RT12 rate | |
| 11 | Western Power has formed the view that the cost of supplying customers who have a PV system is the same as the cost of supply for customers without. However, it is conceivable that owners of PV systems are more aware of their energy use than others and may actually have a lower peak contribution than non PV households. Further analysis should be provided to empirically determine the average PV-household's contribution to peak demand (transmission and distribution) | Tariff Design Issue |
| 12 | It is understood that no analysis has been conducted on what impacts exist for customers in different classes (i.e. low socio-economic; pensioners; high energy users; low energy users). This analysis should be undertaken to assess and understand the full impact of the tariff | Tariff Design Issue |
| 13 | It is understood that the rates were determined using only one data set. The Office of Energy noted a preference for the analysis to be underpinned by multiple data sets to ensure the analysis is defensible | Tariff Design Issue |
| 14 | RT12 creates a Time of Use tariff: It is understood that Synergy cannot pass through the Time of Use component of the tariff due to severe complications in billing. Given this, there is little benefit from a Time of Use tariff if the signal cannot be passed through The Government has a uniform tariff policy. Forcing customers onto a non-uniform tariff may be problematic. Western Power were requested to advise on whether they had consulted with the Minister for Energy | Tariff Design Issue |
| 15 | There may be implications for the tariff review work being undertaken by the Office of Energy. The concern is that implementation of a Time of Use tariff under RT12 could limit Options available for consideration. | Tariff Design Issue |
| 16 | The National Principles for Feed-in Tariff Schemes, agreed by COAG in 2008 state that customers with small scale PV should not be treated any less favourably than customers without small scale PV but with a similar load on the network (where load can be defined as demand or energy). This may or may not be relevant in considering the imposition of additional charges, depending on the interpretation of the national principles | Equity Issue |
| 17 | Cross subsidies exist both within the SWIN and between the SWIN and HV networks. There may be a cross subsidy that exists between PV and non-PV owners, however, it is not clear that this cross-subsidy requires particular attention | Tariff Design Issue |
| 18 | The Government supports the installation of renewable energy systems through the Western Australian feed-in tariff and other policies. The imposition of a new tariff which increases costs for customer's load in comparison to an average customer without PV customers with such systems could be seen as contrary to the Government's position on this matter | Equity Issue |

4. Issues raised in Second-Round Consultations on Existing Bi-directional Reference Service and Reference Tariff

4.1 Purpose of this section

The purpose of this section is to present the issues raised by stakeholders as part of the second and formal round of the consultation process in May 2011. This section includes stakeholder comments from the consultation and also written submissions regarding the draft report.

Specifically:

- ▶ Section 4.2 sets out an overview of the consultation process, the stakeholders consulted and the three issue categories identified
- ▶ Section 4.3- 4.5 sets out the issues raised by stakeholders and categorises each issue into the three issue categories identified in section 3.2

Refer to section 7 for a description of the Options.

4.2 Overview of consultation process

Following the release of the draft report on Bi-directional Reference Services and Associated Tariffs for Residential and Commercial Users⁹, a second round of consultations was conducted by Western Power and Ernst & Young with the following stakeholders:

- ▶ The Western Australian Office of Energy
- ▶ Synergy
- ▶ Perth Energy
- ▶ Alinta
- ▶ Landfill Gas and Power
- ▶ SunPower
- ▶ Sustainable Energy Association

Stakeholders were also invited to prepare written submissions further detailing their views and concerns with respect to the proposed tariff structures.

In general, the issues raised by stakeholders in relation to the draft version of this report were:

- ▶ Tariff design issues
- ▶ Report drafting issues
- ▶ Equity issues

⁹ Western Power, Bi-directional Reference Services and Associated Tariffs for Residential and Commercial Users, Draft Report, 6 May 2011.

In summary, the comments made by stakeholders in relation to the draft version of this report were that they:

- ▶ Did not support the draft recommendation that Option 1 (incorporating a volumetric export charge) be proposed for incorporation in Western Power’s AA3 submission
- ▶ Did not consider the export charge in Option 1 to be appropriate at the current time
- ▶ Considered that Option 2 (the current default situation) in the draft report was the most suitable Option
- ▶ Considered the draft report to contain some issues as to its drafting

A description of each of the issues raised by each stakeholder is set out below.

4.3 Issues raised by Synergy

Synergy provided a Commercial-in-Confidence submission with respect to the proposed tariff structures. As such, the detail of that submission is not set out in this report, however a broad summary of the issues raised by Synergy are set out in the table below, and are categorised according to the six issue categories identified in section 3.2:

| Issue Number | Issue | Issue Category |
|--------------|--|---------------------|
| 1 | Synergy offered support for Option 2 as proposed in the Draft Report | Tariff Design Issue |
| 2 | Issues were raised with respect to the possible application of the export charge applied in Option 1 | Tariff Design Issue |

Western Power has further consulted with Synergy regarding all issues raised.

4.4 Issues raised by the Office of Energy

Most of the issues raised in discussions with the Office of Energy were related to the design of the existing RT12 Reference Tariff, the cost associated with meter replacement and reprogramming and transactional costs, equity issues relating to the costs borne by customers and the need to apply a different tariff structure to customers with PV generation and policy concerns. The Office of Energy indicated that its preference was for Option 2.

The main issues raised by the Office of Energy are set out in the table below, and are categorised according to the six issue categories identified in section 3.2:

| Issue Number | Issue | Issue Category |
|--------------|--|-----------------------|
| 1 | Queried whether statistical tests had been conducted on the difference between customers with and without small scale generation in relation to peak demand and consumption | Report Drafting Issue |
| 2 | Noted that the report did not set out what components of Western Power’s costs relate to system peak | Report Drafting Issue |
| 3 | Noted that the report did not clearly articulate how the evaluation criteria were prioritised | Report Drafting Issue |
| 4 | Requested that the metering requirements be clarified in the reference service description for each Option. Where a customer already has an interval meter, or if the customer’s is required to have interval metering under existing metering code provisions, then an accumulation meter is not available to these customers | Report Drafting Issue |

A response to each of these issues is contained within this report.

4.5 Issues raised by the SEA

While the SEA welcomed the introduction of a commercial bi-directional reference tariff, it noted that its preference was for a time of use reference tariff in combination with a gross feed-in tariff, stating that the current net feed-in tariff arrangement is exacerbating the peak demand issues being experienced by Western Power.

The main issues raised by the SEA are set out in the table below, and are categorised according to the six issue categories identified in section 3.2:

| Issue Number | Issue | Issue Category |
|--------------|--|---------------------|
| 1 | SEA did not consider Option 3 (demand based tariff), 4 (existing RT12 tariff) or 5 (RT12 modified for register data) as appropriate for consideration | Tariff Design Issue |
| 2 | Option 1 (existing Reference Tariff with a flat volumetric export charge) was considered to create a disincentive for take-up of the FiT and REBS as the export charge of \$0.07 per kW/h nullifies the impact of the \$0.07 per kW/ REBS. | Tariff Design Issue |
| 3 | SEA considered that the operation of the FiT as a net energy export scheme provided little incentive to reduce peak consumption due to a lack of ToU price signalling during peak periods. It was suggested that ToU price signals be conveyed in real time in order to more readily influence customer behaviour. Further to this, it was suggested that this approach would offer a price support mechanism for other peak load offsetting measures such as energy storage installations | Tariff Design Issue |
| 4 | SEA suggested that alternatively a low gross FiT could be applied at a small margin over the retail price, applying a time of use tariff. This would be funded from a component of NUoS charges. | Tariff Design Issue |
| 5 | Strong support for the introduction of a bi-directional commercial sector reference tariff was indicated, where it allowed SMEs/Public Organisations to connect and export to the grid easily, and without significant additional costs being incurred to prevent export | Equity Issue |
| 6 | The proposed scope of the commercial Reference Tariff (up to a total of 1MVA generation capacity) was supported. However, it was noted that an issue ancillary to Reference Services and Reference Tariffs, specifically the high cost of connection to the network for installations of above 30KVA, was considered as a strong disincentive for take-up rates of solar PV. | Tariff Design Issue |

SEA also raised a number of report drafting issues which have since been rectified in this report.

4.6 Issues raised by Alinta

Alinta’s primary concern was that the Draft EY report supported the introduction of Option 2, which in Alinta’s opinion, allowed for the non-transparent cross subsidy of consumers with PV systems by those without. Alinta further suggested that the basis for the assumption of equivalence between the residential and commercial versions of the Option 2 approach were unclear.

A summary of all issues raised by the Alinta are set out in the table below, and are categorised according to the six issue categories identified in section 3.2

| Issue Number | Issue | Issue Category |
|--------------|---|-------------------------------------|
| 1 | Alinta suggested that Option 2 results in non-transparent cross subsidy of consumers with PV systems by those without. | Tariff Design Issue |
| 2 | It was considered that the result of this cross subsidy would be to impose non-reflective NUoS charges upon customers with solar PV and customers without solar PV. | Equity Issue |
| 3 | Given growth projections for solar PV take-up, the extent of the cross-subsidisation was perceived to be increasing | Equity Issue |
| 4 | The recommended option was not perceived to be consistent with the stated objectives of Chapter 7 of the <i>Electricity Networks Access Code 2004</i> . In particular, clause 7.3(a) requires that reference tariffs recover forward looking efficient costs of providing reference services. | Tariff Design Issue |
| 5 | EY's assumption that Option 2 would avoid price shocks to residential customers with PV systems was suggested as only applicable where network users passed through changes to any distribution network reference tariffs, including those under options 1 and 2A. This assumption was challenged on the grounds that the ERA does not separately regulate pass-through of network charges by Retailers, and thus it was unclear whether any additional charges could be passed on to residential customers | Tariff Design Issue |
| 6 | To the extent that retailers could not recover costs incurred in respect of customers with PV systems, Alinta suggested a transparent CSO payment be made. This was suggested to be in conformance with government policies encouraging uptake of small scale generation | Tariff Design Issue |
| 7 | Alinta raised the concern that there was little in depth analysis of peak demand of non-residential customers with and without PV systems and that this undermined the assumption that the application of the recommended Option 2 across both types of customer would be equivocal. | Equity Issue, Report Drafting Issue |

In response to issues 1, 2 and 3, the introduction of separate tariffs will enable variation to prices in the future if the perceived cross-subsidies become material.

Regarding issue 4, Western Power is of the view that clause 7.3 (a) of the Code relates to the result of all tariffs (as opposed to each particular tariff). Section 7.3 (a) of the Code requires that the pricing methods in an access arrangement must have the objectives that:

reference tariffs recover the forward-looking efficient costs of providing reference services

Western Power's view is that, as the sum of all tariffs recover efficient forward-looking costs, this requirement is met. In particular, the reference to "reference tariffs" (as opposed to "each reference tariff") in clause 7.3 (a) would seem to indicate this is the intent of the clause.

In response to issues 5 and 6, Western Power has been advised by Synergy that they have the ability to pass through costs as stipulated in the Renewable Energy Buyback Schemes terms and conditions which are approved by the state government. Therefore the issue of price shocks must be considered. Also, while the suggestion in issue 6 has merit, it is outside the scope of the review.

Finally, in response to issue 7, as there are few non-residential customers with PV, analysis is not possible. As such, consistency for non-residential customers with and

without PV is seen to be appropriate, and there is no basis for an alternate approach at this stage.

4.7 Issues raised by LGP

LGP did not raise any issues in relation to the recommended option in the EY draft report and offered support for the conclusion that Option 2 be implemented.

Whilst LGP noted that Option 2 may not be cost reflective, it supported Option 2 on the basis that it is simple, does not result in price shocks and is consistent with government policies encouraging uptake of small scale generation.

5. Jurisdictional Precedent

5.1 Purpose of this section

The purpose of this section is to examine the precedent across Australia for establishing Bi-directional Reference Services and Reference Tariffs for residential and commercial customers with small scale generation.

Specifically:

- ▶ Section 5.2 provides an overview of the review undertaken for each Distribution Network Service Provider (DNSP) within each Australian jurisdiction
- ▶ Section 5.3 discusses the findings of the review for the DNSP within Australian state and territory separately
- ▶ Section 5.4 sets out a summary of the findings based on the review detailed in section 5.3

5.2 Background to the review

In order to inform the process of developing new Residential and Commercial bi-directional tariffs and reviewing the existing RT12 tariff, consideration was given to the tariff arrangements applicable to customers with small scale embedded generators in other Australian jurisdictions. Specifically, a review was conducted of the tariff arrangements of the following DNSPs:

- ▶ Energex
- ▶ Ergon Energy
- ▶ ETSA Utilities
- ▶ Jemena/United Energy
- ▶ Citipower/Powercor
- ▶ SP Ausnet
- ▶ Actew AGL
- ▶ Essential Energy
- ▶ Ausgrid
- ▶ Endeavour Energy
- ▶ Aurora Energy
- ▶ Power and Water Corporation

The following sections set out a summary of the findings for the DNSPs in each jurisdiction, covering the applicable service, its corresponding tariff, metering requirements and technical eligibility criteria. Detailed findings are attached in the matrix in Appendix B.

5.3 Findings

5.3.1 General Observations

In reviewing the precedent for tariff arrangements applicable to customers with small scale embedded generators in other Australian jurisdictions, it emerged that most DNSP have not yet moved to offering a specific Reference Tariff for customers with small scale generation. This may be due to a number of possible factors, including:

- ▶ The broad-scale uptake of small scale generation at a residential level is a comparatively recent development in the electricity supply industry, and DNSPs have not yet invested significant time in developing specific tariffs for these customers
- ▶ There are still comparatively few customers with small scale generation systems installed and connected to the network, although uptake of small scale generation is rapidly increasing. As such, the transaction costs associated with establishing specific Reference Tariffs for customers with small scale generation may be considered to outweigh the benefits of establishing these tariffs
- ▶ There is currently limited historical data available to analyse customer consumption and demand profiles for the purpose of developing specific tariffs for customers with small scale generation, particularly when compared to the data available on the consumption and demand profiles of customers without small scale generation
- ▶ The requirement for a bi-directional service is not the same in Western Australia due to the access regime

This chapter does not attempt to establish or confirm the reasons why specific Reference Tariffs have not been more widely established in other jurisdictions. Rather, the following sections set out the current tariff arrangements being offered by DNSPs in each jurisdiction at the time of writing this report.

5.3.2 Queensland

5.3.2.1 *ENERGEX and Ergon Energy*

Queensland operates under a net feed-in tariff arrangement whereby the customer is paid 44 cents for every kWh of electricity sent out to the network. This amount is deducted from the customer's energy bill, or where electricity exported to the network exceeds electricity imported from the network, refunded to the customer or retained as an ongoing credit.

The two Queensland DNSPs do not provide a specific bi-directional Reference Service and hence there is no specific bi-directional Reference Tariff. Where a customer has small scale generation installed, the same standard network tariffs apply as if there was no generation installed. There is no charge paid by the customer for electricity sent out to the network, and the customer is not refunded for avoided Transmission Use of System (TUoS) charges.

5.3.3 South Australia

5.3.3.1 *ETSA Utilities*

South Australia operates under a net feed-in tariff arrangement whereby the customer is paid 44 cents for every kWh of electricity sent out to the network. However, on 10 June 2011, the *Electricity (Miscellaneous) Amendment Bill 2011* was tabled in the South Australian Parliament, which will increase the feed in tariff rate to 54 cents for the first 45 kWh of electricity sent out to the network per day. The amended scheme will limit customers to one generator per customer and will be closed to new entrants after 1 October 2011.

Similar to Queensland, South Australia does not provide for a separate and specific Reference Service and Reference Tariff for customers with small scale generation connected to the network via bi-directional point. As in Queensland, the same standard network tariffs apply as if there was no generation installed, and there is no charge paid by the customer for electricity sent out to the network.

5.3.4 Victoria

5.3.4.1 *Jemena and United Energy*

In Victoria, there are two feed-in tariff arrangements currently in operation, being the SFIT arrangement and the PFIT arrangement. These feed-in tariff schemes were introduced by the Victorian State Government on 1 November 2009 for customers with net metered PV power systems. The PFIT is a net feed-in tariff that amounts to 60 cents for every kWh of electricity sent out to the network, where a commercial or residential customer has installed an embedded generator of up to 5 kW in capacity. By comparison, the SFIT is a net feed-in tariff whereby the customer is paid the same rate for electricity sent out to the network that the customer is charged for electricity imported from the network.

Jemena and United Energy both provide residential and commercial customers on the PFIT with a choice of distribution tariffs that incorporate bi-directional flows of energy. All customers on the SFIT are charged the same standard network charges for electricity imported from the network as customers without small scale generation. For customers on the SFIT and PFIT, there is no charge paid by the customer for electricity sent out to the network. The cost of network and administration costs incurred in the provision of the PFIT scheme is recovered from all customers through higher network charges.

In the case of Jemena, the network tariffs for electricity imported from the network by customers on the SFIT or PFIT are structurally the same as the corresponding tariffs that would apply if the customer did not have small scale generation. However, the primary difference is that the name of the network tariffs that applies to customers with small scale generation is different to distinguish those customers from other customers without small scale generation. Further, all customers (residential and commercial) are required to install interval meters in order to access the SFIT or the PFIT. As a result, only the appropriate residential or commercial network time of use tariffs are offered to customers with small scale generation.

United Energy has taken a similar approach to Jemena in that renamed versions of the standard network tariffs, which are identical in structure to the network tariffs paid by customers without small scale generation, are applied to customers with small scale generation on the PFIT. However, for residential customers, the standard small low voltage flat rate tariff (FLVS1R with allowance for PFIT) is available. Commercial customers default to the standard medium low voltage flat rate tariff (FLVM1R with allowance for PFIT). Both residential and commercial customers may select a Time of Day tariff (TOD with PFIT) or for usage over 20MWh per annum, a Time of Use tariff (TOU with PFIT) is available.

5.3.4.2 *Citipower/Powercor*

Unlike Jemena and United Energy, Citipower/Powercor do not offer separate network tariffs that accommodate the PFIT arrangements. Rather, the application of PFIT is treated separately, with customers with small scale generation paying the same standard network charges for electricity imported from the network as customers without small scale generation. The additional cost of the PFIT is borne across the network.

Customers with small scale generation are supplied with a bi-directional interval meter, and must transfer to either a Residential (or Non-Residential) Interval (Citipower/Powercor) or Residential (or Non-Residential) Interval - Bulk tariff (Citipower) for consumption, with the PFIT tariff credited against consumption. In the case of Citipower, the Residential (or Non-Residential) Interval - Bulk tariff is offered where

customers are supplied directly from onsite substation terminals where there are no CitiPower distribution assets beyond the substation. As a result, the tariff rates are slightly lower than the equivalent non-bulk tariff.

5.3.4.3 SP AusNet

SP AusNet is the only DNSP in Australia which requires customers with PV generation on a feed-in tariff to shift to a separate network tariff that is different to their existing network tariff in name, structure and tariff rates. Further, all of SP AusNet's tariffs for customers with PV generation are time of use tariffs, and customers with PV generation are required to install an interval meter to access the SFIT or PFIT.

Under the SFIT, the applicable network tariff is NEE23, being a volumetric two time period time of use tariff with an additional summer generation charge. This charge only applies between 1 November and 30 March and is paid to customers for each kWh of electricity sent out to the network.

Under the PFIT, the applicable network charge for residential customers is SUN23. This tariff is structurally similar to NEE23, but incorporates the feed-in tariff rate of 60 cents for every kWh of electricity sent out to the network. For commercial and industrial customers, the applicable network tariff is SUN21, which is structurally the same as the network tariff NEE21 (being a volumetric two time period time of use tariff), but incorporates the feed-in tariff rate of 60 cents for every kWh of electricity sent out to the network.

5.3.5 Australian Capital Territory

5.3.5.1 ActewAGL

ACT operates a gross feed-in tariff arrangement whereby customers who connected prior to 1 July 2010 are paid 50.05 cents for every kWh of electricity sent out to the network. Customers who connected after 1 July 2010 are paid 45.7 cents for every kWh of electricity sent out to the network. In September 2010, the ACT government put forward a proposal to expand its feed-in tariff arrangement to include medium to large scale generators with a capacity up to 200kW. In April 2011, the ACT government announced the feed-in tariff rate for these generators would be 34.27 cents for every kWh of electricity sent out to the network¹⁰.

As in the case of Queensland and South Australia, the ActewAGL does not provide a specific bi-directional Reference Service and hence there is no specific bi-directional Reference Tariff. Where a customer has small scale generation installed (less than 30kW), the same standard network tariffs apply as if there was no generation installed. There is no charge paid by the customer for electricity exported to the network.

However, ActewAGL has established a "Renewable Generation" tariff that applies to customers with solar or wind generation systems connected to the network. The tariff applies only to electricity produced by the renewable energy system then imported by the customer, and is currently charged at zero cents per kWh generated. This in effect means that there is no charge to the customer for any energy produced and subsequently imported by the customer.

