PowerWater

Committee on the Northern Territory's Energy Future

Electricity Pricing Options

Submission from Power and Water Corporation

October 2014
Power and Water Corporation

1. INTRODUCTION

On 21 August 2014, the Committee on the Northern Territory's Energy Future resolved to inquire and report on Electricity Pricing Options with specific reference to:

a) The advantages and disadvantages of different electricity tariff designs;

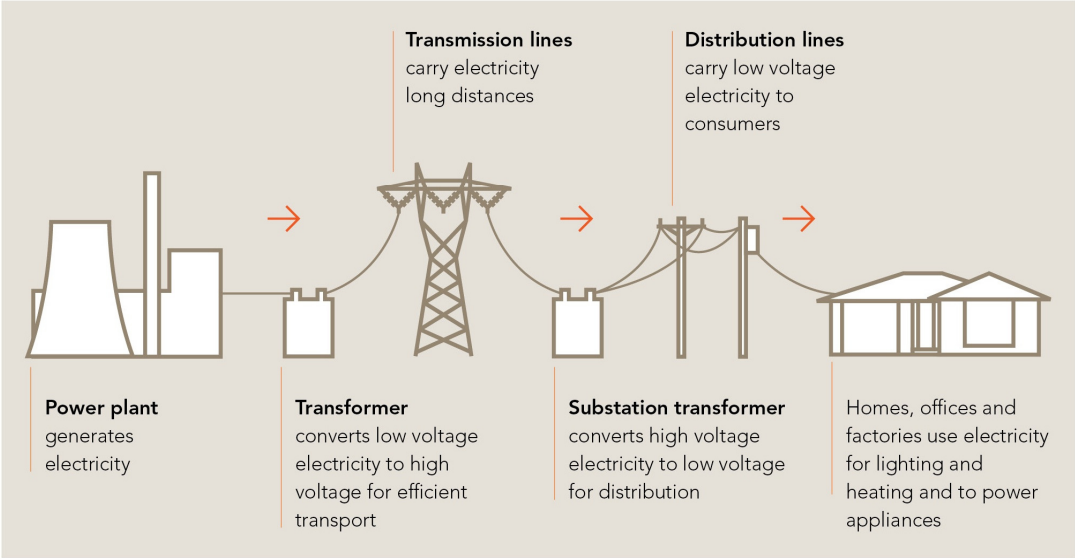
b) Factors to be taken into consideration in the design and implementation of electricity tariffs; and

c) Options for feed-in tariffs for renewable electricity generation.

Power and Water Corporation is pleased to make this submission to the Committee on these important issues.

2. ELECTRICITY SUPPLY CHAIN

The electricity supply chain begins in power stations and small scale local power sources, such as roof top photovoltaic systems, where electricity is generated. Electricity is transported over long distances from power stations through high voltage transmission powerlines. The electricity is then transformed to lower voltages before being distributed to residences and businesses, as depicted in the diagram below.



Generation

Generators are the entities that produce electricity. Electricity is generated in power stations, using either fossil fuels (such as coal or gas) or renewable energy sources (such as wind, water or the sun). A proportion of energy is produced in small generators such as solar PV, located within customers' premises.

Networks

Electricity networks are considered to be 'natural monopolies' as they involve facilities that cannot be economically duplicated. Accordingly, the network revenue and aspects of its operations are regulated. Network users, including generators and retailers, are required to enter into an access agreement with the network service provider to access the network for the delivery of electricity from power stations to customers.

System Control

The System Controller's major function is to monitor and oversee the operation of the NT's power systems, to ensure that the system operates reliably, safely and securely in accordance with relevant legislation, codes and standards. As electricity cannot economically be stored, the system controller must balance the demand for electricity with the available supply at all times. The System Controller's charges are also regulated.

Retailers

Electricity retailers manage the sale and billing of electricity. Electricity retailers buy electricity from generators under contract, and pay the regulated network and system control charges. Retailers then sell the electricity to customers. Retailers are the first point of contact for questions about:

- Connecting to the network; and
- Customers' electricity supply, including bills and sales.

The NT Electricity Market became fully contestable from 1 April 2010 which enabled all NT electricity consumers to choose their preferred retailer.

3. POWER AND WATER CORPORATION'S RESTRUCTURE

Prior to 1 July 2014, all parts of the electricity supply chain were provided by Power and Water Corporation, with some private energy generation subject to contractual arrangements.

On 1 July 2014, Power and Water Corporation separated into three separate Government Owned Corporations:

- Power and Water Corporation (Power and Water);
- Power Generation Corporation (Territory Generation); and
- Power Retail Corporation (Jacana Energy).

Power and Water continues to provide electricity network and system control services to all electricity customers, along with electricity retail services in remote communities and retailing centres (in some mining communities). Territory Generation provides electricity generation services, and Jacana Energy, along with other retailers in the market, provides electricity retail services.

4. FOCUS OF THIS SUBMISSION

Given the above, the focus of Power and Water's submission is on pricing options and tariff structures for electricity networks and system control, along with Power and Water's retailing services.