¹⁰ <http://www.energymatters.com.au/government-rebates/feedintariff.php#act>

If a customer has a small scale generator but is not receiving the ACT feed-in tariff, ActewAGL pays the customer's retailer for the electricity sent out into the network at the same tariff rate as the customer's network tariff rate for electricity imported from the network. If the customer is on a time of use network tariff, the mid rate for residential customers or the evening rate for commercial customers is paid to the retailer for electricity sent out to the network. If the customer is on a network tariff with two or more pricing steps, ActewAGL uses first rate for the purposes of paying the customer's retailer for electricity sent out to the network.

5.3.6 New South Wales

5.3.6.1 *Essential Energy, Ausgrid and Endeavour Energy*

NSW operates a gross feed-in tariff arrangement under the Solar Bonus Scheme whereby customers who connected prior to 27 October 2010 are paid 60 cents for every kWh of electricity generated. Customers who connected after 27 October 2010 are subject to a net Solar Bonus Scheme arrangement whereby customers are paid 20 cents for every kWh of electricity sent out to the network. However, as of 6 May 2011, the NSW Government has suspended the Solar Bonus Scheme, with no new applications being considered. While existing customers on the scheme are currently unaffected by the suspension, the NSW Government is currently assessing the future viability of the scheme.

As in the case of Queensland, South Australia and the ACT, the NSW DNSPs do not provide a specific bi-directional Reference Service and hence there is no specific bi-directional Reference Tariff. Where a customer has small scale generation installed, the same standard network tariffs apply as if there was no generation installed. There is no charge paid by the customer for electricity sent out to the network.

5.3.7 Tasmania

5.3.7.1 *Aurora Energy*

Unlike the other jurisdictions, Tasmania does not have a Solar Bonus Scheme in operation. Customers with embedded generation are provided with the requisite meter at no cost. The same standard network tariffs apply for electricity imported from the network as would apply for customers without small scale generation, and any excess energy sent out to the network is credited to the customer's bill at the same rate at which they are charged for electricity imported from the network.

5.3.8 Northern Territory

5.3.8.1 *Power and Water Corporation*

The Northern Territory operates under a gross feed-in tariff arrangement whereby the customer is paid the same rate for every kWh of electricity sent out to the network that the customer pays for electricity imported from the network. For residential customers, this currently amounts to 19.23 cents for every kWh of electricity sent out to the network, and for commercial customers this amounts to 22.37 cents for every kWh of electricity sent out to the network. Commercial time of use customers are paid 28.63 cents per kWh in peak times and 16.12 cents in off-peak times for every kWh of electricity sent out to the network.

As in the case of DNSPs in Queensland, South Australia, the ACT and NSW, Power and Water Corporation do not provide a specific bi-directional Reference Service and hence

there is no specific bi-directional Reference Tariff. Where a customer has small scale generation installed, the same standard network tariffs apply as if there was no generation installed. There is no charge paid by the customer for electricity sent out to the network.

5.4 Summary of findings

Based on the precedent established in other jurisdictions, it should be noted that:

- ▶ Most DNSPs have applied the same network tariff to customers with small scale generation for electricity imported from the network as would apply if the customer did not have small scale generation. However in Victoria, two DNSPs have distinguished customers with feed-in tariffs by assigning them network tariffs that are different in name, but are otherwise identical to the network tariffs that would have applied if the customer did not have small scale generation. This allows for changing of charging rates in the future
- ▶ Only SP AusNet requires customers to shift to a new network tariff applicable only to customers with PV generation that is different to their existing network tariff in name, structure and tariff rates. Different tariffs apply if the customer is also on the PFIT.
- ▶ No DNSPs are charging for electricity sent out to the network. However, unlike Western Australia, in the NEM no generators are charged network costs.
- ▶ No DNSPs are charging customers with small scale generation on a demand basis (that is, all of the network tariffs paid by customers with small scale generation are volumetric consumption tariffs)
- ▶ In Victoria, customers with PV generation are required to install interval meters in order to access the feed-in tariffs

6. Peak Demand and Energy Consumption Characteristics of Customers with Small Scale Generation

6.1 Purpose of this section

The purpose of this section is to examine the impact of small scale generation on an average residential customers' energy consumption from the network and their peak demand. This outcome of this analysis will inform the design of the preferred Bi-directional Reference Tariff, because the Reference Tariff must reflect the cost of supplying customers with small scale generation as required by Chapter 7 of the *Electricity Networks Access Code 2004*.

An equivalent analysis has not been performed for non-residential customers as there is currently insufficient data available to conduct a statistical analysis.

6.2 Analysis and Findings

Western Power has analysed consumption data for customers with and without small scale generation with a view to establishing:

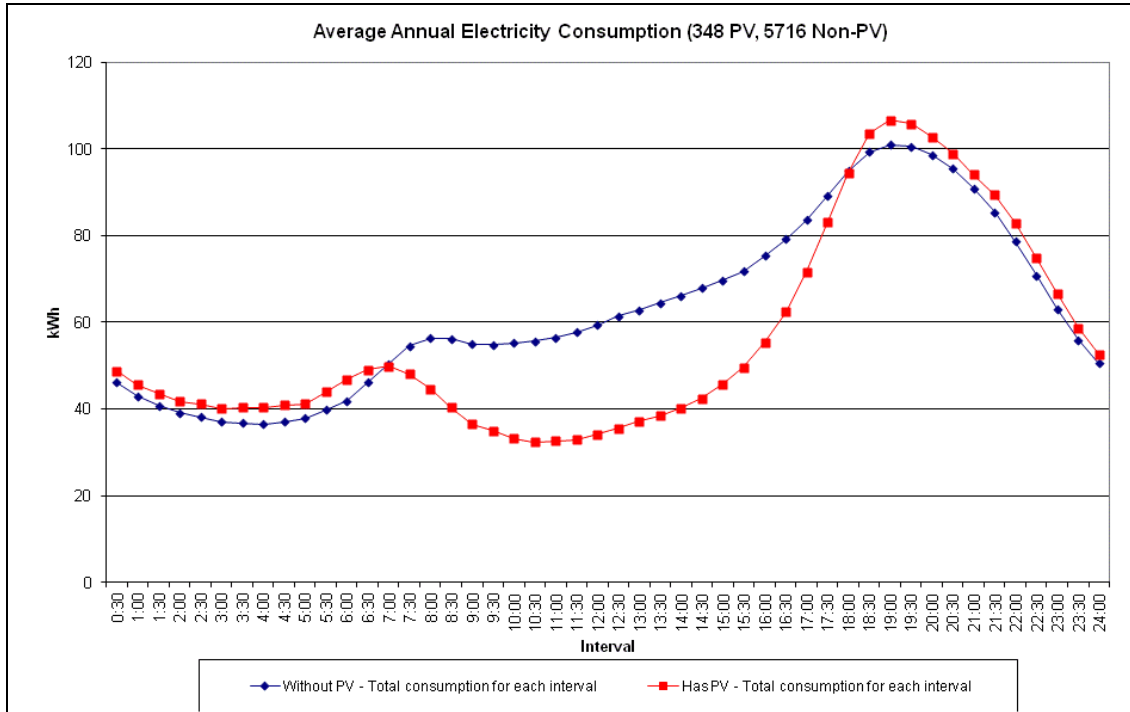
- ▶ The average annual energy consumption (in kWh) for customers with small scale generation as consumed
- ▶ The average annual energy consumption (in kWh) for customers without small scale generation as consumed
- ▶ A derived peak demand (in kW) for customers with small scale generation
- ▶ A derived peak demand (in kW) for customers without small scale generation

The following table summarises the results of this analysis:

| Tariff | Has Small Scale Generation? | Number of Basic Meters | Average Annual Consumption (kWh) | Peak Demand (kW) |
|------------------------------|-----------------------------|------------------------|----------------------------------|------------------|
| Anytime Energy (Residential) | No | 842,187 | 6019.7 | 4.2 |
| Anytime Energy (Residential) | Yes | 25,932 | 5507.7 | 4.3 |

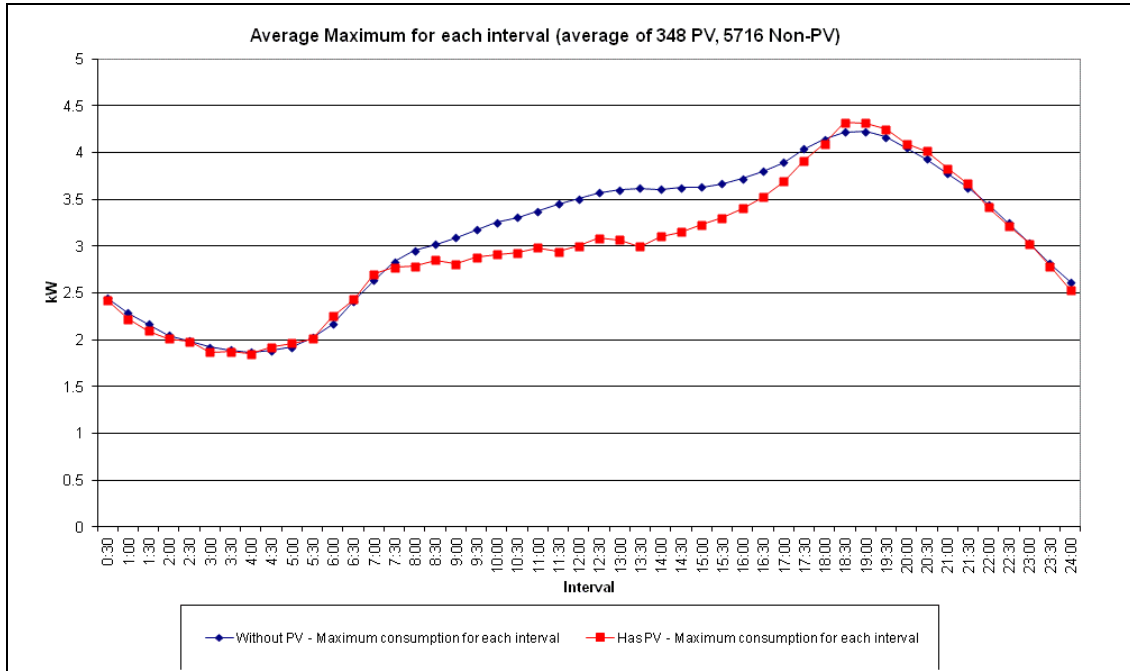
In addition to this, Western Power also performed an analysis of average annual electricity consumption and the average maximum electricity consumption for each half-hour time interval, based on a sample of 348 customers with small scale PV generation and 5,716 customers without small scale generation.

The following chart depicts the average annual electricity consumption for each half-hourly time interval for a sample of the customers with small scale PV generation (the red line) and the customers without small scale generation (the blue line). The data presented in this chart covers the period from 1 September 2010 to 28 February 2011 inclusive.



This chart indicates that customers with small scale PV generation have slightly higher electricity consumption at peak times than customers without small scale PV generation. However, for the majority of half-hour intervals where the small scale PV generator is generating electricity, the average interval consumption is less than that of customers without small scale PV generation.

The following chart depicts the average maximum demand for each half-hourly time interval for a sample of customers with small scale PV generation (the red line) and customers without small scale generation (the blue line). The data presented in this chart covers the period from 1 September 2010 to 28 February 2011 inclusive.



This chart indicates that, during the evening peak period, customers with small scale PV generation have a slightly higher average maximum demand (4.3 kW) than customers without small scale PV generation (4.2 kW). However, for the majority of half-hour intervals where the small scale PV generator is generating electricity, the demand is less than that of customers without small scale PV generation.

From the results set out in the table and charts above, there is evidence to suggest that:

- ▶ The average amount of electricity consumed by a residential customer connected to the SWIN without small scale generation is around 8.5% more than the average amount of electricity consumed by a residential customer with small scale generation
- ▶ The average peak daily demand of a residential customer with small scale generation is at least as high as the demand of a customer without small scale generation at the peak period.

These findings indicate that, at present, there is little difference between customers with and without small scale generation from a demand perspective, but customers with small scale generation consume less than energy than customers without small scale generation. There is no difference in the demand of residential customers with and without small scale generation between 5.30 pm and 7.30 am, but outside these times there is a statistically significant difference (i.e. the demand of customers with small scale generation is less than that of customers without small scale generation).¹¹ In addition there is a significant reduction in the total consumption of residential customers with small scale generation compared to those without.

¹¹ At a significance level of 0.05. The analysis was performed on the same data set as used in the analysis above (i.e. using data from 1 September 2010 to 28 February 2011 inclusive) and therefore includes the summer peak period.

Western Power has performed analysis of the impact of PV systems on various residential and commercial feeders, as well as the SWIS as a whole (refer to Appendix C for the analysis). This analysis suggests that, based on an assumed forecast of penetration, residential PV systems have the potential to marginally reduce the SWIS system peak in 2017.

However, this is unlikely to affect Western Power's network investment plans because network investment is primarily driven by individual demand forecasts for zone substations or distribution feeders, and is not directly influenced by the total SWIS system forecast peak demand. The total SWIS system forecast peak demand compiled by Western Power is used as a benchmark to compare overall forecasts with the Independent Market Operator and other sources.

For network investment to be affected, a given distributed generation project would need to be considered individually against relevant specific network investment projects.

6.3 Summary

These findings indicate that at present:

- ▶ A customer with small scale generation requires the same network capacity as a customer without such generation
- ▶ The *average* annual amount of electricity imported by customers with small scale generation is less than the average annual amount of electricity imported by customers without small scale generation

Consequently, these factors must be considered in ensuring that a Bi-directional Reference Tariff for customers with small scale generation reflects the costs of supplying those customers.

Further, to ensure the Bi-directional Reference Tariff for customers with small scale generation remains cost reflective in the future, it must be flexible enough to accommodate changes in average network energy consumption and peak demand of customers with small scale generation over time.

7. Options for designing residential and commercial Reference Services

7.1 Purpose of this section

Section 7.2 details the Options for the Residential Bi-directional Reference Service and Reference Tariff. It defines each Reference Service, outlines the associated Reference Tariff structure, and details the metering arrangements that would apply for:

- ▶ Existing customers seeking to connect small scale generation to the network
- ▶ Existing customers with small scale generation already connected to the network
- ▶ New customers seeking to connect small scale generation to the network

Section 7.3 details the Options for the Commercial Bi-directional Reference Service and Reference Tariff. It defines each Reference Service, outlines the associated Reference Tariff structure, and details the metering arrangements that would apply for:

- ▶ Existing customers seeking to connect small scale generation to the network
- ▶ Existing customers with small scale generation already connected to the network
- ▶ New customers seeking to connect small scale generation to the network

Note that Sections 9 and 10 provide an indication of charges for each option. For clarity, following stakeholder comments during the second round of consultation, the definition of the Reference Services were varied slightly from the draft report.

7.2 Revised Residential Reference Service and Reference Tariff

In response to the issues raised by stakeholders in the first round of consultations, five initial Options were developed in consultation with Western Power for the revised Reference Tariff to apply at a residential customer's bi-directional point.

These options were identified by taking into account:

- ▶ The recommended outcome from the previous review, RT12 (Options 4 and 5)
- ▶ The current default situation (Option 2)
- ▶ The current default situation, but with higher fixed and/or variable charges (Option 2A)
- ▶ The optimal tariff design in terms of network investment (Option 3)
- ▶ Comments by stakeholders (Option 1)

The options were:

1. To design and apply a new tariff which combines:
 - a. the customer's existing Reference Tariff, which would be paid by the customer for all electricity imported from the network into the customer's connection point

- b. a usage based export charge, which would be paid by the customer for all electricity sent out to the network from the customer’s connection point (that is, net generation)

With regard to the tariff paid for all electricity imported from the network into the customer’s connection point, the customer has the option to change, at any time, to the existing anytime energy or time-of-use Reference Tariffs (RT1 and RT3). Existing customers who install small scale generators at bi-directional points would therefore retain the same Reference Tariff they were paying prior to installing the small scale generator at that connection point, with the addition of a new charge for electricity sent out to the network via the bi-directional point

2. This Option is similar to Option 1 in terms of consumption, however no charge is levied on electricity sent out to the network from the customer’s bi-directional point. Existing customers who install small scale generators at bi-directional points would retain the same Reference Tariff they were paying prior to installing the small scale generator at that connection point
3. To design and apply a demand tariff to customers at bi-directional points which is similar to other demand tariffs currently offered by Western Power, which would be paid by the customer for all electricity that is imported from and exported to the network into the customer’s connection point
4. To apply the existing RT12 Reference Tariff without modification
5. To apply the existing RT12 Reference Tariff however, rather than require interval metering data, use register data

Following the second round of stakeholder consultations in May 2011, an additional Option (“Option 2A”) was developed. This Option was similar to Option 2 in structure, but applies higher fixed and/or variable charges.

The initial five Options and the additional Option 2A are discussed in more detail below.

7.2.1 Option 1

Option 1 involves assigning new customers, and potentially re-assigning existing customers, to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed).

The definition of the new Bi-Directional Reference Service for residential customers would be as follows:

| Characteristics | Option 1 Details |
|---------------------------------|---|
| Reference Service Name: | Reference Service C1 - Anytime Energy (Residential) - Bi-directional Service Reference Service C3 - Time of Use (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles. |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise or a premise occupied by a voluntary/charitable organization with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three |

| Characteristics | Option 1 Details |
|---|--|
| | <p>phase connections</p> <ul style="list-style-type: none"> ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | <ul style="list-style-type: none"> ▶ Installation at the bi-directional point of a SmartPower meter or a multiple register TOU interval meter having capability for import and export channels, or ▶ Retention at the bi-directional point of an existing accumulation meter having capability for import and export channels. This option is only available to customers with an existing accumulation meter and who are eligible to have an accumulation meter under the Metering Code |
| Applicable Reference Tariff: | <p>"RT13" (anytime energy) in the Price List published in Appendix 5 of the Access Arrangement. "RT15" (time of use) in the Price List published in Appendix 5 of the Access Arrangement. See below for further information regarding the applicable tariffs.</p> |
| Applicable Standard Access Contract: | <p>"Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement</p> |
| Applicable Service Standard Benchmarks: | <p>As set out in Section 3.18 and 3.19 of the Access Arrangement</p> |

The new Reference Tariff would be structured such that:

- a. the customer's existing Reference Tariff, which would be paid by the customer for all electricity imported from the network into the customer's connection point
- b. a usage based export charge, which would be paid by the customer for all electricity exported to the network from the customer's connection point (that is, net generation)

With regard to the tariff paid for all electricity imported from the network into the customer's connection point, the customer has the option to change, at any time, to the existing anytime energy or time-of-use Reference Tariffs (RT1 and RT3).

This Reference Tariff is broadly consistent with precedent in other Australian jurisdictions. This is because the structure of the Reference Tariff for electricity imported from the network is the same as the existing Reference Tariffs that would apply if the customer did not have small scale generation. However, unlike the SWIN, there is no charge on exported electricity in the NEM.

In practice, rather than creating a new tariff, the existing RT1 and RT3 tariffs would be re-defined to include the export charge. This will minimise implementation costs.

Metering arrangements for existing customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

In accordance with current procedures, Western Power currently considers and approves the connection of the small scale generator to its network, installs an upgraded two

channel, five register interval meter at the connection point to facilitate import and export channels, and provides meter reading services.

The current practice is then for Western Power to invoice Synergy following the two monthly manual meter reading cycle for the total amount of electricity which has been imported from the network.

Customers that already have an existing compatible single phase, or three phase meter (generally an EM1000 meter, or an EM3330 meter, respectively) need to have their meter reprogrammed by Western Power to allow the measurement of imported and exported electricity at a cost of \$49.50¹² exclusive of GST. For other customers, Western Power's standard single and three-phase direct connect interval meter is installed at a cost of approximately \$115.50 or \$203.50, exclusive of GST and travel costs, respectively.¹³ The metering installation costs are invoiced to Synergy and then passed on, through a gazetted charge, to customers.

Metering arrangements for existing customers with small scale generation already connected to the network

There will be no changes to current practices for this Option.

Existing customers with small scale generation who have already had an upgraded two channel, five register interval meter installed at the connection point will not need their current meter arrangement altered in any way.

Metering arrangements for new customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. As the new customer does not have any previous tariff arrangements in place - the default Reference Tariff for all electricity imported from the network into the customer's connection point would be RT1, unless the customer requests a time-of-use Reference Tariff.

7.2.2 Option 2

Option 2 involves assigning new customers, and potentially re-assigning existing customers, to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed).

The definition of the new Bi-Directional Reference Service for residential customers would be as follows:

¹² Western Power's standard three phase interval meters are configured with two channels for import only measurement (kWh and kVArh), although capability exists for four channels with import/export measurement.

¹³ Western Power, 'Metering Code Model Service Level Agreement', Approved by the ERA on 30 March 2006. All costs are exclusive of GST. (http://www.WesternPowercorp.com.au/documents/METERING_SERVICES_GENERIC_SLA_WITH_WA_RETAILERS.pdf)

| Characteristics | Option 2 Details |
|---|--|
| Reference Service Name: | Reference Service C1 - Anytime Energy (Residential) - Bi-directional Service Reference Service C3 - Time of Use (Residential) - Bi-directional Service |
| Reference Service Description: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise or a premise occupied by a voluntary/charitable organization with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 These criteria apply regardless of whether a battery storage system is part of the installation |
| Technical Eligibility Criteria: | <ul style="list-style-type: none"> ▶ Installation at the bi-directional point of a SmartPower meter or a multiple register TOU interval meter having capability for import and export channels, or ▶ Retention at the bi-directional point of an existing accumulation meter having capability for import and export channels. This option is only available to customers with an existing accumulation meter and who are eligible to have an accumulation meter under the Metering Code |
| Metering Criteria: | "RT13" (anytime energy) in the Price List published in Appendix 5 of the Access Arrangement. "RT15" (time of use) in the Price List published in Appendix 5 of the Access Arrangement. See below for further information regarding the applicable tariffs. |
| Applicable Reference Tariff: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Standard Access Contract: | As set out in Section 3.18 and 3.19 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise or a premise occupied by a voluntary/charitable organization with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 These criteria apply regardless of whether a battery storage system is part of the installation |

Even though the tariff structure and tariff rates are the same as the existing anytime energy or time-of-use Reference Tariffs (RT1 and RT3), new Reference Tariffs would still need to be created under this Option. This will allow provision for the tariff structure and tariff rates to be amended in the future if changes are required in response to changes in customer usage profiles.

The customer has the option to change, at any time, to the existing anytime energy or time-of-use Reference Tariffs (RT1 and RT3). This Reference Tariff is broadly consistent with precedent in other Australian jurisdictions. This is because the structure of the Reference Tariff for electricity imported from the network is the same as the existing Reference Tariffs that would apply if the customer did not have small scale generation.

Metering arrangements for existing customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out in Option 1 for existing customers seeking to connect small scale generation to the network would apply.

Metering arrangements for existing customers with small scale generation already connected to the network

There will be no changes to current practices for this Option.

Existing customers with small scale generation who have already had an upgraded two channel, five register interval meter installed at the connection point will not need their current meter arrangement altered in any way.

Metering arrangements for new customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. As the new customer does not have any previous tariff arrangements in place - the default Reference Tariff for all electricity imported from the network into the customer’s connection point would be RT1, unless the customer requests a different Reference Tariff for which it they are eligible.

7.2.3 Option 2A

Option 2A involves assigning new customers, and re-assigning existing customers, to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed).

Option 2A is a reference tariff with the same structure as the existing reference tariffs for residential customers, but with a higher fixed daily charge. For transparency, the higher fixed charge is presented as the original fixed charge plus an additional daily fixed charge. In practice, a single fixed charge would be seen and paid by the user. The volumetric charge would be unchanged.

Consideration was also given to assessing an additional option which would have involved designing a reference tariff with the same structure as the existing reference tariffs for residential and commercial customers, but with higher variable charges, and the fixed daily charge left unchanged. Stakeholders were of the view that this would cause additional confusion with customers and likely lead to significant customer complaints and disputation.

The definition of the new Bi-Directional Reference Service for residential customers would be as follows:

| Characteristics | Option 2A Details |
|---------------------------------|---|
| Reference Service Names: | Reference Service C1 - Anytime Energy (Residential) - Bi-directional Service Reference Service C3 - Time of Use (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles. |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise or a premise occupied by a voluntary/charitable organization with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three |

| Characteristics | Option 2A Details |
|---|---|
| | <p>phase connections</p> <ul style="list-style-type: none"> ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | <ul style="list-style-type: none"> ▶ Installation at the bi-directional point of a SmartPower meter or a multiple register TOU interval meter having capability for import and export channels, or ▶ Retention at the bi-directional point of an existing accumulation meter. This option is only available to customers with an existing accumulation meter and who are eligible to have an accumulation meter under the Metering Code |
| Applicable Reference Tariffs: | <p>"RT13" (anytime energy) in the Price List published in Appendix 5 of the Access Arrangement.</p> <p>"RT15" (time of use) in the Price List published in Appendix 5 of the Access Arrangement.</p> <p>See below for further information regarding the applicable tariffs.</p> |
| Applicable Standard Access Contract: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

As with Option 1 and Option 2, new Reference Tariffs would need to be created under this Option. The customer has the option to change, at any time, to tariffs with an identical variable consumption cost to the existing anytime energy or time-of-use Reference Tariffs (RT1 and RT3), though with an increased fixed cost compared to those tariffs. This Reference Tariff is arguably consistent with precedent in other Australian jurisdictions. This is because the structure of the Reference Tariff for electricity consumed from the network is the same as the existing Reference Tariffs that would apply if the customer did not have small scale generation.

Metering arrangements for existing customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out in Option 1 in the report for existing customers seeking to connect small scale generation to the network would apply.

Metering arrangements for existing customers with small scale generation already connected to the network

There will be no changes to current practices for this Option.

Existing customers with small scale generation who have already had an upgraded two channel, five register interval meter installed at the connection point will not need their current meter arrangement altered in any way.

Metering arrangements for new customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small

scale generation to the network. As the new customer does not have any previous tariff arrangements in place - the default Reference Tariff for all electricity consumed from the network into the customer’s connection point would be RT13 (anytime energy), unless the customer requests a different Reference Tariff for which it they are eligible.

7.2.4 Option 3

Option 3 would involve assigning new customers and potentially re-assigning existing customers to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed). This is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff for imported electricity (however the new tariff structure and charges may be the same as the customer’s existing consumption tariff, depending on the DNSP).

The definition of the new Bi-Directional Reference Service for residential customers would be as follows:

| Characteristics | Option 3 Details |
|---|---|
| Reference Service Name: | Reference Service C1 - Metered Demand (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard metering service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The maximum demand at the exit point is: <ul style="list-style-type: none"> ▶ less than 1,500 kVA based on historical metering data, or ▶ Western Power considers, as a reasonable and prudent person, that the User’s forecast maximum demand will be less than 1,500 kVA ▶ The bi-directional point is located at a residential premise with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three phase connections ▶ The consumer’s inverter system must comply with the requirements of AS 4777 and the Technical Rules ▶ The consumer’s facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | Installation at the bi-directional point of a TOU interval meter having capability for import and export channels |
| Applicable Reference Tariff: | “RT13” in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The new Reference Tariff would be demand based, such as \$/kVA, which would be charged to the customer based on its maximum monthly demand. The structure of the tariff would be similar to the existing low voltage metered demand tariffs currently used by Western Power and would consist of:

- ▶ A fixed metered demand charge which is payable each day

- ▶ A variable metered demand charge calculated by multiplying the demand price (\$/kVA) by a rolling seasonal monthly maximum half hourly demand at the bi-directional connection point
- ▶ A fixed metering charge which is payable each day

The time periods for the peak and off-peak periods are defined as follows:

- ▶ Off-peak is from 10pm to 8am on working weekdays and all day on weekends
- ▶ On-peak is from 8am to 10pm on working weekdays

There is no precedent for this Option in any DNSP in Australia. This is because no DNSP has a specific Reference Tariff, applicable only to customers with small scale generation that is based on demand charges and not consumption charges. However, this is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff.

Metering arrangements for existing customers seeking to connect small scale generation to the network

Western Power has advised that Option 3 would require either the installation of multi-channel interval meters with the capability of recording kVA data, or the installation of multi-channel interval meters, with the kVA demand mathematically derived from the kWh and kVA_{rh} channels.

Currently, kVA demand can be derived from Western Power's standard EM3330 (O350) three phase interval meter, but not from its standard single phase EM1000 (O200) interval meter, which is only capable of measuring kWh usage. Western Power does not have a single phase meter capable of measuring, or deriving kVA demand.

The simplest solution under Option 3 would be for Western Power to source and install a single phase interval meter with both kWh and kVA_{rh} measurement functionality to complement its existing standard three phase interval meter. The cost associated with the new single phase meter would likely be materially higher than the cost of the current EM1000 meter and closer in quantum to that of the three phase meter.

The process for approving the installation of a new single phase interval meter with the additional functionality may involve, amongst other things:

- ▶ Testing and evaluation of the new meter by Western Power
- ▶ Commercial justification of the new meter
- ▶ Determining who would pay for the additional cost associated with the new meter
- ▶ Discussing with Synergy on the impact on the existing REBS of installing the new meter
- ▶ Demonstrating the customer's willingness to pay

Where a compatible three phase meter currently exists, namely the O350 meter type, no additional cost would be incurred, otherwise a three phase meter installation cost of \$203.50, exclusive of GST and travel costs, would apply. Under this scenario, Western Power could continue to manually download the data using hand held units. The metering installation costs would be paid by the customer when the small scale generator was installed at the customer's premise.

Metering arrangements for existing customers with small scale generation already connected to the network

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. This means that many customers would require new meters to be installed.

Metering arrangements for new customers seeking to connect small scale generation to the network

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network.

7.2.5 Option 4 - The Existing RT12 Tariff

Option 4 would involve assigning new customers and potentially re-assigning existing customers to the existing Bi-Directional Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed). This is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff for imported electricity (however the new tariff structure and charges may be the same as the customer’s existing consumption tariff, depending on the DNSP).

The definition of the existing Bi-Directional Reference Service for residential customers is as follows:

| Characteristics | Option 4 Details |
|---|--|
| Reference Service Name: | Reference Service C1 - Time of Use (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise ▶ The consumer’s facilities and equipment include a small scale generation system connected via an inverter system that is rated up to 10 kVA for single phase connections and 30 kVA for three phase connections ▶ The consumer's inverter system must comply with the requirements of AS 4777 and the Technical Rules ▶ The consumer’s facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | An interval meter having capability for import and export channels and five register information collection is installed at the bi-directional point |
| Applicable Reference Tariff: | “RT12” in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The existing Reference Tariff RT12 tariff is a time of use tariff that consists of:

- ▶ A fixed use of system charge which is payable each day
- ▶ An on-peak use of system variable charge calculated by multiplying the on-peak energy price by the quantity of on-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ An off-peak use of system variable charge calculated by multiplying the off-peak energy price by the quantity of off-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ A fixed metering charge which is payable each day
- ▶ An on-peak variable metering charge calculated by multiplying the on-peak variable price by the quantity of on-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ An off-peak variable metering charge calculated by multiplying the off-peak variable price by the quantity of off-peak electricity imported at the bi-directional point (expressed in kWh)

The time periods for the shoulder, peak and off-peak periods are defined as follows:

- ▶ Off-peak is from 10pm to 7am everyday
- ▶ Shoulder is from 7am to 2pm and 8pm to 10pm during working weekdays and from 7am to 10pm on weekends and public holidays, and
- ▶ On-peak is from 2pm to 8pm on working weekdays

The only parallel to this Option is the SP AusNet arrangement whereby customers are shifted to network tariff that is different in name, structure and tariff rates. However, this is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff. The structure of the tariff is broadly consistent with the Victorian PFIT network tariffs in that they are all time of use tariffs, but there are differences in the number of time periods and the commencement and termination times of each time period.

7.2.6 Option 5 - Modified RT12

Option 5 would involve assigning new customers and potentially re-assigning existing customers to a modified version of the existing Bi-Directional Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed). This Option is identical to Option 4, with the exception that register data is used instead of interval data.

The definition of the existing Bi-Directional Reference Service for residential customers is as follows:

| Characteristics | Option 5 Details |
|---------------------------------|--|
| Reference Service Name: | Reference Service C1 - Time of Use (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise ▶ The consumer's facilities and equipment include a small scale generation system connected via an inverter system that is rated up to 10 kVA for single phase connections and 30 kVA for three phase |

| Characteristics | Option 5 Details |
|---|--|
| | <p>connections</p> <ul style="list-style-type: none"> ▶ The consumer's inverter system must comply with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | An interval meter having capability for import and export channels and five register information collection is installed at the bi-directional point |
| Applicable Reference Tariff: | "RT12" in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The Reference Tariff would be identical to the existing RT12 tariff, being a time of use tariff that consists of:

- ▶ A fixed use of system charge which is payable each day
- ▶ An on-peak use of system variable charge calculated by multiplying the on-peak energy price by the quantity of on-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ An off-peak use of system variable charge calculated by multiplying the off-peak energy price by the quantity of off-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ A fixed metering charge which is payable each day
- ▶ An on-peak variable metering charge calculated by multiplying the on-peak variable price by the quantity of on-peak electricity imported at the bi-directional connection point (expressed in kWh)
- ▶ An off-peak variable metering charge calculated by multiplying the off-peak variable price by the quantity of off-peak electricity imported at the bi-directional point (expressed in kWh)

The time periods for the shoulder, peak and off-peak periods are defined as follows:

- ▶ Off-peak is from 10pm to 7am everyday
- ▶ Shoulder is from 7am to 2pm and 8pm to 10pm during working weekdays and from 7am to 10pm on weekends and public holidays
- ▶ On-peak is from 2pm to 8pm on working weekdays

The only parallel to this Option is the SP AusNet arrangement whereby customers are shifted to network tariff that is different in name, structure and tariff rates. However, this is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff. The structure of the tariff is broadly consistent with the Victorian PFIT network tariffs in that they are all time of use tariffs, but there are differences in the number of time periods and the commencement and termination times of each time period.

7.3 New Commercial Reference Service and Reference Tariff

In response to the issues raised by stakeholders in the first round of consultations, five Options were developed in consultation with Western Power for the new Reference Tariff to apply at a commercial customer's bi-directional point.

These options were identified by taking into account:

- ▶ The recommended outcome from the previous review, RT12 (Options 4 and 5)
- ▶ The current default situation (Option 2)
- ▶ The optimal tariff design in terms of network investment (Option 3)
- ▶ Comments by stakeholders (Option 1)

The options are:

1. To design and apply a new tariff which combines:
 - a. the customer's existing Reference Tariff, which would be paid by the customer for all electricity imported from the network into the customer's connection point
 - b. a usage based export charge, which would be paid by the customer for all electricity exported to the network from the customer's connection point (that is, net generation)

With regard to tariff paid for all electricity imported from the network into the customer's connection point, the customer has the option to change, at any time, to the existing anytime energy or time-of-use Reference Tariffs (RT2 and RT4) Existing customers who install small scale generators at bi-directional points would therefore retain the same Reference Tariff they were paying prior to installing the small scale generator at that connection point, with the addition of a new charge for electricity sent out to the network via the bi-directional point.

2. This Option is the same as Option 1 in terms of consumption, however no charge is levied on electricity sent out to the network from the customer's bi-directional point. Existing customers who install small scale generators at bi-directional points would retain the same Reference Tariff they were paying prior to installing the small scale generator at that connection point
3. To design and apply a demand tariff to customers at bi-directional points which is similar to other demand tariffs currently offered by Western Power, which would be paid by the customer for all electricity that is imported from and sent out to the network into the customer's connection point.
4. To apply the existing RT12 Reference Tariff without modification to commercial customers
5. To apply the existing RT12 Reference Tariff however, rather than require interval metering data, use register data

Following the second round of stakeholder consultations in May 2011, an additional Option (“Option 2A”) was developed. This Option was similar to Option 2 in structure, but higher fixed and/or variable charges would be applied

The initial five Options and the additional Option 2A are discussed in more detail below.

7.3.1 Option 1

Option 1 involves assigning new customers, and potentially re-assigning existing customers, to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed).

The definition of the new Bi-Directional Reference Service for commercial customers would be as follows:

| Characteristics | Option 1 Details |
|---|---|
| Reference Service Name: | Reference Service C2 - Anytime Energy (Business) - Bi-directional Service Reference Service C4 - Time of Use (Business) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system or on the high voltage system at 6.6kV. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a commercial premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 These criteria apply regardless of whether a battery storage system is part of the installation |
| Metering Criteria: | <ul style="list-style-type: none"> ▶ Installation at the bi-directional point of a SmartPower meter or a multiple register TOU interval meter having capability for import and export channels, or ▶ Retention at the bi-directional point of an existing accumulation meter having capability for import and export channels. This option is only available to customers with an existing accumulation meter and who are eligible to have an accumulation meter under the Metering Code |
| Applicable Reference Tariff: | “RT14” (anytime energy) in the Price List published in Appendix 5 of the Access Arrangement. “RT16” (time of use) in the Price List published in Appendix 5 of the Access Arrangement. See below for further information regarding the applicable tariffs. |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The new Reference Tariff would be structured such that:

- a. the customer’s existing Reference Tariff, which would be paid by the customer for all electricity imported from the network into the customer’s connection point

- b. a usage based export charge, which would be paid by the customer for all electricity exported to the network from the customer's connection point (that is, net generation)

With regard to tariff paid for all electricity imported from the network into the customer's connection point, the customer has the option to change, at any time, to the existing anytime energy of time-of-use Reference Tariffs (RT2 and RT4). As the number of customers on other distribution business tariffs (i.e. RT5, RT6, RT7 and RT8) are low, the bi-directional service will not be offered for those tariffs at this time.

This Reference Tariff is broadly consistent with precedent in other Australian jurisdictions. This is because the structure of the Reference Tariff for electricity imported from the network is the same as the existing Reference Tariffs that would apply if the customer did not have small scale generation. However, unlike the SWIN, there is no charge on exported electricity in the NEM.

In practice, rather than creating a new tariff, the existing RT2 and RT4 tariffs would be re-defined to include the export charge. This will minimise implementation costs.

Metering arrangements for existing customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out in Option 1 for existing residential customers seeking to connect small scale generation to the network would also apply for commercial customers.

Metering arrangements for existing customers with small scale generation already connected to the network

There will be no changes to current practices for this Option.

Existing customers with small scale generation who have already had an upgraded two channel, five register interval meter installed at the connection point will not need their current meter arrangement altered in any way.

Metering arrangements for new customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. As the new customer does not have any previous tariff arrangements in place - the default Reference Tariff for all electricity imported from the network into the customer's connection point would be RT2, unless the customer requests a time-of-use Reference Tariff.

7.3.2 Option 2

Option 2 involves assigning new customers, and potentially re-assigning existing customers, to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed).

The definition of the new Bi-Directional Reference Service for commercial customers would be as follows:

| Characteristics | Option 2 Details |
|---|---|
| Reference Service Name: | Reference Service C2 - Anytime Energy (Business) - Bi-directional Service Reference Service C4 - Time of Use (Business) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system or on the high voltage system at 6.6kV. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles. |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a commercial premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 These criteria apply regardless of whether a battery storage system is part of the installation |
| Metering Criteria: | <ul style="list-style-type: none"> ▶ Installation at the bi-directional point of a SmartPower meter or a multiple register TOU interval meter having capability for import and export channels, or ▶ Retention at the bi-directional point of an existing accumulation meter having capability for import and export channels. This option is only available to customers with an existing accumulation meter and who are eligible to have an accumulation meter under the Metering Code |
| Applicable Reference Tariff: | "RT14" (anytime energy) in the Price List published in Appendix 5 of the Access Arrangement. "RT16" (time of use) in the Price List published in Appendix 5 of the Access Arrangement. See below for further information regarding the applicable tariffs. |
| Applicable Standard Access Contract: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

New Reference Tariffs would not be created under this Option. The customer has the option to change, at any time, to the existing anytime energy or time-of-use Reference Tariffs (RT2 and RT4). This Reference Tariff is broadly consistent with precedent in other Australian jurisdictions. This is because the structure of the Reference Tariff for electricity imported from the network is the same as the existing Reference Tariffs that would apply if the customer did not have small scale generation.

Metering arrangements for existing customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out in Option 1 for existing commercial customers seeking to connect small scale generation to the network would apply.

Metering arrangements for existing customers with small scale generation already connected to the network

There will be no changes to current practices for this Option.

Existing customers with small scale generation who have already had an upgraded two channel, five register interval meter installed at the connection point will not need their current meter arrangement altered in any way.

Metering arrangements for new customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out above for existing commercial customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. As the new customer does not have any previous tariff arrangements in place - the default Reference Tariff for all electricity imported from the network into the customer’s connection point would be RT2, unless the customer requests a different Reference Tariff for which it they are eligible.

7.3.3 Option 2A

Option 2A involves assigning new customers, and potentially re-assigning existing customers, to a new Reference Tariff once the connection point has been classified as a bi-directional point (i.e. once the small scale generator has been installed).

Option 2A is a reference tariff with the same structure as the existing reference tariffs for commercial customers, but with a higher fixed daily charge. For transparency, the higher fixed charge is presented as the original fixed charge plus an additional daily fixed charge. In practice, a single fixed charge would be seen and paid by the user. The volumetric charge would be unchanged.