Power and Water considers that tariff structures should accurately reflect and signal the cost of supply, and should also be equitable for all customers.

It should be noted that the majority of domestic and small commercial customers are not currently impacted by network tariff or system control pricing decisions, as they are subject to an Electricity Pricing Order issued by the NT Government that determines their overall electricity price.

Retailers can pass on the tariffs relating to electricity networks and system operations to contracted customers (mostly large commercial customers) if they have a pass-through clause in their contracts.

5. ELECTRICITY NETWORKS

Network Services and Tariffs

Services provided by Power and Water Networks include planning, designing, and constructing the electricity network, connecting network users to the network and the metering of network users to the relevant standards.

The expenditure associated with standard network, connection and metering services is recovered through Power and Water's Standard Control Network Tariffs (network tariffs).

Network tariffs are charged to all electricity retailers for the provision of these services to their customers, and are regulated by the NT Utilities Commission.

Above standard and non-standard services are termed Alternative Control Services, and are charged only to those network users that request such services, and hence are not the focus of this submission.

Capital contributions may be required from network users for new or upgraded connections to the electricity network, as per Power and Water's Network Capital Contributions Policy. The purpose of these contributions is to ensure that costs attributable to a network user's new or upgraded connection are paid for by that user and not shared by everyone connected to the network.

Network Tariff Objectives

The major objectives of network tariffs are as follows:

- *Pricing efficiency* – an efficient network tariff is one that reflects underlying cost drivers and signals to the network user their contribution to the cost of providing network services. The Australian Energy Market Commission has recently proposed that network tariffs be based on the

long run marginal cost of providing the network service, supporting this tariff objective[1];

- *Customer equity* – network users should pay a reasonable allocated share of costs;
- *Pricing simplicity* – tariff structures should be understandable, simple and transparent; and
- *Revenue sufficiency* – tariffs are formulated to recover the regulated revenue allowance.

It is recognised that these objectives may conflict with each other to some extent. The overall aim is to produce a tariff schedule that adequately reflects the above objectives while incorporating a reasonable balance where conflict exists.

Network Cost Drivers

Network system provision is capital intensive, with much of the cost related to prior investment in system capacity. In order to create an efficient and equitable tariff, the costs relating to existing assets should be recovered by taking into account the demand on these assets, and at the same time, signalling the cost associated with future system augmentation.

Costs associated with the provision of electricity networks are generally driven by factors relating to:

- Network user connection and metering requirements; and
- Peak demand or maximum capacity required, and the maximum capacity used by a network user (as this affects investments that the network must make to maintain a secure and reliable supply).

The cost of providing network services is not directly related to energy consumption, notwithstanding that the meters of small customers are only capable of recording the accumulated energy consumption.

Consumption versus Demand

Energy Consumption is the amount of electricity used by a network user over a period of time, and is usually measured in kilowatt or megawatt hours (kWh or MWh).

Energy Demand is the maximum amount of electricity consumed at a point in time, and is usually measured in kilo or mega volt-amperes (kVA or MVA).

[1] AEMC, Draft Rule Determination, National Electricity Amendment (Distribution Network Pricing Arrangements) Rule 2014, 28 August 2014.

It is important to note that consumption does not influence the costs of supplying a particular load. This is because system infrastructure is driven by the need to supply demand at peak times.

High network demand only occurs for limited periods during the year but a significant amount of capital expenditure is required to cater for it. Therefore, managing peak demand growth is a priority for Power and Water, as this can reduce overall expenditure, which then reduces the network tariffs that all electricity customers must pay.

Peak demand in the Darwin-Katherine network occurs in the wet season build-up, typically for a few hours in the afternoon of the hottest and most humid days of the year.

The network must be built to supply this peak demand.

Current Network Tariff Structure

Power and Water has two main categories of network users – those that consume:

- Greater than 750 MWh per annum (large commercial network users); and
- Less than 750 MWh per annum (residential and small commercial network users).

Network users with annual consumption greater than 750 MWh are further classified into the type of voltage connection, recognising that network users connected to the High Voltage (HV) network should not contribute to the cost of providing the Low Voltage (LV) network, which is used by customers connected at LV and which customers connected at HV do not use.

Network users with annual consumption less than 750 MWh are further classified into the type of user (domestic, small commercial or unmetered), determined by similar electricity usage patterns.

Table 1 below specifies the current structure of network tariffs.

Table 1: Standard Control Network Tariffs – Structure

<750 MWh pa Network Users	>750 MWh pa Network Users
• Fixed system availability charge; and • Declining block c/kWh consumption charges	• Fixed system availability charge; • Declining block peak and off-peak c/kWh consumption charges; and • Declining block peak and off-peak $/kVA demand charges

Issues with the Current Network Tariff Structure

Power and Water has recently undertaken a major review of its network tariff structures and initiated some minor changes in 2014/15. The structure of the Network tariffs had not changed since their first introduction in 2000.

The major issues with the current network tariff structure are as follows:

- *No time of use or demand charges for smaller network users*

  Network tariffs for larger network users (those consuming above 750 MWh per annum) currently have time of use charging parameters that provide a signal to users of the increased costs of using the network during peak periods. In addition, these network users also have a demand charge that signals the cost of installing a certain level of system capacity to meet demand.