The definition of the new Bi-Directional Reference Service for commercial customers would be as follows:

| Characteristics | Option 2 Details |
|---------------------------------|---|
| Reference Service Name: | Reference Service C2 - Anytime Energy (Business) - Bi-directional Service Reference Service C4 - Time of Use (Business) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system or on the high voltage system at 6.6kV. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles. |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a commercial premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 These criteria apply regardless of whether a battery storage system is part of the installation |
| Metering Criteria: | <ul style="list-style-type: none"> ▶ Installation at the bi-directional point of a SmartPower meter or a multiple register TOU interval meter having capability for import and export channels, or ▶ Retention at the bi-directional point of an existing accumulation meter. This option is only available to customers with an existing accumulation meter and who are eligible to have an accumulation meter under the Metering Code |

| Characteristics | Option 2 Details |
|---|--|
| Applicable Reference Tariffs: | “RT14” (anytime energy) in the Price List published in Appendix 5 of the Access Arrangement. “RT16” (time of use) in the Price List published in Appendix 5 of the Access Arrangement. See below for further information regarding the applicable tariffs. |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

As with Option 1 and Option 2, new Reference Tariffs would need to be created under this Option. The customer has the option to change, at any time, to tariffs with an identical variable consumption cost to the existing anytime energy or time-of-use Reference Tariffs (RT2 and RT4), though with an increased fixed cost compared to those tariffs. This Reference Tariff is broadly consistent with precedent in other Australian jurisdictions. This is because the structure of the Reference Tariff for electricity consumed from the network is the same as the existing Reference Tariffs that would apply if the customer did not have small scale generation.

Metering arrangements for existing customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out in Option 1 in the report for existing commercial customers seeking to connect small scale generation to the network would apply.

Metering arrangements for existing customers with small scale generation already connected to the network

There will be no changes to current practices for this Option.

Existing customers with small scale generation who have already had an upgraded two channel, five register interval meter installed at the connection point will not need their current meter arrangement altered in any way.

Metering arrangements for new customers seeking to connect small scale generation to the network

There will be no changes to current practices for this Option.

The metering arrangements as set out above for existing commercial customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. As the new customer does not have any previous tariff arrangements in place - the default Reference Tariff for all electricity consumed from the network into the customer’s connection point would be the RT14 (anytime energy) structure, unless the customer requests a different Reference Tariff for which it they are eligible.

7.3.4 Option 3

Option 3 would involve assigning new customers and potentially re-assigning existing customers to a new Reference Tariff once the connection point has been classified as a bi-

directional point (i.e. once the small scale generator has been installed). This is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff for imported electricity (however the new tariff structure and charges may be the same as the customer’s existing consumption tariff, depending on the DNSP).

The definition of the new Bi-Directional Reference Service for commercial customers would be as follows:

| Characteristics | Option 3 Details |
|---|---|
| Reference Service Name: | Reference Service C2 - Metered Demand (Business) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system or on the high voltage system at 6.6kV. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a commercial premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The maximum demand at the bi-directional point is: <ul style="list-style-type: none"> ▶ less than 1 MVA based on historical metering data, or ▶ Western Power considers, as a reasonable and prudent person, that the User’s forecast maximum demand will be less than 1MVA ▶ The consumer’s inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer’s facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | Installation at the bi-directional point of a TOU interval meter having capability for import and export channels |
| Applicable Reference Tariff: | “RT14” in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The new Reference Tariff would be demand based, such as \$/kVA, which would be charged to the customer based on its maximum monthly demand. The structure of the tariff would be similar to other demand tariffs currently offered by Western Power and would consist of:

- ▶ A fixed metered demand charge which is payable each day
- ▶ A variable metered demand charge calculated by multiplying the demand price (\$/kVA) by a rolling seasonal monthly maximum half hourly demand at the bi-directional connection point
- ▶ A fixed metering charge which is payable each day

The time periods for the peak and off-peak periods are defined as follows:

- ▶ Off-peak is from 10pm to 8am on working weekdays and all day on weekends
- ▶ On-peak is from 8am to 10pm on working weekdays

There is no precedent for this Option in any DNSP in Australia. This is because no DNSP has a specific network tariff, applicable only to customers with small scale generation that is based on demand charges and not consumption charges. However, this is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff.

Metering arrangements for existing customers seeking to connect small scale generation to the network

The metering arrangements as set out in Option 3 for existing commercial customers seeking to connect small scale generation to the network would apply. This means that commercial customers who were not already on demand tariffs would require new meters to be installed.

Metering arrangements for existing customers with small scale generation already connected to the network

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network. This means that commercial customers who were not already on demand tariffs would require new meters to be installed.

Metering arrangements for new customers seeking to connect small scale generation to the network

The metering arrangements as set out above for existing customers seeking to connect small scale generation to the network apply for new customers seeking to connect small scale generation to the network.

7.3.5 Option 4 - Apply the Existing RT12 to commercial customers

Western Power’s existing bi-direction Reference Service and Reference Tariff were not specifically aimed at commercial customers, but for the purposes of the commercial Reference Service and Reference Tariff Options assessment, the existing bi-directional reference has been considered as if it were to be applied to both residential and commercial customers without discrimination. This is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff for imported electricity (however the new tariff structure and charges may be the same as the customer’s existing consumption tariff, depending on the DNSP).

The definition of the existing Reference Service and Reference Tariff is set out in Option 4 for residential customers.

| Characteristics | Option 4 Details |
|---------------------------------|--|
| Reference Service Name: | Reference Service C1 - Time of Use (Commercial) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | Users are eligible to use this service if: <ul style="list-style-type: none"> ▶ The bi-directional point is located at a commercial premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by |

| Characteristics | Option 4 Details |
|---|---|
| | <p>Western Power for installations larger than 30kVA</p> <ul style="list-style-type: none"> ▶ The consumer’s facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | An interval meter having capability for import and export channels and five register information collection is installed at the bi-directional point |
| Applicable Reference Tariff: | “RT14” in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

7.3.6 Option 5 - Apply a Modified RT12

The definition of the Reference Service and Reference Tariff for Option 5 is set out in Option 5 for residential customers. This is broadly similar to the approach taken by Victorian DNSPs whereby customers with small scale generation are shifted to a different tariff for imported electricity (however the new tariff structure and charges may be the same as the customer’s existing consumption tariff, depending on the DNSP).

| Characteristics | Option 5 Details |
|---|---|
| Reference Service Name: | Reference Service C1 - Time of Use (Commercial) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a commercial premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer’s facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | An interval meter having capability for import and export channels and five register information collection is installed at the bi-directional point |
| Applicable Reference Tariff: | “RT14” in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

8. Assessment criteria

8.1 Purpose of this section

The purpose of this section is to define the criteria by which each Option set out in Chapter 7 of this report will be assessed. The detailed assessment against each of these criteria is set out in detail in Chapter 9 and 10 of this report.

Specifically, section 8.2 establishes the assessment criteria for each of the Options, and defines the purpose of each assessment criteria in detail.

8.2 Criteria for assessment of options

Consistent with the previous review in 2009, each Option for the Reference Tariff to apply at the residential and commercial customer's bi-directional point has been assessed against the following criteria as requested by Western Power:

1. Ensuring that the tariff is cost reflective with respect to both the transmission and distribution networks, as required by Chapter 7 of the *Electricity Networks Access Code 2004*, and that the tariff sends price signals to customers to provide an incentive to shift load out of times of peak network demand
2. More specifically, ensuring there are minimal cross subsidies in an economic sense between customers with and without small scale generation, as required by Chapter 7 of the *Electricity Networks Access Code 2004*
3. Administrative simplicity
4. Ensuring Reference Service design does not set up any unreasonable barriers to entry such as high up-front cost
5. Compatibility with the REBS and the Net Feed-in Tariff

Further to these criteria, an additional set of criteria, which reflect the issues raised by stakeholders, have been agreed with Western Power and included in the assessment. These are:

6. Ensuring the implementation issues relating to metering are addressed
7. Ensuring the implementation issues relating to meter data are addressed
8. Ensuring the implementation issues relating to the Billing and IT Systems are addressed
9. Ensuring Transactional Costs are minimised
10. Ensuring Tariff Design issues raised by stakeholders are addressed
11. Ensuring the tariffs are applied on an equitable basis
12. Ensuring there are no compliance issues associated with the implementation of the Reference Tariff

These criteria are discussed further below.

8.2.1 Criteria 1 - Ensuring that Tariffs Reflect Cost

Criteria 1 is important to consider because the Options imply different Reference Tariff designs and therefore different relationships between the cost of supply and the tariff revenue collected.

Cost reflectivity of tariffs has been considered at length by Western Power and by the ERA as part of previous Access Arrangement approval processes. This is because section 7.3 of the *Electricity Networks Access Code 2004* requires that Western Power's proposed pricing methods must ensure that tariffs recover the forward looking efficient costs of providing the Reference Services.

For this reason, Western Power's Price List Information sets out a justification of how Reference Tariffs have been structured in order to reflect cost, and an interpretation of this relationship. Section 3.3.1 of the Price List Information provides that:

It is essential to separate the two processes of "determining cost of supply" and "setting Reference Tariffs" to recover those costs. In the ideal world the costs of supply can be clearly allocated to particular customer groups and the Reference Tariffs are set to exactly recover those costs. In addition, the costs are separated into fixed and variable components and the Reference Tariffs are similarly split so that fixed costs are recovered by fixed charges and variable costs by variable charges.

It is recognised that the determination of the cost of supply for users and respective Reference Tariffs is not a completely definitive process. A number of simplifying assumptions are required, for example, the categorising of users into a small number of customer groups or classes. These assumptions may introduce errors that are considered to not be significant and there is considerable historical precedence in deriving the network cost of supply that supports the approach.

Demand is the best measurement of capacity but as the vast majority of users have energy only metering that does not record demand; energy is used as a proxy for demand. The limitations on the metering information available will introduce minor non-deterministic errors that cannot be avoided or quantified.

Western Power currently ensures that tariffs reflect cost via a process of distributed cost allocation set out in the Price List Information, and approved by the ERA. Essentially, it involves two stages, being:

- ▶ Determination of the target revenue and the Reference Service revenue for Western Power
- ▶ Allocation of the revenue components to different cost pools for various customer groups, based on factors such as supply voltage, location and load characteristics

Western Power sets Reference Tariffs from the cost of supply determination - therefore the Reference Tariffs do not directly relate to the customer groups. Section 3.3.3 of the Price List Information notes that this:

is because a number of the customer groups are based on derived user demands whereas the Reference Tariffs are based on the user and metering data that is actually available. The users within the customer groups are linked to Reference Tariffs so that cost of supply can then be derived for each Reference Tariff. The cost

of supply is in terms of fixed and variable costs and price settings are then simply established to recover the cost pools from the users.

In order to assess whether a particular Option reflects costs, it is necessary to understand what is the cost of a customer on the network. In general, the cost associated with providing network services to a customer differs according to the shape of the customer's load profile, which is reflective of the nature of the customer (i.e. domestic or business), the voltage required and the total electricity use of the customer. The load shape affects the cost of service provision because the network is primarily built to meet peak load requirements rather than energy consumption. This has been confirmed by various distribution network service providers. For example:

- ▶ Integral Energy has stated that *"Growth in peak demand is a primary driver of network capital investment"*¹⁴
- ▶ Country Energy has stated that *"Peak demand, particularly summer peak demand, is a principal driver of growth related capital expenditure"*¹⁵
- ▶ AGL Electricity (now known as Jemena Electricity Networks) has stated that *"Forecasts of network demand and customer connections drive much of the need for investment in the network"*¹⁶
- ▶ ActewAGL has stated that *"The zone substation demand forecasts are key drivers of the capital expenditure program"*¹⁷

Customers with higher peaking load profiles that correspond with the network peaks generally require greater network capacity, and therefore have higher costs to serve per unit of energy delivered compared to customers with a relatively flat load profile.

It should also be noted that there is an assumed relationship between the number of new small scale generator connections and the costs of planning and building the network. If peak demand can be reduced by increasing numbers of small scale generation systems then reductions in capital expenditure may be achievable in some areas of the network. However, large numbers of these systems, located in areas where load is low, may lead to the amount of electricity being sent out to the system exceeding that which is being used by the area - thus feeding electricity back up into the system and into transformers which may require substantial network redesign to accommodate.

However, the relationship of renewable energy systems, such as solar PV systems, with network cost is complicated by the fact that the generation output may not be coincidental with peak demand and that there is a lack of certainty associated with the reliability of renewable generator systems. In Western Power's SWIN, the residential peak demand tends to occur between approximately 5:30pm and 8pm during summer and between 6:15pm and 8:30pm during winter,¹⁸ whereas solar PV output tends to peak between 10am and 3pm, when the sun is strongest.

On balance, it is arguable that an appropriate way to reflect a customer's cost on the network is for a network owner to allocate costs to that customer based on that customer's demand. As indicated in Section 6, the peak demand for a customer with small scale generation is at least equal to the demand of a customer without such generation.

¹⁴ Integral Energy, 'Regulatory Proposal to the Australian Energy Regulator 2009 to 2014', 2 June 2008, p.27.

¹⁵ Country Energy, 'Electricity Network Regulatory Proposal 2009-2014', 2 June 2008, p.84.

¹⁶ AGL Electricity, '2006 Electricity Distribution Price Review – Submission by AGL Electricity Limited', October 2004, p.29.

¹⁷ ActewAGL, 'ActewAGL Distribution Determination 2009-14 – Regulatory Proposal to the Australian Energy Regulator 2009 to 2014', June 2008, p.92.

¹⁸ For representative examples of summer and winter residential customer demand within Western Power's SWIN, refer to attachment A and attachment B of this report, respectively.

8.2.2 Criteria 2 - Limiting Cross Subsidies

A cross subsidy is essentially where a customer is paying a price that is not reflective of the costs incurred in serving them and therefore their decisions on whether to use an asset impact on the costs borne by other users.

ETSA Utilities, in its *2010-11 Pricing Proposal*, defined an economic cross subsidy from or to other customers to exist:

“Where the price to a tariff class falls outside the range between the avoidable incremental cost of supply and the cost of stand-alone supply”¹⁹

The extent of cross subsidisation present will be relative to the degree of cost reflectivity achieved in the tariff design. It is generally accepted that cross subsidies are minimised where the cost of providing a service exceeds the incremental cost, or marginal cost, of that service. To illustrate this, Ergon Energy defined a tariff as being “free from cross subsidy” in its *Information Guide On Alternative Control Services Pricing 1 July 2010 To 30 June 2011* where:

“the price for a customer, or group of customers, recovers costs which are between the ‘floor’ price which is the incremental cost of service provision and a ‘ceiling’ price represented by the stand-alone cost of service provision”

This principle is also reflected in section 7.3(b)(i) of the *Electricity Networks Access Code 2004* where it is a requirement that the Reference Tariff applying to a user:

“at the lower bound, is equal to, or exceeds, the incremental cost of service provision”

Given that the output from renewable small scale generation systems, such as solar PV systems, may not be coincidental with peak demand and that there is a lack of certainty associated with the reliability of renewable generator systems, it could be assumed, all other things being equal, that the cost to the network of a customer with a small scale generator installed will be approximately the same as a customer without a small scale generator installed. This is consistent with the data provided by Western Power which suggests that customers with small scale generation have at least the same peak demand as customers without such generation.

8.2.3 Criteria 3 - Administrative Simplicity for Western Power, Retailers and Customers

Western Power forecasts that it will have over 50,000 small scale generation systems in its network in the next 12 months, with projections of between 160,000 to 280,000 small scale generation systems by 2017²⁰. For this reason, it would be prudent to design a Reference Service and a Reference Tariff that:

- ▶ Requires as little administrative amendments to Western Power’s current practices as possible
- ▶ Requires as little up-front and ongoing complexity to customers and retailers as possible
- ▶ Avoids, to the greatest extent possible, customers with small scale generation systems being on different tariffs

¹⁹ ETSA Utilities’ Pricing Proposal 2010-11, page i

²⁰ Estimate provided by Western Power

8.2.4 Criteria 4 - Barriers to Entry

In assessing the Reference Service and associated tariff design there is a need to consider whether any additional and unreasonable barriers to entry will be imposed on prospective customers. These include any additional up-front costs and reduced financial incentives.

8.2.5 Criteria 5 - Compatibility with the REBS and the Net Feed-in Tariff

Western Power recognises that any Option that it chooses must be compatible with the REBS and the Net Feed-in Tariff. This is because the schemes are currently operating in the market, are understood by customers, and have led to the request for the Reference Service to be established.

8.2.6 Criteria 6 - Metering Issues

In response to the issues raised during consultations, it was identified that any Option that Western Power chooses must, wherever practical and appropriate, minimise the need to replace or reprogram existing meters at customers' premises. In doing so, the costs associated with performing meter changes would also be minimised. Further, the Option must allow for meter data to be able to be presented on customers' bills.

8.2.7 Criteria 7 - Data Issues

In response to the issues raised during consultations, it was identified that any Option that Western Power chooses must, wherever practical and appropriate, recognise that issues and data gaps currently exist in meter interval data and that the factors causing these issues have not yet been resolved.

8.2.8 Criteria 8 - Billing and IT Systems Issues

In response to the issues raised during consultations, it was identified that any Option that Western Power chooses must, wherever practical and appropriate, minimise the scope of changes required to both Western Power and Synergy's billing and IT systems in order to implement and administer the bi-directional Reference Tariffs. In doing so, the costs associated with implementing the necessary changes would also be minimised.

8.2.9 Criteria 9 - Transactional Costs

In response to the issues raised during consultations, it was identified that any Option that Western Power chooses must, wherever practical and appropriate, minimise transactional (administrative) costs associated with implementing and administering the bi-directional Reference Tariffs.

8.2.10 Criteria 10 - Tariff Design Issues

In response to the issues raised during consultations, it was identified that if Western Power chooses to adopt a time of use tariff, that wherever practical and appropriate the time periods align with those in existing reference and/or retail tariffs. This would minimise the implementation costs associated with the new Reference Tariff and ensure that appropriate tariff signals are sent to customers without significant distortion.

8.2.11 Criteria 11 - Equity Issues

In response to the issues raised during consultations with the Office of Energy, it was identified that any Option that Western Power chooses must, wherever practical and appropriate, ensure that customers with small scale generation do not bear higher implementation and metering costs or face a significantly different charging mechanism to their existing tariff arrangements. The Office of Energy considers that not meeting these requirements would be contrary to the Western Australian Government's policy direction to encourage small scale renewable generation.

The preferred Option should also minimise the risk of price shocks to customers under the new Reference Tariff, and should be consistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments. Specifically, clause 3 (c) requires that the "assignment of tariffs to small renewable consumers should be on the basis that they are treated no less favourably than customers without small renewable but with a similar load on the network" (where load is defined as either demand or energy).

8.2.12 Criteria 12 - Compliance Issues

Western Power recognises that any Option that it chooses must meet the requirements of all regulatory and legislative instruments, including the technical rules the *Electricity Networks Access Code 2004* and the *Electricity Industry Metering Code 2005*. Further, Western Power recognises that any Option that it chooses must be capable of being modelled using its existing tariff modelling capabilities.

9. Evaluation of the Initial Options

9.1 Purpose of this section

The purpose of this section is to detail the assessment of each of the initial five Options against the criteria set out and defined in Chapter 8 of this report. The initial options were defined in the draft report and were the basis of comments from stakeholders during the second round of consultation.

Specifically, section 9.2 sets out the evaluation of each of the initial five Options against the assessment criteria, and section 9.3 sets out a financial evaluation of each of the Options, having regard for the initial upfront costs to implement the tariff, and the ongoing annual costs for both Western Power and Synergy.

Note that section 10 details the assessment of the final options identified during the second round of consultation.

9.2 Evaluation of options against each criteria

The following sections set out a detailed evaluation of each of the initial five Options against the criteria set out in the previous chapter of this Report. As the Options for the residential bi-directional Reference Services and Reference Tariffs are similar to the equivalent Options for commercial bi-directional Reference Services and Reference Tariffs, the Options for both residential and commercial bi-directional Reference Services and Reference Tariffs are considered together in the sections below.

In evaluating each of the initial five Options, priority was placed on those criteria relating to economic efficiency (Criteria 1 and 2), administrative simplicity (Criteria 3) and equity (Criteria 11).

9.2.1 Option 1

| Criteria | Assessment of Option Against the Criteria |
|---|---|
| <p>Criteria 1 - Ensuring that Tariffs Reflect Cost and Send Price Signals</p> | <p>Option 1 has a weaker relationship with cost than Options 3, 4 and 5, but has a stronger relation than Option 2. Unlike Option 2, Option 1 will reflect costs in a manner consistent with the existing approved Reference Tariffs. This is because the export charge, in combination with the import charges, will ensure that the total charges for electricity exported and imported to the network will be similar to the total charges paid by customers who only import electricity from the network, all other things being equal. This is important, because the peak demand for customers with small scale generation is similar to the peak demand of customers without small scale generation, and hence the charges recovered from customers with and without small scale generation should be similar, all other things being equal.</p> <p>From the data provided by Western Power, there is evidence to suggest that over time, the peak demand of the average customer with small scale generation is likely to increase, and the average amount of electricity imported from the network by these customers is also expected to increase. Notwithstanding this, an individual customer with small scale generation is expected to consume less electricity than a similar customer without small scale generation, even though both customers will have the same peak demand. Option 1 accommodates this through the inclusion of generation charges to compensate for the lower charges for imported electricity. This ensures that total charges paid by customers with small scale generation continue to reflect the cost to supply those customers.</p> <p>The ability for customers to choose to have a time of use tariff structure apply</p> |

| Criteria | Assessment of Option Against the Criteria |
|--|--|
| | to imported electricity will result in price signalling to those customers, but unless all customers voluntarily choose this arrangement, this price signal will not reach all customers, and hence Western Power's ability to influence customer behaviour will be diminished. However, the export charges to apply to all users will provide a signal to users of their use of the LV network while they are generating and exporting electricity to the network, and in this way Option 1 sends stronger price signals to customers than Option 2. However, the signals are not as strong as Option 3, 4 or 5 as they are flat volumetric charges and neither demand nor time of use charges |
| Criteria 2 - Limiting Cross Subsidies | Option 1 does not result in cross-subsidisation. This is because the export charges will compensate for the lower charges for imported electricity, ensuring that there is no cross subsidisation of customers with small scale generation by those without such generation, or vice versa |
| Criteria 3 - Administrative simplicity to Western Power, Retailers and Customers | Option 1 is the second most administratively simple of the Options behind Option 2, and is more administratively simple than the existing RT12. Option 1 involves no change to the current practice of installing a two channel meter for small scale generators, but will involve a change to Western Power and Synergy's billing systems to handle the calculation and processing of network charges for exported electricity. However, based on consultations with Synergy, this is not expected to be a significant change as the export values are already being collected for the purpose of the feed-in tariff. It would also involve a change to the existing tariff arrangements paid by customers with small scale generation installed as all new and existing customers would be required to pay network charges on exported electricity under RT1 and RT3. However, there would be no change to the tariff arrangements paid by customers for electricity imported from the network, nor would there be a need to existing customers' metering arrangements in any way |
| Criteria 4 - Barriers to Entry | Option 1 does not present any additional barriers to entry for customers wanting to install small scale generators at bi-directional points |
| Criteria 5 - Compatibility with the REBS and the Net Feed-in Tariff | Option 1 is compatible with the REBS and the Net Feed-in Tariff |
| Criteria 6 - Metering Issues | Option 1 does not require reprogramming or replacement of existing meters, and hence no additional metering costs would be incurred by customers or Western Power. Meter data can be presented on the customer's bill in the same way as it is currently being presented |
| Criteria 7 - Data Issues | Option 1 would pose no additional data issues than under the current arrangements as the consumption component of the tariff is structured identically to existing Reference Tariffs, and the export component is a flat rate volumetric charge |
| Criteria 8 - Billing and IT Systems Issues | Option 1 will only require changes to Billing and IT systems to reflect the sending out of electricity exported to the network, as the existing Reference Tariff structures will be used for electricity imported from the network |
| Criteria 9 - Transactional Costs | While Option 1 will result in some costs being borne by Western Power and Synergy associated with administrative and system changes to implement the new export charges, these costs will be considerably less than the transactional costs associated with the existing RT12 tariff. This is because import component of the tariff is structured identically to the existing Reference Tariffs. However, transactional costs will be higher than Option 2 due to the implementation of the new export charges |
| Criteria 10 - Tariff Design Issues | Option 1 removes the issues identified with the time of use periods not aligning with the existing network time of use periods. This is because the import component of the tariff is structured identically to the existing Reference Tariffs. Synergy has indicated this Option will require the need to develop a new retail tariff offering which would ensure that the network charge for exported electricity is recovered. However, from the perspective of electricity imported from the network, this retail tariff will be the same as Synergy's existing tariffs for residential users |

| Criteria | Assessment of Option Against the Criteria |
|---------------------------------|--|
| Criteria 11 - Equity issues | <p>No customers would be worse off under the new arrangement, although the amount paid to customers exporting electricity to the network would be less than under Option 2 due to the new export charges.</p> <p>Customers who generate but do not export electricity to the network would face the least network charges (as they only pay network charges on their imported electricity but none for exported electricity as they do not export electricity to the network).</p> <p>Customers who generate and export electricity to the network would still realise a greater financial gain than those who do not have small scale generation, or do not have sufficient generation to send out electricity to the network, as the feed in tariff will be significantly greater than the export charges (refer to the table in section 9.4). In this way, Option 1 does not materially diminish the incentive for customers to install small scale generation.</p> <p>Option 1 also eliminates the likelihood of price shocks as there is no change to existing tariffs rate paid for imported electricity, and the export tariff rate will always be less than feed-in tariff rate.</p> <p>Option 1 is also consistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments. This is because customers with small scale generation will not face higher charges, even with the inclusion of the export charges, than customers without small scale generation. This is because the costs to be recovered are based on equal demand.</p> |
| Criteria 12 - Compliance Issues | <p>No compliance issues have been identified with the technical rules, the Electricity Networks Access Code 2004 or the Electricity Industry Metering Code 2005. This is because the tariff for imported electricity is identical in structure to existing Reference Tariffs which are already compliant with these instruments, and the export tariff is a volumetric flat tariff.</p> <p>The tariff is capable of being modelled using Western Power's existing tariff modelling arrangements. This is because the tariff for imported electricity is identical in structure to existing Reference Tariffs and historical data for both imported and exported electricity is already available for modelling purposes</p> |

9.2.2 Option 2

| Criteria | Assessment of Option Against the Criteria |
|--|--|
| Criteria 1 - Ensuring that Tariffs Reflect Cost and Send Price Signals | <p>Option 2 has a weaker relationship with cost than all other Options. This is because customers with small scale generation consume less electricity than similar customers without small scale generation, even though both customers will have the same peak demand. Under Option 2, the absence of an export charge means that the charges paid by customers with small scale generation will be lower than those without small scale generation, and hence will not reflect the cost to supply those customers.</p> <p>The ability for customers to choose to have a time of use tariff structure apply to imported electricity will result in price signalling to those customers, but unless all customers voluntarily choose this arrangement, this price signal will not reach all customers, and hence Western Power's ability to influence customer behaviour will be diminished. Further, the absence of the export charges to apply to all users will further diminish Western Power's ability to influence customer behaviour</p> |
| Criteria 2 - Limiting Cross Subsidies | <p>Option 2 does present some cross-subsidisation. This is because the peak demand from the network is the same for individual customers with small scale generation consume less electricity than a similar customer without small scale generation, even though both customers have the same peak demand. As such, customers with small scale generation pay less in network charges than customers without such generation, meaning that Option 2 will result in customers with small scale generation being subsidised by those without such generation</p> |
| Criteria 3 - Administrative simplicity to Western Power, Retailers and Customers | <p>Option 2 is the most administratively simple of the Options. Option 2 involves no change to the current practice of installing a two channel meter for small scale generators and no material change to Western Power and Synergy's billing systems.</p> |

| Criteria | Assessment of Option Against the Criteria |
|---|---|
| | There would be no change to the existing tariff arrangements paid by customers with small scale generation installed as all new and existing customers would be required to pay network charges on imported electricity in the same way as if there was no small scale generation. Finally, existing customers' metering arrangements would not need to change in any way |
| Criteria 4 - Barriers to Entry | Option 2 does not present any additional barriers to entry for customers wanting to install small scale generators at bi-directional points |
| Criteria 5 - Compatibility with the REBS and the net Feed-in Tariff | Option 2 is compatible with the REBS and the net Feed-in Tariff |
| Criteria 6 - Metering Issues | Option 2 does not require reprogramming or replacement of existing meters, and hence no additional metering costs would be incurred by customers or Western Power. Meter data can be presented on the customer's bill in the same way as it is currently being presented |
| Criteria 7 - Data Issues | Option 2 would pose no additional data issues than under the current arrangements as it uses existing Reference Tariffs |
| Criteria 8 - Billing and IT Systems Issues | Option 2 would not require any changes to Billing and IT systems as the existing Reference Tariffs will be used for electricity imported from the network |
| Criteria 9 - Transactional Costs | Option 2 would not require any administrative and system changes as the existing Reference Tariffs will be used for electricity imported from the network |
| Criteria 10 - Tariff Design Issues | Option 2 removes the issues identified with the time of use periods not aligning with the existing network time of use periods. This is because the import component of the tariff is structured identically to the existing Reference Tariffs. Also, Synergy will not need to develop a new retail tariff offering as the existing retail tariffs could be used. |
| Criteria 11 - Equity issues | No customers will be worse off under Option 2. Option 2 also eliminates the likelihood of price shocks as there is no change to existing tariffs rate paid for imported electricity, and there is no tariff for exported electricity. Option 2 is also consistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments. This is because customers with small scale generation will not face higher charges than customers without small scale generation |
| Criteria 12 - Compliance Issues | No compliance issues have been identified with the technical rules, the Electricity Networks Access Code 2004 or the Electricity Industry Metering Code 2005. This is because the existing Reference Tariffs will be used. |

9.2.3 Option 3

| Criteria | Assessment of Option Against the Criteria |
|--|---|
| Criteria 1 - Ensuring that Tariffs Reflect Cost and Send Price Signals | Option 3 has the strongest relationship with cost of all the Options as it is determined by the customer's reserved capacity on the network. A customer with a small scale generator installed will pay the same as a customer without a small scale generator unless that customer is able to effectively utilise their small scale generation to reduce their demand on the network at peak time. In this case, the customer with the small scale generator would then pay less than a similar customer without a small scale generator. In this way, customers are being charged based on their usage of the network on a demand basis, rather than using consumption as a proxy. Price signalling is stronger than the other Options. This is because charging customers on the basis of their monthly peak demand would clearly signal a customer's impact on the network. Where a customer with a small scale generator can reduce their peak demand on the network through the use of their small scale generation, they will be charged less than a customer with a demand charge for imported electricity but without small scale generation |
| Criteria 2 - Limiting Cross Subsidies | Option 3 involves the least cross subsidisation of all of the Options. By charging customers on the basis of their monthly peak demand, there is no means by which customers without small scale generators can cross-subsidise |

| Criteria | Assessment of Option Against the Criteria |
|---|---|
| | <p>customers with small scale generation because each customer is charged based on their peak demand on the network, not a proxy based on consumption. Where a customer with a small scale generator can reduce their peak demand on the network through the use of their small scale generation, they will be charged less than a customer without small scale generation. Where a customer with a small scale generator is unable to reduce their peak demand on the network, they will be charged the same as a customer without small scale generation</p> |
| <p>Criteria 3 - Administrative simplicity to Western Power, Retailers and Customers</p> | <p>Option 3 is the most administratively complex of the Options. Option 3 would involve all new customers having a time of use interval meter capable of measuring kVA demand installed, with a time of use interval meter capable of measuring kVA demand to be rolled out to all existing customers with small scale generation. Alternatively, to avoid having to replace existing customers' meters, the current tariffs for existing customers with small scale generation could be grandfathered. However, this would introduce two classes of customer with small scale generation, further increasing the administrative complexity of implementing the bi-directional tariff.</p> <p>Under Option 3, a reference tariff similar to other demand tariffs currently offered by Western Power would apply to customers with small scale generation. While there would be costs to update Western Power and Synergy's billing and IT systems, the costs would not be as high as those to implement the existing RT12 as these tariffs are currently already offered to customers.</p> <p>If grandfathering of the tariffs paid by existing customers with small scale generation were adopted, there would be no change to the existing tariff arrangements paid by customers with small scale generation installed as only new customers would be required to pay for the time of use interval meters capable of measuring kVA demand</p> |
| <p>Criteria 4 - Barriers to Entry</p> | <p>Option 3 presents an increased cost to residential and commercial customers requiring new single phase meters, with the exception of those commercial customers with existing meters capable of measuring demand. The application of this tariff may remove some of the financial incentive for customers to install small scale generators compared with under the other Options</p> |
| <p>Criteria 5 - Compatibility with the REBS and the net Feed-in Tariff</p> | <p>Option 3 involves the installation of a new single phase meter in addition to a new tariff structure. Adjustment to the REBS and the net Feed-in Tariff would need to be discussed with Synergy</p> |
| <p>Criteria 6 - Metering Issues</p> | <p>If grandfathering of the tariff and metering arrangements is not adopted for existing customers with small scale generation, replacement of existing meters will be necessary under this Option, and hence additional metering costs would be incurred by the customer or Western Power.</p> <p>Further, under this Option, meter data will not be able to be presented on the customer's bill in the same manner as it is currently being presented. This is because the data is interval data rather than accumulation data</p> |
| <p>Criteria 7 - Data Issues</p> | <p>The Reference Tariff under Option 3 would face similar data issues as the existing RT12 because it relies on interval data</p> |
| <p>Criteria 8 - Billing and IT Systems Issues</p> | <p>No significant changes required as the Reference Tariff structure matches the structure of other demand tariffs currently offered by Western Power, and there is no generation tariff. However the use of interval data required by this option poses significant costs</p> |
| <p>Criteria 9 - Transactional Costs</p> | <p>The transactional costs associated Option 3 would be of a similar magnitude to the transactional costs for the existing RT12 tariff, regardless of whether or not grandfathering of the tariffs paid by existing customers with small scale generation is adopted. If grandfathering is adopted, two classes of customer will need to be handled by both Western Power and Synergy. If grandfathering is not adopted, administrative and system changes will still be required to recognise customers on the new bi-directional tariff rather than their existing tariffs</p> |
| <p>Criteria 10 - Tariff Design Issues</p> | <p>Option 3 removes the issues identified with the time of use periods not aligning with the existing network or retail time of use periods. This is because the</p> |

| Criteria | Assessment of Option Against the Criteria |
|---------------------------------|---|
| | <p>structure of the tariff is the same as the other demand tariffs currently offered by Western Power.</p> <p>Synergy will need to develop a new retail tariff offering which would reflect the new bi-directional Reference Tariff, however this would be structurally the same as Synergy's existing tariffs for customers on the other demand tariffs currently offered by Western Power</p> |
| Criteria 11 - Equity issues | <p>Whilst Option 3 will result in the strongest price signalling to customers of all of the Options, introducing this tariff only to customers with small scale generation raises the same issue of equity as was raised of the existing RT12 Reference Tariff, because a similar tariff structure will not be applied to customers without small scale generation. Further, in the absence of grandfathering arrangements, customers with small scale generation but without time of use interval meters capable of measuring demand would be required to change their meters at an additional cost.</p> <p>Option 3 may increase the likelihood of price shocks as some customers will be charged on a different basis to their existing consumption-based arrangements and the possibility exists for some customers to pay more on a demand based tariff than on a consumption based tariff.</p> <p>Option 3 is inconsistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments. This is because customers with small scale generation may face higher charges than customers without small scale generation. The only way to ensure this requirement would be met would be to shift all customers (with and without small scale generation) to the Reference Tariff structure under Option 3</p> |
| Criteria 12 - Compliance Issues | <p>No compliance issues have been identified with the technical rules, the Electricity Networks Access Code 2004 or the Electricity Industry Metering Code 2005. This is because the tariff is similar in structure to existing Reference Tariffs which are already compliant with these instruments.</p> <p>The tariff is capable of being modelled using Western Power's existing tariff modelling arrangements. This is because the tariff is similar in structure to existing Reference Tariffs and historical data is already available for modelling purposes</p> |

9.2.4 Option 4

| Criteria | Assessment of Option Against the Criteria |
|--|--|
| Criteria 1 - Ensuring that Tariffs Reflect Cost and Send Price Signals | <p>For residential customers, Option 4 will have a stronger relationship with cost than Options 1 and 2, with the higher peak demand charge operating as an incentive to reduce or shift consumption patterns. Option 4 would not be as cost reflective as Option 3, due to the method of charging being based on electricity consumption rather than demand.</p> <p>Price signalling is stronger than Options 1 and 2, but not Option 3. While the time of use structure with an on-peak rate higher than the flat tariff rate sends a clear signal to users at peak times, it still uses consumption as a proxy for demand. However, it is likely that residential customers would be best placed to respond to the price signals, as commercial customers may not be able to shift their load out of peak times to avoid the higher on-peak charges</p> |
| Criteria 2 - Limiting Cross Subsidies | <p>Option 4 may reduce or limit cross subsidisation that would occur when customers with small scale generation pay less than customers with no small scale generation even though their network capacity requirements are the same or similar. The higher peak rate under the three time period structure provides an incentive to change consumption patterns to achieve cost savings and reduce the customer's network usage at peak times. Where a customer does not alter their behaviour (and therefore not change their network usage at peak time), the higher peak rate ensures that that customer pays the same amount as a customer without small scale generation</p> |
| Criteria 3 - Administrative simplicity to Western Power, Retailers and Customers | <p>Option 4 involves no change to existing practices in the approval of the connection application, and no changes to metering and meter data collection processes. This is because the two channel meters currently installed when a customer connects a small scale generator are capable of recording 5 channels of information suitable for time of use tariffs. The new distribution tariff would</p> |

| Criteria | Assessment of Option Against the Criteria |
|---|--|
| | <p>need to be designed and implemented and a decision would need to be made on whether to transition existing REBS customers to the new arrangements. If Western Power elected to transition these customers - therefore declaring the status quo redundant - then there would be a large cost impost on customers for metering changes and the extent of tariff increases would need to be assessed in the context of allowable side constraints. If Western Power elected not to transition these customers, then there would be two classes of customers - those existing as at the date that the existing arrangement was declared obsolete, and new customers - receiving a bi-directional service</p> |
| Criteria 4 - Barriers to Entry | <p>The metering requirements and metering costs associated with Option 4 are the same as what currently exists and hence do not present any additional barriers to entry for customers wanting to install small scale generators at bi-directional points. However, the associated tariff may remove some of the existing financial incentive for customers to install small scale generators</p> |
| Criteria 5 - Compatibility with the REBS and the net Feed-in Tariff | <p>Option 4 is technically compatible with the REBS and the net Feed-in Tariff, although an adjustment would need to be made to the current retail tariff offering</p> |
| Criteria 6 - Metering Issues | <p>If grandfathering of the tariff and metering arrangements is not adopted for existing customers with small scale generation, reprogramming and partial replacement of existing meters will be necessary under Option 4, and hence additional metering costs would be incurred by the customer or Western Power Further, under Option 4, meter data will not be able to be presented on the customer's bill in the same manner as it is currently being presented. This is because the data is interval data rather than accumulation data</p> |
| Criteria 7 - Data Issues | <p>The Reference Tariff under Option 4 would be subject to the current data issues associated with the collection of interval data</p> |
| Criteria 8 - Billing and IT Systems Issues | <p>Significant changes would be required as the Reference Tariff structure does not match any of the existing Reference Tariff structures. These costs incurred by both Synergy and Western Power would potentially need to be passed on to customers</p> |
| Criteria 9 - Transactional Costs | <p>There will be additional administrative costs to both Western Power and Synergy associated with implementing Option 4, regardless of whether or not grandfathering of existing customers with small scale generation is adopted. If grandfathering is adopted, two classes of customer will need to be handled by both Western Power and Synergy. If grandfathering is not adopted, administrative and system changes will still be required to recognise customers on the new bi-directional tariff rather than their existing tariffs</p> |
| Criteria 10 - Tariff Design Issues | <p>Option 4 raises issues that the time of use periods do not align with the existing network or retail time of use periods. Synergy would need to develop a new retail tariff offering which would reflect the new Reference Tariff and time periods which would be structurally different to Synergy's existing tariffs for residential users. Alternatively, if new retail tariffs are not offered, the network price signalling would not be visible to users, thereby negating any benefit of introducing the Reference Tariff</p> |
| Criteria 11 - Equity issues | <p>Option 4 will result in clear price signalling to customers, although not as strong as Option 3. However introducing this tariff only to customers with small scale generation raises the issue of equity, because a similar tariff structure will not be applied to customers without small scale generation. Further, in the absence of grandfathering arrangements, many customers with small scale generation would require their meters to be reprogrammed to align the time of use periods with the tariff time of use period at an additional cost.</p> <p>Option 4 may increase the likelihood of price shocks as some customers will be charged on a different basis to their existing arrangements and the possibility exists that some customers would pay more if they are unable to shift their usage out of peak demand times.</p> <p>Option 4 may be inconsistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments. This is because customers with small scale generation may face higher charges than customers without small scale generation (even considering the similar peak usage). The only way to ensure this requirement would be met would be</p> |

| Criteria | Assessment of Option Against the Criteria |
|---------------------------------|---|
| | to shift all customers (with and without small scale generation) to the Reference Tariff structure under Option 4 |
| Criteria 12 - Compliance Issues | No compliance issues have been identified with the technical rules, the Electricity Networks Access Code 2004 or the Electricity Industry Metering Code 2005. This is because the tariff has already been assessed as compliant with these instruments. The tariff is capable of being modelled using Western Power's existing tariff modelling arrangements. This is because the tariff and its associated parameters have already been established |

9.2.5 Option 5

| Criteria | Assessment of Option Against the Criteria |
|--|---|
| Criteria 1 - Ensuring that Tariffs Reflect Cost and Send Price Signals | As per Option 4 |
| Criteria 2 - Limiting Cross Subsidies | As per Option 4 |
| Criteria 3 - Administrative simplicity to Western Power, Retailers and Customers | As per Option 4 |
| Criteria 4 - Barriers to Entry | As per Option 4 |
| Criteria 5 - Compatibility with the REBS and the net Feed-in Tariff | As per Option 4 |
| Criteria 6 - Metering Issues | If grandfathering of the tariff and metering arrangements is not adopted for existing customers with small scale generation, reprogramming of existing meters will be necessary under Option 5, and hence additional metering costs would be incurred by the customer or Western Power Meter data can be presented on the customer's bill in the same way as it is currently being presented |
| Criteria 7 - Data Issues | Option 5 would pose no additional data issues than under the current arrangements as it does not rely on interval data |
| Criteria 8 - Billing and IT Systems Issues | As per Option 4 |
| Criteria 9 - Transactional Costs | As per Option 4 |
| Criteria 10 - Tariff Design Issues | As per Option 4 |
| Criteria 11 - Equity issues | As per Option 4 |
| Criteria 12 - Compliance Issues | As per Option 4 |

9.3 Evaluation of the costs of implementing each option

The following sections set out a detailed evaluation of various costs associated with the implementation of each Option.

9.3.1 Assumptions

The following assumptions underpin the cost analysis set out in the following sections:

- ▶ There are 37,314 existing customers on the Renewable Energy Buyback Scheme (REBS) as at 28 February 2011

- ▶ There is estimated to be an additional 24,000 to 36,000 new customers on the Bi-directional Reference Tariff each year, with up to 240,000 customers expected to be on the Bi-directional Reference Tariff by 2017
- ▶ 36,414 existing meters will need to be reprogrammed at a cost of \$49.50 per meter excluding GST
- ▶ 200 new single phase meters will need to be installed at a cost of \$115.50 per meter
- ▶ 100 new three phase meters will need to be installed at a cost of \$203.50 per meter
- ▶ 600 new communications equipment installations on existing interval capable meters will required at a cost of \$858.00 per meter
- ▶ 100 new meter probes for reading interval data will need required at a cost of \$1000.00 per probe. The cost of these interval data probes will be absorbed by Western Power and not passed on to retailers
- ▶ Increased interval meter reading costs of one dollar for each bi-monthly reading will be incurred, and will be initially absorbed by Western Power but will eventually be passed on to retailers
- ▶ The costs associated with Western Power's billing system changes will be absorbed by Western Power and not passed on to retailers

9.3.2 Metering costs

The tables below set out the upfront costs to Western Power associated with the metering arrangements for each of the initial five Options. Specifically, the table below sets out the costs of meter reprogramming, new meters (single and three phase), communications equipment, probes and meter reading if no grandfathering of existing arrangements is adopted:

| Upfront Meter Costs - No Grandfathering Arrangements | | | | | |
|--|----------|----------|-------------|-------------|-------------|
| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| Meter reprogramming | \$0 | \$0 | \$1,802,493 | \$1,802,493 | \$1,802,493 |
| New single-phase meters | \$0 | \$0 | \$23,100 | \$23,100 | \$23,100 |
| New three-phase meters | \$0 | \$0 | \$20,350 | \$20,350 | \$20,350 |
| Communications equipment | \$0 | \$0 | \$514,800 | \$514,800 | \$514,800 |
| Interval data probes | \$0 | \$0 | \$120,000 | \$120,000 | \$0 |
| Increased meter reading charges for interval data | \$0 | \$0 | \$223,884 | \$223,884 | \$0 |
| Totals | \$0 | \$0 | \$2,704,267 | \$2,704,267 | \$2,360,743 |

Options 1 and 2 require no additional metering costs and are hence the lowest cost Options in relation to all of the metering costs considered. Options 3 and 4 would incur the highest costs. Option 5, which does not require interval meter reading but still involves replacement or reprogramming of existing meters, results in a lower cost than Options 3 or 4. However, should grandfathering of existing arrangements be adopted, there will be no additional metering cost under any of the Options, thereby avoiding up to \$2,684,267 of costs under Options 3 and 4, and \$2,360,743 of costs under Option 5.

The table below sets out the ongoing annual costs associated with meter charges and interval meter reading charges for new customers. Note there are no additional increased meter charges as all new meters installed will interval meters:

| Ongoing Annual Meter Costs | | | | | |
|---|----------|----------|-----------|-----------|----------|
| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| Increased meter charges | \$0 | \$0 | \$0 | \$0 | \$0 |
| Increased meter reading charges for interval data | \$0 | \$0 | \$144,000 | \$144,000 | \$0 |
| Increased storage costs for interval data | \$0 | \$0 | 40,000 | 40,000 | \$0 |
| MBS interval meter licence costs | \$0 | \$0 | 120,000 | 120,000 | \$0 |
| Totals | \$0 | \$0 | \$304,000 | \$304,000 | \$0 |

Again, Options 1 and 2 require no additional metering costs and are hence the lowest cost Options in relation to all of the metering costs considered. Options 3 and 4 would incur the highest costs, however Option 5 would result in no additional cost. The costs incurred under Options 3 and 4 would still be incurred regardless of whether grandfathering of existing arrangements is adopted.

9.3.3 Billing system and Tariff Variation costs

The table below sets out the costs to Western Power associated with the billing system and tariff variations for each of the initial five Options for Western Power’s existing customers. Specifically, the table below sets out the costs of changing the billing system to accommodate interval data, export charges, tariff variations and maximum demand calculations regardless of whether grandfathering of existing arrangements is adopted:

| Billing System and Tariff Variations Costs | | | | | |
|--|----------|----------|-----------|-----------|----------|
| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| MBS/NetCiss variations for interval data | \$0 | \$0 | \$0 | \$0 | \$0 |
| MBS/NetCiss variations for export charges | \$0 | \$0 | \$0 | \$0 | \$0 |
| MBS variation to calculate maximum demand | \$0 | \$0 | \$0 | \$0 | \$0 |
| Automate MRIM (Type5) download/upload | \$0 | \$0 | \$162,000 | \$162,000 | \$0 |
| Tariff variations | \$95,000 | \$95,000 | \$116,500 | \$24,000 | \$31,000 |
| Totals | \$95,000 | \$95,000 | \$278,500 | \$186,000 | \$31,000 |

Option 5 is the lowest cost Option in relation to all of the billing system and tariff variation costs considered, because the majority of the costs associated with this Option have already been incurred in establishing the existing RT12 reference tariff. The tariff

variation costs would be considerably higher if the existing RT12 reference tariff had not previously been implemented. Options 1 and 2 incurring the next lowest costs, and Option 3 would incur the highest costs.

9.3.4 Retailer incurred costs

The tables below set out the costs to Synergy associated with the system variations required for each of the initial five Options for existing customers. Specifically, the table below sets out the costs of changing Synergy's internal systems to accommodate interval data and new tariffs regardless of whether grandfathering of existing arrangements is adopted:

| Retailer costs incurred - No Grandfathering Arrangements | | | | | |
|--|-------------|-------------|-------------|-------------|-------------|
| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| New Product Costs | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 | \$1,000,000 |
| Interval Data Costs | \$0 | \$0 | \$500,000 | \$500,000 | \$0 |
| Customer Education Costs | \$250,000 | \$250,000 | \$250,000 | \$250,000 | \$250,000 |
| Totals | \$1,250,000 | \$1,250,000 | \$1,750,000 | \$1,750,000 | \$1,250,000 |

Synergy, in providing these estimated costs, indicated that any Option that varied existing Reference Tariffs would require a new retail tariff. On this basis, all of the initial five Options will incur New Product Costs and Customer Education costs. However, unlike the other Options, Options 3 and 4 incur interval meter data costs and are hence the highest cost Options for Synergy.

9.4 Estimated Tariff Prices for each option for residential customers

The table below compares the Reference Tariff structures and tariff prices for each of the initial five Options, based on tariff modelling for residential customers performed by Western Power. The tariffs are based on those set out in the 2011-12 Price List, with the exception of Option 3.

Based on analysis of residential customers using interval meter data which indicated that the demand for a customer with small scale generation is at least equal to the demand of a customer without small scale generation (see Section 6), the costs to be recovered from the group of customers with small scale generation were determined. Using the 2011/12 Price List as a base²¹ the charges for Options 3, 4 and 5, as well as the export charge for Option 1 were estimated, based on the methodology described in Appendix B. Two scenarios have been provided for both Option 1 and Option 2, whereby the existing flat-rate Reference Tariff (RT1) and the existing time of use Reference Tariff (RT3) are presented.

Based on the modelling provided by Western Power, if Option 1 were offered in 2011-12, an export charge of 7 cents per kWh of electricity sent out to the network would be charged to customers with small scale generation.

²¹ The 2011/12 Price List will be published on the Economic Regulation Authority's web-site in May 2011: http://www.erawa.com.au/2/486/48/electricity_access__price_determinations.pm

| Option Pricing Outcomes | Option | Option 1 | | Option 2 | | Option 3 | Option 4 | Option 5 |
|---|--------------------|----------------|-------------|----------------|-------------|----------|-------------|-------------|
| | Import Tariff | RT1 | RT3 | RT1 | RT3 | N/A | RT12 | RT12 |
| | Tariff Description | Anytime Energy | Time of Use | Anytime Energy | Time of Use | Demand | Time of Use | Time of Use |
| Data type | Register | | | Register | | Interval | Interval | Register |
| Fixed price per day for consumption | cents/day | 36.464 | 36.464 | 36.464 | 36.464 | 0.000 | 36.464 | 36.464 |
| Variable price per kWh for consumption | cents/kWh | 6.863 | - | 6.863 | - | - | - | - |
| Variable on-peak price for consumption | cents/kWh | - | 11.513 | - | 11.513 | - | 15.210 | 15.210 |
| Variable off-peak price for consumption | cents/kWh | - | 2.587 | - | 2.587 | - | 6.863 | 6.863 |
| Variable shoulder price for consumption | cents/kWh | - | - | - | - | - | 2.587 | 2.587 |
| Demand c/kVA/day | c/kVA/day | | | | | 151.129 | - | - |
| Variable price per kWh for export | cents/kWh | 7.000 | 7.000 | - | - | - | - | - |

9.5 Initial Options Summary Assessment

A summary of the assessments of the initial five Options is set out below.

| Evaluation criteria | Options | | | | |
|--|--|--|--|---|---|
| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
| Criteria 1 - Ensuring that Tariffs Reflect Cost | Cost reflective, but may be a weaker relationship to cost than Options 3, 4 or 5 | Not cost reflective and the weakest relationship with cost | Strongest relationship with cost imposed on network due to demand basis of tariff | Depending on design, potentially a stronger cost relationship than Option 1 and Option 2 due to price signalling from peak/non peak rates | Depending on design, potentially a stronger cost relationship than Option 1 and Option 2 due to price signalling from peak/non peak rates |
| Criteria 2 - Limiting Cross Subsidies | Unlikely to be material cross subsidisation of customers with small scale generation by customers without such generation, or vice versa | Some cross subsidisation of customers with small scale generation by customers without such generation | Least degree of cross subsidisation as customers pay for precisely the amount of reserved capacity they require | Depending on design - minimises cross subsidisation due to the likely impact of price signals on peak demand | Depending on design - minimises cross subsidisation due to the likely impact of price signals on peak demand |
| Criteria 3 - Administrative Simplicity by Western Power, Retailers and Customers | Second most administratively simple Option - no change to metering practices, only change is the application of a new flat-rate volumetric export charge | Most administratively simple Option - no changes to metering or existing tariff arrangements is required | Most administratively complex Option - new single phase interval meter required and associated data requirements, in addition to implementation of new tariff arrangements | Second most administratively complex Option | Second most administratively complex Option |
| Criteria 4 - Barriers to Entry | No additional barriers to entry | No additional barriers to entry | Highest up-front costs of the Options and potentially weaker financial incentive than the other Options | No additional barriers to entry, although potentially weaker financial incentive than the other Options | No additional barriers to entry, although potentially weaker financial incentive than the other Options |
| Criteria 5 - Compatibility with the REBS | Compatible | Compatible | Involves installation of new single phase meter and new tariff structure. Adjustment to REBS would need to be discussed with Synergy | Technically compatible with the REBS, although may require retail tariff adjustment | Technically compatible with the REBS, although may require retail tariff adjustment |
| Criteria 6 - Metering Issues | No change to existing | No change to existing | Existing customer meters need to be reprogrammed | Existing customer meters need to be reprogrammed | Existing customer meters |

| Evaluation criteria | Options | | | | |
|--|---|---------------------------|---|---|---|
| | metering | metering | or replaced | to recognise the new time periods, and some meters may require replacement | need to be reprogrammed |
| Criteria 7 - Data Issues | No additional data issues | No additional data issues | Data issues associated with interval data | Data issues associated with interval data | No additional data issues |
| Criteria 8 - Billing and IT Systems Issues | Changes required to implement the export charges, but uses existing Reference Tariff structure for imported electricity | No changes required | Changes required to recognise existing customers on the new tariff, but uses existing Reference Tariff structure | Changes required to recognise existing customers on the new tariff, and to establish the new tariff as it is not structurally the same as any other Reference Tariff | Changes required to recognise existing customers on the new tariff, and to establish the new tariff as it is not structurally the same as any other Reference Tariff |
| Criteria 9 - Transactional Costs | Minimises transactional costs, although costs associated with implementing new export charges | Least transactional costs | Transaction costs associated with moving customers from consumption to demand based tariffs | Transaction costs associated with moving customers from flat tariffs to time of use tariffs that do not align with existing time of use periods | Transaction costs associated with moving customers from flat tariffs to time of use tariffs that do not align with existing time of use periods |
| Criteria 10 - Tariff Design Issues | Changes would be required to recognise the export charges, but consumption component the same as existing Reference Tariffs | No changes required | Changes would be required to recognise the new tariff, but tariff structure similar to existing demand-based Reference Tariffs | Significant changes would be required as the Reference Tariff structure does not match any of the existing Reference Tariff structures | Significant changes would be required as the Reference Tariff structure does not match any of the existing Reference Tariff structures |
| Criteria 11 - Equity issues | No equity issues | No equity issues | Basis of charging is materially different to customers without small scale generation. Basis of charging is also materially different to the tariff the customer was on prior to connecting small scale generation. There is also a material risk of price shocks, and is inconsistent with clause 3 (c) of the National Principles for Feed- | Basis of charging is materially different to customers without small scale generation. Basis of charging is also materially different to the tariff the customer was on prior to connecting small scale generation. There is also a material risk of price shocks, and is inconsistent with clause 3 (c) of the National Principles for Feed- | Basis of charging is materially different to customers without small scale generation. Basis of charging is also materially different to the tariff the customer was on prior to connecting small scale generation. There is also a material risk of price shocks, and is inconsistent with clause 3 (c) of the National Principles for Feed- |

| Evaluation criteria | Options | | | | |
|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| | | | in Tariff Schemes | in Tariff Schemes | in Tariff Schemes |
| Criteria 12 - Compliance Issues | No compliance issues identified | No compliance issues identified | No compliance issues identified | No compliance issues identified | No compliance issues identified |
| Total Implementation Costs (Including Upfront and Ongoing costs for Western Power and Synergy) | \$1,345,000 | \$0 | \$5,037,127 | \$4,944,627 | \$3,641,743 |

10. Evaluation of the Final Options

10.1 Purpose of this section

Following the release of the draft version of this report, a second round of consultations was conducted by Western Power and Ernst & Young. Based on the initial outcomes of the consultation process, Western Power and Ernst & Young further narrowed the range of options under consideration for the purposes of Western Power's AA3 submission from the initial five Options evaluated in Chapter 9 of this report, to three Options - the initial Options 1 and 2 and a new Option 2A. This was because the other options (initial Options 3, 4, and 5) were considered by Western Power and stakeholders to have:

1. Administrative complexity (Options 3, 4 and 5)
2. Unreasonable barriers to entry (Option 3)
3. Potential incompatibility with REBS and the Feed-in tariff
4. Metering issues requiring substantial upfront and ongoing costs for Western Power, users and customers
5. Data issues associated with interval metering (Options 3 and 4)
6. High transactional costs (Options 3, 4 and 5)
7. Equity issues, in particular inconsistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes
8. Unreasonably high implementation costs (Options 3, 4 and 5).

Thus while Options 3, 4 and 5 were considered to most meet the economic efficiency criteria (ensuring that tariffs reflect cost, and limiting cross subsidies), they were unable to meet virtually any other criteria and, in particular, did not meet the important criteria of administrative simplicity and equity. Those options therefore did not resolve stakeholders' concerns.

The remainder of this report considers only Options 1, 2 and 2A (herein referred to as the "Final Options"), with Options 3, 4 and 5 no longer considered for proposing as part of Western Power's AA3 submission. As a consequence, this chapter provides an assessment of the new Option 2A against the criteria set out and defined in Chapter 8 of this report. This chapter also sets out a financial evaluation of Option 2A, having regard to the initial upfront costs to implement the tariff, and the ongoing annual costs for both Western Power and Synergy.

The Final Options are compared in a summary assessment set out in section 10.6.

10.2 Evaluation of Option 2A against each criteria

The following sections set out a detailed evaluation of Option 2A against the criteria set out in Chapter 8 of this report. As the Options for the residential bi-directional Reference Services and Reference Tariffs are similar to the equivalent Options for commercial bi-directional Reference Services and Reference Tariffs, the Options for both residential and commercial bi-directional Reference Services and Reference Tariffs are considered together in the sections below.

In evaluating Option 2A, priority was placed on those criteria relating to economic efficiency (Criteria 1 and 2), administrative simplicity (Criteria 3) and equity (Criteria 11).

| Criteria | Assessment of Option Against the Criteria |
|--|--|
| Criteria 1 - Ensuring that Tariffs Reflect Cost and Send Price Signals | Option 2A has a stronger relationship with cost than Option 2, but the same relationship as Option 1. This is because there is evidence to suggest that customers with small scale generation typically consume less electricity than similar customers without small scale generation, even though both customers have the same peak demand. However, under Option 2A, the higher fixed charge will act to ensure that the charges paid by customers with small scale generation will be similar to those without small scale generation for an otherwise similar customer, and hence will better reflect the cost to supply those customers than Option 2. |
| Criteria 2 - Limiting Cross Subsidies | Similar to Option 1, Option 2A would reduce the degree of cross-subsidisation (in a cost recovery sense) relative to Option 2. This is because the higher fixed charges will act to compensate for the lower charges for consumed electricity, ensuring that cross subsidisation of customers with small scale generation by those without such generation is minimised. |
| Criteria 3 - Administrative simplicity to Western Power, Retailers and Customers | Option 2A is as administratively simple as Option 2, and more administratively simple than Option 1. This is because all Options involve no change to the current practice of installing a two channel meter for small scale generators and no change to existing customers' metering arrangements, and all Options require Western Power and Synergy to implement the new tariffs. Only Option 1 requires the establishment of reference tariffs that are structurally different to the existing reference tariffs |
| Criteria 4 - Barriers to Entry | Unlike Option 2, the higher fixed charge under Option 2A may be perceived to be a barrier to entry, however Option 2A arguably poses lower barriers to entry than Option 1, because it would involve an explicit charge on generation |
| Criteria 5 - Compatibility with the REBS and the Net Feed-in Tariff | Similar to Option 1 and Option 2, Option 2A is compatible with the REBS and the Net Feed-in Tariff |
| Criteria 6 - Metering Issues | Similar to Option 1 and Option 2, Option 2A does not require reprogramming or replacement of existing meters, and hence no additional metering costs would be incurred by customers or Western Power. Meter data can be presented on the customer's bill in the same way as it is currently being presented |
| Criteria 7 - Data Issues | Similar to Option 1 and Option 2, Option 2A would pose no additional data issues than under the current arrangements as it uses the same structure as existing Reference Tariffs |
| Criteria 8 - Billing and IT Systems Issues | Similar to Option 1 and Option 2, Option 2A would require changes to Billing and IT systems to recognise the new tariffs, but unlike Option 1, Option 2A uses existing Reference Tariff structure of RT1 or RT3 |
| Criteria 9 - Transactional Costs | While Option 2A will result in some costs being borne by Western Power and Synergy associated with administrative and system changes to implement the new tariffs, these costs will be similar to Option 2, and considerably less than the transactional costs associated with Options 1. This is because the import component of the tariff is structured identically to the existing Reference Tariffs. |
| Criteria 10 - Tariff Design Issues | Similar to Option 1 and Option 2, Option 2A removes the issues identified with the time of use periods not aligning with the existing network time of use periods. This is because the import component of the tariff is structured identically to the existing Reference Tariffs. While Synergy will need to develop a new retail tariff offering which would reflect the new bi-directional Reference Tariff, this would be structurally the same as Synergy's existing tariffs for residential customers |
| Criteria 11 - Equity issues | Under Option 2A a customer with small scale generation will face a significantly higher fixed charge than customers without small scale generation. The higher fixed charges under Option 2A may pose a material disincentive to customers to take up small scale generation. This is despite the higher fixed charge not impacting on the incentive to customers to reduce the volumetric component of their bill by reducing their electricity consumption from the network. |

| Criteria | Assessment of Option Against the Criteria |
|---------------------------------|---|
| | <p>Option 2A also increases the likelihood of price shocks as the significantly higher fixed charges may not be offset by the reduction in the imported electricity and hence the variable charges.</p> <p>Option 2A is therefore potentially inconsistent with clause 3 (c) of the National Principles for Feed-in Tariff Schemes established by the Council of Australian Governments. This is because customers with small scale generation would face higher fixed charges than customers without small scale generation.</p> |
| Criteria 12 - Compliance Issues | Similar to Option 1 and Option 2, no compliance issues have been identified with the Technical Rules, the Electricity Networks Access Code 2004 or the Electricity Industry Metering Code 2005. |

10.3 Evaluation of the costs of implementing Option 2A

The following sections set out a detailed evaluation of various costs associated with the implementation of Option 2A, compared to Option 1 and Option 2 as set out in the report. Note that the same assumptions as set out in section 9.3.1 of this report have been adopted.

10.3.1 Metering costs

The tables below set out the upfront costs to Western Power associated with the metering arrangements for the final three Options. Specifically, the table below sets out the costs of meter reprogramming, new meters (single and three phase), communications equipment, probes and meter reading if no grandfathering of existing arrangements is adopted:

| Upfront Meter Costs - No Grandfathering Arrangements | | | |
|--|----------|----------|-----------|
| | Option 1 | Option 2 | Option 2A |
| Meter reprogramming | \$0 | \$0 | \$0 |
| New single-phase meters | \$0 | \$0 | \$0 |
| New three-phase meters | \$0 | \$0 | \$0 |
| Communications equipment | \$0 | \$0 | \$0 |
| Interval data probes | \$0 | \$0 | \$0 |
| Increased meter reading charges for interval data | \$0 | \$0 | \$0 |
| Totals | \$0 | \$0 | \$0 |

Options 1, 2 and 2A require no additional up-front metering costs and hence all three Options present the lowest up-front metering cost of all of the Options considered in the report.

The table below sets out the ongoing annual costs associated with meter charges and interval meter reading charges for new customers. Note there are no additional increased meter charges as all new meters installed will be interval meter capable:

| Ongoing Annual Meter Costs | | | |
|----------------------------|----------|----------|-----------|
| | Option 1 | Option 2 | Option 2A |
| Increased meter charges | \$0 | \$0 | \$0 |
| Increased | \$0 | \$0 | \$0 |

| Ongoing Annual Meter Costs | | | |
|---|----------|----------|-----------|
| | Option 1 | Option 2 | Option 2A |
| meter reading charges for interval data | | | |
| Increased storage costs for interval data | \$0 | \$0 | \$0 |
| MBS interval meter licence costs | \$0 | \$0 | \$0 |
| Totals | \$0 | \$0 | \$0 |

Again, Options 1, 2 and 2A require no additional metering costs and hence all three Options present the lowest ongoing metering cost of all of the Options considered in the report.

10.3.2 Billing system and Tariff Variation costs

The table below sets out the costs to Western Power associated with the billing system and tariff variations for both Options for Western Power’s existing customers. Specifically, the table below sets out the costs of changing the billing system to accommodate interval data, generation charges, tariff variations and maximum demand calculations regardless of whether grandfathering of existing arrangements is adopted:

| Billing System and Tariff Variations Costs | | | |
|---|-----------|-----------|-----------|
| | Option 1 | Option 2 | Option 2A |
| MBS/NetCiss variations for interval data | \$0 | \$0 | \$0 |
| MBS/NetCiss variations for generation charges | \$0 | \$0 | \$0 |
| MBS variation to calculate maximum demand | \$0 | \$0 | \$0 |
| Automate MRIM (Type5) download/upload | \$0 | \$0 | \$0 |
| Tariff variations | \$238,000 | \$143,000 | \$143,000 |
| Totals | \$238,000 | \$143,000 | \$143,000 |

Options 2 and 2A incur the same billing system and tariff variation costs because in each instance Western Power will be required to establish new bi-directional reference tariffs. The total billing system and tariff variation costs for Option 2 and 2A are higher than Option 1 and also higher than the costs for Option 2 as set out in section 9.3.3 because four new tariffs will need to be established (i.e. residential anytime energy, residential time-of-use, commercial anytime energy and commercial time-of-use).

10.3.3 Retailer incurred costs

The tables below set out the costs to Synergy associated with the system variations required for the three Options for existing customers. Specifically, the table below sets out the costs of changing Synergy’s internal systems to accommodate interval data and new tariffs regardless of whether grandfathering of existing arrangements is adopted:

| Retailer costs incurred - No Grandfathering Arrangements | | | |
|--|-------------|-------------|-------------|
| | Option 1 | Option 2 | Option 2A |
| New Product Costs | \$1,000,000 | \$1,000,000 | \$1,000,000 |
| Interval Data Costs | \$0 | \$0 | \$0 |
| Customer Education Costs | \$250,000 | \$250,000 | \$250,000 |
| Totals | \$1,250,000 | \$1,250,000 | \$1,250,000 |

Synergy will incur the same costs under Options 1, 2 and 2A because in each instance Synergy will be required to establish new retail tariffs. Note that the retailer incurred costs for Option 2 are at variance with those indicated in the draft report as it has been identified that new tariffs are required.

10.4 Estimated Tariff Prices for each option for residential customers

The table below compares the Reference Tariff structures and tariff prices for each Option, based on tariff modelling for residential customers performed by Western Power. Using the 2011/12 Price List as a base²² the charges for Option 2A, as well as the export charge for Option 1 were estimated, based on the methodology described in Appendix B.

Two scenarios have been provided for each Option, whereby the existing flat-rate Reference Tariff (RT1) structure and the existing time of use Reference Tariff (RT3) structure are presented. Again, for transparency, the higher fixed charge in Option 2A is presented as the original fixed charge plus an additional daily fixed charge. In practice, a single fixed charge would be seen and paid by the user. The volumetric charge would be unchanged.

| Option Pricing Outcomes | Option | Option 1 | | Option 2 | | Option 2A | |
|---|--------------------|----------------|-------------|----------------|-------------|----------------|-------------|
| | Import Tariff | RT1 | RT3 | RT1 | RT3 | RT1 | RT3 |
| | Tariff Description | Anytime Energy | Time of Use | Anytime Energy | Time of Use | Anytime Energy | Time of Use |
| | Data type | Register | | Register | | Register | |
| Fixed price per day for consumption | cents/day | 36.464 | 36.464 | 36.464 | 36.464 | 36.464 | 36.464 |
| Variable price per kWh for consumption | cents/kWh | 6.863 | - | 6.863 | - | 6.863 | - |
| Variable on-peak price for consumption | cents/kWh | - | 11.513 | - | 11.513 | - | 11.513 |
| Variable off-peak price for consumption | cents/kWh | - | 2.587 | - | 2.587 | - | 2.587 |
| Variable shoulder price for consumption | cents/kWh | - | - | - | - | - | - |
| Demand c/kVA/day | c/kVA/day | - | - | - | - | - | - |
| Variable price per kWh for generation | cents/kWh | 7.000 | 7.000 | - | - | - | - |
| Additional Fixed Charge | cents/kWh | - | - | - | - | 14.000 | 14.000 |

10.5 Estimated Residential Customer Impacts

Implications for customers without small scale generation

If Option 2 is adopted by Western Power, the variable charges for all residential and commercial customers on anytime energy or time of use tariffs would need to increase slightly to ensure that network costs are recovered. This is because, all other things being equal, the total energy consumed by all customers in the SWIS is less than if there was no small scale generation installed anywhere on the SWIS. As a result,

²² The 2011/12 Price List will be published on the Economic Regulation Authority's web-site in May 2011: http://www.erawa.com.au/2/486/48/electricity_access__price_determinations.pm

the network costs will need to be recovered from a smaller consumption base, which in turn means that the unit cost (in cents per kWh) will need to increase.

Based on an average consumption reduction of 500 units for residential consumers with PV systems, the current under-recovery equates to \$1.5M. Based on a total residential consumption base of 5.3 billion kW hours, this would equate to an increase of the variable network consumption price of 0.43%.

Based on a residential retail tariff of 20 cents for variable consumption, the increase to the residential consumer from this change to network tariffs would be in the order of 0.146%.

10.6 Final Options Summary Assessment

A summary of the assessments of the final Options is set out below.

| Evaluation criteria | Options | | |
|--|---|--|--|
| | Option 1 | Option 2 | Option 2A |
| Criteria 1 - Ensuring that Tariffs Reflect Cost | More cost reflective than Option 2, but still a weak relationship with cost | Least cost reflective and the weakest relationship with cost | More cost reflective than Option 2, but still a weak relationship with cost |
| Criteria 2 - Limiting Cross Subsidies (in a cost recovery sense) | Export charges act to reduce the degree of cross subsidisation | Some cross subsidisation of customers with small scale generation by customers without such generation | Higher fixed charges act to reduce the degree of cross subsidisation |
| Criteria 3 - Administrative Simplicity by Western Power, Retailers and Customers | Less administratively simple than Option 2 and Option 2A because the export charge needs to be implemented | Administratively simple- no changes to metering arrangements required, but need to implement new reference tariffs | Administratively simple- no changes to metering arrangements required, but need to implement new reference tariffs |
| Criteria 4 - Barriers to Entry | Export charge may be perceived to be a barrier to entry | No additional barriers to entry | Higher fixed charge may be perceived to be a barrier to entry, but less so than Option 1 |
| Criteria 5 - Compatibility with the REBS and the Net Feed-in Tariff | Compatible | Compatible | Compatible |
| Criteria 6 - Metering Issues | No change to existing metering | No change to existing metering | No change to existing metering |
| Criteria 7 - Data Issues | No additional data issues | No additional data issues | No additional data issues |
| Criteria 8 - Billing and IT Systems Issues | Changes required to recognise existing customers on the new tariff, and to implement the new export charges | Changes required to recognise existing customers on the new tariff, but uses existing Reference Tariff structure | Changes required to recognise existing customers on the new tariff, but uses existing Reference Tariff structure |
| Criteria 9 - Transactional Costs | Minimises transactional costs, although costs associated with implementing new tariffs and export charges | Minimises transactional costs, although costs associated with implementing new tariffs | Minimises transactional costs, although costs associated with implementing new tariffs |
| Criteria 10 - Tariff Design Issues | Changes would be required to recognise the new tariff and to implement the export charges | Changes would be required to recognise the new tariff, but tariff structure similar to existing Reference Tariffs | Changes would be required to recognise the new tariff, but tariff structure similar to existing Reference Tariffs |
| Criteria 11 - Equity issues | Export charge may pose a material disincentive to customers to take up small scale generation | No equity issues | The higher fixed charge may pose a material disincentive to the take up small scale generation and increases the likelihood of price shocks. |
| Criteria 12 - Compliance Issues | No compliance issues identified | No compliance issues identified | No compliance issues identified |
| Total Implementation Costs (Including Upfront and Ongoing) | \$1,345,000 | \$1,393,000 | \$1,393,000 |

Evaluation criteria**Options**

costs for Western Power and Synergy

11. Conclusions / Recommendations

11.1 Rationale for the recommendations

This report documents a process that Western Power has undertaken with the assistance of Ernst & Young. Consistent with the previous review in 2009, each Option for the Reference Tariff to apply at the residential and commercial customer's bi-directional point has been assessed against particular criteria and via a two stage consultation process as requested by Western Power.

As a result of the first and second round of consultation, Option 2 (i.e. identical to the existing residential RT1 (anytime energy) and RT 3 (time of use) Reference Tariff in structure and design) is proposed for incorporation in Western Power's AA3 submission. This is because it:

- ▶ Has precedent in most other jurisdictions across Australia
- ▶ Is the most equitable option and is supportive of the Western Australian's Government policies in respect of encouraging the uptake of small scale generation, even though those policies have been modified in recent times. Unlike Options 1 and 2A, it does not risk imposing a material disincentive to the uptake of small scale generation
- ▶ Is the most administratively simple option
- ▶ Is identical to Option 1 and Option 2A in terms of consumption price signalling and therefore has similar merits from an economic efficiency perspective
- ▶ Would avoid price shocks to customers with small scale generation. By contrast, the export charge in Option 1, and the higher fixed and/or variable charge in Option 2A may give rise to price shocks for customers with small scale generation
- ▶ Has the lowest implementation cost
- ▶ Introduces a new tariff that could be varied over time if and as the needs arises, as the uptake of small scale generation increases and more is learnt about its impact on electricity networks. This is important as AA3 provides the only opportunity in the next five years to enable Western Power to introduce more appropriate tariffs for customers with small scale generation if required

However, Option 2 arguably introduces anomalies compared to Western Power's accepted cost recovery principles, which could ultimately result in the basis of those principles being undermined. More specifically:

- ▶ It is not as cost reflective, because the tariff has no means of compensating for the reduction in network charges paid by individual small generation customers compared to those without small scale generation. As a result, the network charge paid by customers with small scale generation will not reflect the average cost of supply
- ▶ It therefore does not minimise cross-subsidisation in a cost recovery sense, as the tariff has no means of compensating for the expected reduction in network charges paid by individual customers with small scale generation as their average amount of electricity consumed declines. Therefore, customers without small scale generation, all other things being equal, are likely to pay relatively more for their demand on the network than customers with small scale generation, even though their peak demand is the same. In this way, customers without small scale generation will be bearing more of the cost of reserving the same peak capacity than customers with small scale generation. Hence customers without small scale generation will be effectively cross subsidising, in a cost recovery sense, customers with small scale generation. At present, however, analysis by Western Power indicates that the extent of cross-subsidisation is modest
- ▶ Over time it is possible that this approach might prove to be unsustainable (for example if the rapid uptake of small scale generation continues), because it would embed an ever increasing cost recovery problem. It may therefore to customer complaints and disputation over time. As indicated by stakeholders, there is, however, an alternative longer term solution to this potential problem, which is

to introduce smart meters that would enable all customers to be charged for the use of their network in more direct proportion to their use of the network at peak times. This would likely involve a bidirectional tariff based on a similar premise to Option 1 but relying on a time of use structure to capture the customer's peak demand on the network or contribution to assisting in meeting that demand

As Western Power is proposing a broader review of all tariffs during AA4, these anomalies are considered acceptable for the present.

Therefore, on balance, it is considered appropriate that Option 2 be proposed for incorporation in AA3 because it provides the simplest and lowest cost means of implementing a bi-directional reference service and reference tariff, and it does not introduce substantial equity issues or disincentives to the uptake of small scale generation that are inconsistent with government policy. Stakeholders consulted were strongly of the view that Option 1 and Option 2A could introduce significant disincentives to the uptake of small scale generation and raise significant equity issues.

It should be emphasised that the recommended commercial Reference Services and Reference Tariffs are identical to the residential Reference Services and Reference Tariffs. This is for two reasons. First, this is to maintain consistency between residential and commercial options. Secondly, due to a lack of data for commercial customers there is no basis for an alternate conclusion.

Finally, it should be noted that the ERA will assess the merits of this proposal when it conducts its assessment of Western Power's AA3 submission against the requirements of the Electricity Network Access Code (2004). This will provide another opportunity for stakeholders to contribute views in respect of the merits of this proposed reference service and reference tariff.

11.2 Consideration of grandfathering arrangements

In developing these recommendations, the issue of grandfathering the existing tariff arrangements for customers with small scale generation prior to 1 July 2012 was considered, with a view to minimising the impact on existing customers of any proposed changes to the bi-directional Reference Services and Reference Tariffs.

It is worth noting that Options 1, 2 and 2A:

- ▶ Do not significantly differ from the consumption based tariff arrangements for customers without small scale generators
- ▶ Do not require any metering changes or additional costs to customers

Given this, it was considered that grandfathering the existing tariff arrangements for customers with small scale generation prior to 1 July 2012 would be unlikely to offer any benefit to those customers and would increase the transaction costs for both Synergy and Western Power. This is because Synergy and Western Power would need to administer tariffs for two classes of customer (i.e. those connected prior to 1 July 2012 and those connected after this date).

11.3 Summary

Residential Bi-Directional Reference Service and Reference Tariff

The recommended definition of the new anytime energy Bi-Directional Reference Service for residential customers with small scale generation is as follows:

Characteristics

Option 2 Details

| Characteristics | Option 2 Details |
|---|--|
| Reference Service Name: | Reference Service C1 - Anytime Energy (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise or a premise occupied by a voluntary/charitable organization with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | <p>Installation at the bi-directional point of either:</p> <ul style="list-style-type: none"> ▶ An accumulation meter having capability for import and export channels, or ▶ A SmartPower meter or multiple register TOU accumulation meter supplied or provided by Western Power having capability for import and export channels. This also applies where a customer already has an interval meter, or the customer's installation is such that interval metering is required. |
| Applicable Reference Tariff: | "RT13" in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The recommended definition of the new time of use energy Bi-Directional Reference Service for residential customers with small scale generation is as follows:

| Characteristics | Option 2 Details |
|---------------------------------|--|
| Reference Service Name: | Reference Service C3 - Time of Use Energy (Residential) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a residential premise or a premise occupied by a voluntary/charitable organization with an inverter system rated up to 10 kVA for single phase connections and 30 kVA for three phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | <p>Installation at the bi-directional point of a SmartPower meter or multiple register TOU accumulation meter supplied or provided by Western Power having capability for import and export channels. This also applies where a customer already has an interval meter, or the customer's installation is such that interval metering is required.</p> |
| Applicable Reference Tariff: | "RT15" in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access | "Electricity Transfer Access Contract" published in Appendix 4 of the Access |

| Characteristics | Option 2 Details |
|---|---|
| Contract: | Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

For both services, the associated Reference Tariff would be structured such that the customer’s existing Reference Tariff would be paid by the customer for all electricity imported from the network into the customer’s connection point.

To allow sufficient time to implement this tariff, Western Power will need to defer the Bi-directional tariff changes until six months after the commencement of Access Arrangement period 3. The earliest commencement date of Access Arrangement period 3 is 1 July 2012 and as such, the earliest implementation of this tariff will be 1 January 2013.

Commercial Bi-Directional Reference Service and Reference Tariff

The recommended definition of the new anytime energy Bi-Directional Reference Service for commercial customers with small scale generation is as follows:

| Characteristics | Option 1 Details |
|---|--|
| Reference Service Name: | Reference Service C2 - Anytime Energy (Business) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system or on the high voltage system at 6.6kV. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a non-residential premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | <p>Installation at the bi-directional point of either:</p> <ul style="list-style-type: none"> ▶ An accumulation meter supplied or provided by Western Power having capability for import and export channels, or ▶ A multiple register TOU accumulation meter supplied or provided by Western Power having capability for import and export channels. This also applies where a customer already has an interval meter, or the customer’s installation is such that interval metering is required. |
| Applicable Reference Tariff: | “RT14” in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | “Electricity Transfer Access Contract” published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

The recommended definition of the new time of use energy Bi-Directional Reference Service for commercial customers with small scale generation is as follows:

| Characteristics | Option 1 Details |
|-----------------|------------------|
|-----------------|------------------|

| Characteristics | Option 1 Details |
|---|--|
| Reference Service Name: | Reference Service C4 - Time of Energy (Business) - Bi-directional Service |
| Reference Service Description: | A bi-directional service combined with a connection service and a standard meter service at a bi-directional point on the low voltage (415 volts or less) distribution system or on the high voltage system at 6.6kV. This applies to small scale generation from renewable sources, non-renewable sources or electrical vehicles |
| Technical Eligibility Criteria: | <p>Users are eligible to use this service if:</p> <ul style="list-style-type: none"> ▶ The bi-directional point is located at a non-residential premise with an inverter system rated up to a total of 1 MVA for single or three-phase connections ▶ The consumer's inverter system complies with the requirements of AS 4777 and the Technical Rules, and satisfies a technical assessment by Western Power for installations larger than 30kVA ▶ The consumer's facilities and equipment comply with the Technical Rules, the WA Electrical Requirements and AS 3000 <p>These criteria apply regardless of whether a battery storage system is part of the installation</p> |
| Metering Criteria: | <p>Installation at the bi-directional point of either:</p> <ul style="list-style-type: none"> ▶ An accumulation meter supplied or provided by Western Power having capability for import and export channels, or ▶ A multiple register TOU accumulation meter supplied or provided by Western Power having capability for import and export channels. This also applies where a customer already has an interval meter, or the customer's installation is such that interval metering is required. |
| Applicable Reference Tariff: | "RT16" in the Price List published in Appendix 5 of the Access Arrangement |
| Applicable Standard Access Contract: | "Electricity Transfer Access Contract" published in Appendix 4 of the Access Arrangement |
| Applicable Service Standard Benchmarks: | As set out in Section 3.18 and 3.19 of the Access Arrangement |

For both services, the associated Reference Tariff would be structured such that the customer's existing Reference Tariff would be paid by the customer for all electricity imported from the network into the customer's connection point.

In order to allow sufficient time to implement this tariff, Western Power will need to defer the Bi-directional tariff changes until six months after the commencement of the third Access Arrangement. The earliest commencement date of AA3 is 1 July 2012 and as such, the earliest implementation of this tariff will be 1 January 2013.

Appendix A

Matrix of feed-in tariff schemes and arrangements for small scale renewable energy across Australian jurisdictions

South Australia, Queensland, Victoria, ACT

| | South Australia | Queensland | Victoria | ACT |
|---|--|--|---|---|
| Bi-directional Network Tariff exists? | No – standard network tariffs apply, feed in provided separately | No – standard network tariffs apply, feed in provided separately | Yes - Specific tariff for small scale generators exists for Jemena, United Energy and SP Ausnet. However, there are no specific tariff for Citipower or Ausnet | No – although a special consumption tariff applies to commercial premises with embedded generators, with feed in tariff separately applied |
| General treatment of tariffs for small scale generation | <p><u>ETSA Utilities</u></p> <p>Confirmed with ETSA Utilities: ETSA Utilities does not charge any DUOS charge to electricity sent out to the network</p> <p>ETSA Utilities does not pay any avoided TUOS charges to customers with small embedded generators</p> <p>ETSA Utilities is obliged by the provisions of the Electricity (Feed-In Scheme-Solar Systems) Amendment Act to provide a credit of 44 cents per kWh for power fed back into the grid. The system shall only measure electricity sent out to the network when the PV system output exceeds the instantaneous load requirements of the customers' load at the installation (Net metering).</p> <p>General Requirements Customer needs to qualify for small market status (less than 160MWh per annum) Customer to first enter into a Small Embedded Generator Agreement with</p> | <p><u>ENERGEX</u></p> <p>The variable charge for generation customers applies only for the consumption of energy. DUOS charges will not be incurred for electricity exported by the user and sent into the network</p> <p>http://www.energex.com.au/network/network_prices/pdf/20100907%205%20Tariff%20Schedule%202010-11.pdf</p> <p>http://www.qca.org.au/files/E-DisPricing-PresDisServ-Energex-PricePrinceStatement-0410.PDF</p> <p><u>Ergon Energy</u> For those generators that export as well import load from the distribution system: a Fixed Charge (\$/day) applies - reflective of the costs associated with the connection assets (entry and exit services) and network user management services DUOS Tariffs for load taken from the</p> | <p><u>Jemena / United Energy</u></p> <p>On the 1st November 2009, the Victorian Government introduced the PFIT for Victorian customers with net metered PV power systems, offering a premium rate for any electricity fed back in to the power grid</p> <p>Households, community groups and small businesses with Solar PV systems up to 5 kW in capacity and consuming less than 100 MWh a year, will receive \$0.60 cents per kWh hour for any electricity fed back in to the power grid</p> <p>Where the PFIT applies, the applicable commercial or residential tariff is altered to include an 'F' for feed in. This means that the feed in tariff payment parameters will also apply to the base tariff</p> <p>http://www.unitedenergy.com.au/industry/supply_reliability/cust_premium_feed_in_tarrif.asp</p> | <p><u>ActewAGL</u></p> <p>The customer shall pay the published network charge for the gross amount of energy consumed from ActewAGL Distribution's network</p> <p>ActewAGL Distribution shall not charge the customer for the use of the network for the energy exported</p> <p>The customer shall continue to pay the network access charge</p> <p>ActewAGL has a "Renewable Generation" tariff that applies to customers with solar or wind generation systems connected to the network. The tariff applies only to electricity produced by the renewable energy system then consumed by the customer, and is currently charged at zero cents per kWh generated</p> <p>http://www.actewagl.com.au/electricity/networks/charges.aspx</p> <p>http://www.actewagl.com.au/publications/electricity/ActewAGL_Tariff_Classes_and_Tariffs_2010_11.pdf</p> |

| South Australia | Queensland | Victoria | ACT |
|---|---|--|-----|
| <p>ETSA Utilities Customer using an 'approved' Inverter supplied via a solar panel array. Customer must have an approved import / export meter No other generation is connected to the export meter Note this includes both Residential and Business customers</p> <p>http://www.etsautilities.com.au/centric/our_network/network_tariffs.jsp</p> | <p>distribution system will be allocated as per the appropriate Network Price category selected from Individually Calculated Customers (ICCs), Connection Asset Customers (CACs) or Standard Asset Customers (SACs) For those generators that export as well as import load from the distribution system:</p> <p>TUOS Tariffs do not apply to exported energy TUOS Tariffs for load taken from the distribution system will be allocated as per the appropriate Network Price category selected from ICCs, CACs or SACs</p> <p>http://www.ergon.com.au/_data/assets/pdf_file/0010/12061/EE-SCS-Network-Tariff-Guide-2010-11-FINAL_Release-1_7June2010.pdf</p> <p>http://www.qca.org.au/files/E-DisPricing-PresDisServ-Ergon-PricePrinccStatement-0410.PDF</p> | <p>http://www.jemena.com.au/operations/distribution/JEN/PremiumFeedInTariff.aspx</p> <p>CitiPower/Powercor</p> <p>Eligible embedded generators shall be charged under designated consumption tariffs plus the feed-in</p> <p>As per Jemena and United Energy, a Premium Feed In Tariff is available to customers of both Citipower and PowerCor networks</p> <p>The same premium applies. Consumption by embedded generators is metered by time of use tariffs in line with the following:</p> <p>http://www.powercor.com.au/docs/pdf/Smart%20Meters/Going%20Solar.pdf</p> <p>SP Ausnet (Victoria)</p> <p>Under the SFIT, the applicable network tariff is NEE23, being a volumetric two time period time of use tariff with an additional summer generation charge. This charge only applies in summer and is levied for each kWh of electricity imported from the network</p> <p>NEE23 was introduced to formalise solar PV billing arrangements and reduce administrative complexity. Solar PV customers continue to</p> | |

| South Australia | Queensland | Victoria | ACT |
|-----------------|------------|--|-----|
| | | <p>receive an equal offset for electricity generation, as well as an additional payment for excess generation during summer peak periods (1 November - 30 March)</p> <p>Under the PFIT, the applicable network charge for residential customers is SUN23. This tariff is structurally similar to NEE23, but incorporates the feed-in tariff rate of 60 cents for every kWh of electricity sent out to the network</p> <p>For commercial and industrial customers, the applicable network tariff is SUN21, which is structurally the same as the network tariff NEE21 (being a volumetric two time period time of use tariff), but incorporates the feed-in tariff rate of 60 cents for every kWh of electricity sent out to the network</p> <p>Prior to 2003, solar PV customers were on a standard network tariff and received payment for the electricity they generated equal to the price that was paid for electricity imported. The diversity of tariffs applied to these customers and offset arrangements created billing and administrative difficulties</p> <p>http://www.sp-usnet.com.au/CA2575630006F222/Lookup/Tariffs/\$file/SP%20AusNet%20Schedule%20of%20Network%20Tariffs%202011_V2.pdf</p> | |

| | South Australia | Queensland | Victoria | ACT |
|-----------------------------------|---|---|--|---|
| Description of Service and Tariff | Not applicable - existing network tariffs apply for electricity imported from the network | Not applicable - existing network tariffs apply for electricity imported from the network | <p>http://www.sp-usnet.com.au/CA2575630006F222/Lookup/Tariffs/\$file/Annual%20Tariff%20Report%202011%20Final_V2.pdf</p> <p><u>United Energy</u></p> <p>PFIT Low voltage small 1 rate (FLVS1R) - "typical" customer within this category is residential with an average consumption of 5 MWh per annum. This customer may also have a dedicated circuit tariff (for hot water/slab heating) which has an average consumption of 2 MWh per annum</p> <p>PFIT Low voltage medium 1 rate (FLVM1R) - The "typical" customer within this category is small commercial with an average consumption of 15 MWh per annum</p> <p>PFIT Time of Day (FTOD) - subcategory of Low Voltage Small, and therefore primarily catering to residential customers</p> <p>PFIT Time of Use (FTOU) - subcategory of Low Voltage Medium, and therefore primarily catering to commercial customers</p> <p>http://www.ue.com.au/industry/network_tariffs/tariffReport.asp</p> <p><u>Jemena</u></p> <p>General Purpose (F100) - single rate</p> | Not applicable - existing network tariffs apply for electricity imported from the network |

| South Australia | Queensland | Victoria | ACT |
|-----------------|------------|--|-----|
| | | <p>residential only tariff</p> <p>Time of Use Interval Meter (F10I) - peak/off peak rate residential only General Purpose (F100) - single rate small business only tariff</p> <p>Time of Use Weekdays (F210) Peak/off peak rate; and only available to customers with a two rate accumulation meter OR to customers consuming < 160 MWh pa and having a maximum demand < 60 kW small business only</p> <p>Time of Use Weekdays - Demand (F230) Peak/off peak rate; Only available to customers with a meter capable of measuring demand small business only</p> <p>Time of Use Extended (F250) - Peak/off peak rate (peak extended to weekends) Only available to customers with a two rate accumulation meter OR to customers consuming < 160 MWh pa and having a maximum demand < 60 kW small business only</p> <p>Time of Use Extended - Demand (F250) Peak/off peak rate (peak extended to weekends) Only available to customers with a two rate accumulation meter OR to customers consuming < 160 MWh pa and having a maximum demand < 60 kW small</p> | |

| | South Australia | Queensland | Victoria | ACT |
|--------------------------------|--|--|---|--|
| | | | <p>business only</p> <p>LV 0.4-0.8GWh (F300) Peak/Off peak rate w/ demand rate for large businesses with annual demand of equal to or less than 0.8GWh</p> <p><u>SP Ausnet</u> NEE23 - small customers with PV cells equal to or less than 2kW in output</p> <p>http://www.sp-ausnet.com.au/CA2575630006F222/Lookup/Tariffs/\$file/Annual%20Tariff%20Report%202011%20Final_V2.pdf</p> | |
| Technical eligibility criteria | Systems of up to 10kW per phase can be installed and can access the feed-in tariff | Systems of up to 10kW per phase can be installed and can access the feed-in tariff | <p><u>United Energy</u></p> <p>See Applicable Access Agreements. Small Scale Generators may be up to 10kW per phase</p> <p><u>Jemena</u></p> <p>See Applicable Access Agreements. Small scale generators may be up to 10kW per phase</p> <p><u>CitiPower/Powercor</u></p> <p>See Applicable Access Agreements. Small scale generators may be up to 10 kW per site</p> | <p><u>ActewAGL</u></p> <p>Small scale generation not greater than 30 kW.</p> |

| | South Australia | Queensland | Victoria | ACT |
|-------------------|-----------------------------------|-----------------------------------|---|-----------------------------------|
| | | | <p><u>SP AusNet</u></p> <p>See Applicable Access Agreements. Small scale generators may be up to 4.5 kW per site</p> | |
| Metering criteria | None identified | None identified | <p><u>United Energy</u></p> <p>Metering change arranged by individual retailers: http://www.unitedenergy.com.au/industry/supply_reliability/cust_grid_connected_system.asp</p> <p><u>Jemena</u></p> <p>Metering change arranged by individual retailers: http://www.jemena.com.au/operations/distribution/JEN/embeddedGenerationInverter.aspx#Requirements</p> <p><u>SP Ausnet</u></p> <p>SP Ausnet will, dependent on the situation and on receipt of a Service Order Request from the individual retailer, install a Single phase/single phase AMI RE-programmed/multiphase solar meters</p> <p>http://www.sp-usnet.com.au/?id=23013280052458980F0C72910CA25765C00802142#changing</p> | None identified |
| Description of | Not applicable - existing network | Not applicable - existing network | <u>United Energy</u> | Not applicable - existing network |

| | South Australia | Queensland | Victoria | ACT |
|------------------|---|---|--|---|
| Tariff structure | tariffs apply for electricity imported from the network | tariffs apply for electricity imported from the network | <p>PFIT Low voltage small 1 rate (FLVS1R) - Standing Charge, summer/non-summer peak energy charge (volumetric)</p> <p>PFIT Low voltage medium 1 rate (FLVM1R) - Standing Charge, summer/non-summer peak energy charge (volumetric)</p> <p>PFIT Time of Day (FTOD) - Standing Charge, summer/non-summer peak energy charge (volumetric), summer/non-summer shoulder charge (volumetric), off-peak energy (volumetric)</p> <p>PFIT Time of Use (FTOU) - summer/non-summer peak energy charge (volumetric), off-peak energy (volumetric), summer demand incentive charge (cents/KW/days)</p> <p>For timing information: http://www.ue.com.au/industry/network_tariffs/download/2010/2011%20Pricing%20Proposal%20V1.pdf</p> <p><u>Jemena</u></p> <p>General Purpose (F100) - Standing Charge, Unit Rate (volumetric)</p> <p>Time of Use Interval Meter (F10I) - Standing Charge, Peak/Off Peak rate (volumetric)</p> <p>Time of Use Weekdays (F210) - Standing Charge, Unit Rate (volumetric)</p> <p>Time of Use Weekdays - Demand</p> | tariffs apply for electricity imported from the network |

| South Australia | Queensland | Victoria | ACT |
|-----------------|------------|--|-----|
| | | <p>(F230) - Standing Charge, Peak/Off Peak rate (volumetric)</p> <p>Time of Use Extended (F250) - Standing Charge, Peak/Off Peak rate (volumetric), Demand rate (\$/kw/pa) based on a minimum chargeable demand</p> <p>Time of Use Extended - Demand (F270) Standing Charge, Peak/Off Peak rate (volumetric), Demand rate (\$/kw/pa) based on a minimum chargeable demand</p> <p>LV 0.4-0.8GWh (F300) Standing Charge, Peak/Off Peak rate (volumetric), Demand rate (\$/kw/pa) based on a minimum chargeable demand</p> <p><i>Peak is defined as 7am-11pm Mon-Fri, except where 'extended' peak applies, which includes Mon-Sat</i></p> <p>http://www.jemena.com.au/operations/distribution/JEN/downloads/2011/Network%20Tariff%20Schedule%20011.pdf</p> <p><u>SP Ausnet</u> NEE23 - Standing charge, peak/off peak charge (volumetric), feed in tariff plus bonus for excess summer generation</p> <p>http://www.sp-</p> | |

| | South Australia | Queensland | Victoria | ACT |
|--|--|-----------------|--|--|
| | | | ausnet.com.au/CA2575630006F222/Lookup/Tariffs/\$file/SP%20AusNet%20Schedule%20of%20Network%20Tariffs%202011_V2.pdf | |
| Applicable access agreements | None identified | None identified | <p><u>United Energy, Jemena, CitiPower/Powercor, SP Ausnet</u> As per the following standardised agreement:</p> <p>http://www.unitedenergy.com.au/customers/download/10.06.18_Custom%20erObligationsSolarConnectionForm_UED.pdf</p> | <p>As per http://www.actewagl.com.au/Publications/Electricity/SpecialConnectionRequest.pdf</p> <p>http://www.actewagl.com.au/Publications/Electricity/Renewable_Energy_Generator_Connection_contract.pdf</p> |
| Applicable service standard benchmarks | None identified | None identified | None identified | None identified |
| NEM jurisdictions a/ | Section 6.1.4 of the NER (Prohibition of DUOS Charges for Export of Energy) states: <i>A Distribution Network Service Provider (DNSP) must not charge a Distribution Network User DUOS charges for the export of electricity generated by the user into the distribution network. This does not preclude charges for the connection services.</i> | | | |

New South Wales, Tasmania, Northern Territory, Western Australia

| | New South Wales (NSW) | Tasmania | Northern Territory |
|---------------------------------------|--|--|---|
| Bi Directional Network Tariff exists? | No - standard network tariffs apply, feed in provided separately | No - standard network tariffs apply, feed in rate applied at tariff price | No - a power buyback scheme applies, however standard network tariffs apply for consumption |
| Distribution tariffs | <p><u>Essential Energy</u></p> <p>SOLAR BONUS SCHEME (SBS) The NSW Government's SBS commenced on 1 January 2010. Customers who submitted an application on or before 18 November 2010, purchased a system on or before 27 October 2010 and with gross metering arrangements are paid a feed-in tariff of 60 cents per kilowatt hour for all energy generated and fed back into the grid. Customers with net metering arrangements receive 60 cents per kilowatt hour for all excess renewable energy that is fed into the electricity grid after household or small business needs are met.</p> <p>Customers who joined the scheme after 18th November 2010 or purchased a system after 27th October 2010, and with gross metering arrangements are paid a feed-in tariff of 20 cents per kilowatt hour for all energy generated and fed back into the grid. Customers with net metering arrangements receive 20 cents per kilowatt hour for all excess renewable energy that is fed into the electricity grid after household or small business needs are met</p> <p>http://www.essentialenergy.com.au/asset/cms/pdf/electricitynetwork/NetworkPriceList_ExplantoryNotes1011.pdf</p> <p><u>Ausgrid</u></p> <p>Where a customer with distributed generation facilities is able to supply their own load and also</p> | <p><u>Aurora Energy:</u></p> <p>Confirmed with Aurora Energy:</p> <p>No separate tariff is applied; the meter is installed for free and the power sold back is returned at the same price as the consumption tariff rate</p> <p>No allowance for avoided TUOS and DUOS</p> | <p><u>Power and Water Corporation</u></p> <p>The customer's account will still be subject to the fixed daily charge or other standard service charges, but no additional fees will be charged for the PV Inverter system</p> <p>A flat buyback rate for sent out energy is paid or netted off the bill as the situation determines. Consumption of energy is still governed by the appropriate consumption tariff</p> <p>http://www.powerwater.com.au/business/renewable_energysolar_buyback_program</p> |

| | New South Wales (NSW) | Tasmania | Northern Territory |
|-----------------------------------|--|---|---|
| | <p>generate energy into the network, no DUOS charges are applied to the energy sent out to the network</p> <p>See Essential Energy for detail of the solar bonus scheme feed in tariffs</p> <p>http://www.ausgrid.com.au/Common/Our-network/Electricity-supply/~media/Files/Network/Electricity%20Supply/Network%20Pricing/EAPricingproposalJune10.ashx</p> <p><u>Endeavour Energy</u></p> <p>Called and confirmed with company that no DUOS fee applies to electricity sent out to the network from micro generation</p> <p>See Essential Energy for detail of the solar bonus scheme feed in tariffs</p> <p>http://www.integral.com.au/wps/wcm/connect/4934290044ce9d6184b58edeba9aa905/2010+IE+Energy+Price+Guide_v4.pdf?MOD=AJPERES</p> | | |
| Description of Service and Tariff | Not applicable - existing network tariffs apply for electricity imported from the network | Not applicable - existing network tariffs apply for electricity imported from the network | Not applicable - existing network tariffs apply for electricity imported from the network |
| Technical eligibility criteria | Solar PV systems and wind turbines up to 10kW capacity that connect to the electricity network via an inverter up to 10kW capacity | Renewable energy systems up to 3kW | |
| | Consumption of electricity must not exceed 160MWh per annum | | |
| Metering criteria | None identified | None identified | None identified |
| Description of Tariff structure | Not applicable - existing network tariffs apply for electricity imported from the network | Not applicable - existing network tariffs apply for electricity imported from the network | Not applicable - existing network tariffs apply for electricity imported from the network |

| | New South Wales (NSW) | Tasmania | Northern Territory |
|--|-----------------------|-----------------|--------------------|
| Applicable access agreements | None identified | None identified | None identified |
| Applicable service standard benchmarks | None identified | None identified | None identified |

Appendix B

High Level Summary of Western Power's Pricing Methodology

Prices for each reference tariff are the outcome of an established methodology which is set out in detail in the Western Power Price List Information²³. Prices are derived in accordance with the following broad methodology:

1. Determine the total costs to be recovered from all customers. These costs represent the total distribution costs combined with an allocation of transmission costs to distribution customers
2. Determine the sum of the maximum demands (in kVA) for each customer. For demand tariff customers or customers with a kVARh reading, the actual maximum demand is used. For customers with basic meters, the maximum demand is derived from consumption. Therefore, for the majority of customers in the SWIS, consumption is a proxy for demand. It is important to note that the demand for each customer is the customer's own maximum demand, and does not represent the customer's demand at time of local or system peak
3. Determine the sum of the maximum demand for each tariff. This represents the aggregation of each individual customer's maximum demand
4. Divide the total costs as determined in Step 1 by the total demand for each tariff as determined in Step 3
5. For each tariff, allocate the fixed and variable proportions of costs
6. Derive the prices for each tariff

²³ http://www.westernpower.com.au/documents/aboutus/accessarrangement/2011/2011_12_Price_List_Information.pdf

Appendix C

Western Power's PV Forecast

Please refer to Western Power's document entitled "Photovoltaic (PV) Forecast", dated 28 March 2011 (DM 7976363) available from Western Power.



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