  Smaller network users (those consuming less than 750 MWh per annum) have basic electricity meters that record only energy totals. Thus, there is currently no peak and off-peak rates for residential and small commercial network users and these users have no financial incentive to reduce their electricity consumption at peak times. These users are also only charged consumption tariffs (c/kWh) and are not currently subject to demand tariffs ($/kVA).

  However, the introduction of time of use and demand tariffs requires investment in more sophisticated metering technology (interval meters). The majority of smaller network users only have standard accumulation meters, and these meters do not have the necessary functionality to measure demand, or energy use at different times of the day.

- *Declining block tariffs for all network users*

  The current declining block tariff structure means that the more network users consume electricity, the lower the unit rate they are charged. This does not provide the appropriate pricing signals.

- *Tariff components are no longer cost reflective*

  Network tariff components have not changed to recognise the movement in costs over time. A network tariff structure that seeks to improve equity between customers should align network tariffs and tariff classes with their cost of supply outcomes.

- *No incentive for network users to improve their power factor*

  Power factor is a measure of the ratio of real power to total power of a load. The power factor of loads on the network has a significant impact on the network capacity that needs to be provided to maintain supply. A significant number of large commercial network users have a power factor that falls outside the technical requirements. Those network users that have a low power factor place a greater demand on the network, which

> The Network Technical Code requires a network user's **power factor** to be at least 0.9. Many users with equipment containing electric motors (air conditioning, industrial equipment etc.) are running much lower power factors than 0.9.
> Low power factors cost the utility in terms of unnecessary transmission losses and voltage regulation issues. Correction of poor power factor is a relatively simple matter for a user, and therefore it's better to offer consumers incentive to improve the power factor themselves.

imposes additional costs on all users through the need to augment network capacity.

Power factor can be corrected at different levels of the network, using capacitors. However, correction is most effective at large customers' installations.

Network Tariff Structure Reform

Power and Water has developed a pricing strategy and a range of network tariff structure reforms to address the issues with the current network tariff structure. This strategy has been reviewed by the NT Utilities Commission.

The pricing strategy was developed with the following high level objectives in mind:

- Enhancing cost reflectivity and reducing cross subsidies through network tariffs;
- Development of tariffs that better reflect the network's cost drivers and are simpler to administer;
- Mitigating peak demand growth and thereby, network costs;
- Improving demand side participation and energy efficiency; and
- Rolling out interval meters and time based pricing, to reduce demand during peak periods.

Network Tariff Structure Changes

Power and Water proposes to progressively move towards the following tariff structure changes:

- Move to *inclining block tariffs* for network users, to provide the appropriate pricing signals;
- Introduction of *separate high and low voltage-based tariffs* for larger network users that reflect the electrical location of network users, ensuring that users only pay for the network services that they require;
- A progressive *rollout of interval meters* to smaller network users, accompanied by the development of a demand tariff ($/kVA) and time of use charging for these users, to provide the appropriate pricing signals. Ultimately, the wide scale rollout of interval meters will allow for demand management initiatives to be offered through tariff incentives;
- Progressively *simplify* the tariff structure and *rebalance* the charging parameters to provide greater cost reflectivity. Re-balancing primarily refers to changes to prices (for individual tariffs), to more closely reflect their cost of provision; and
- Introduction of an *Excess kVAr charge*, initially for larger network users, as an incentive to users to improve compliance with power factor specifications. The correction of small network users' loads is not usually economic. However, correction at large network users' premises is

invariably the most effective solution, as it reduces the demand placed on the network at each upstream level.

For more details, please refer to the 2014-15 Electricity Network Tariffs and Charges and Future Price Trends document on Power and Water's website (http://www.powerwater.com.au/).

These changes will be made progressively, within all regulatory compliance requirements, and with due regard for the impact upon network users.

These changes will also be accompanied by an investment in communication and education to engage with network users and drive the required changes in behaviour.

Power and Water has a **network tariff strategy** that will contribute towards managing peak demand and improving customer equity and cost reflectivity.

Solar Photovoltaics (PV)

There has been a significant uptake in small scale solar photovoltaics (PV) in recent times, driven by government feed-in tariff policies and improvements in technology. This has considerable implications for the electricity network as there is potential for a significant reduction in electricity consumption and a limited decline in network peak demand, but no reduction in the need for base network services.

Network tariffs for residential and small commercial network users currently only have a fixed cost component and a variable consumption charge.

In cloudy weather conditions, solar PV will not maintain full output and the network capacity must therefore be able to supply the majority of the network user's load.

As a result, a network user with a PV installation has a network capacity requirement similar to one without and the cost that they impose on the network remains similar, however the network user with PV will pay significantly less through network tariffs as their overall electricity consumption has decreased.

This results in network users without solar PV cross subsidising network users with solar PV installations.

Case Study:

A large family in a large house live next to a retired couple in a small townhouse.
The family have a maximum 4.5kW PV system installed.
The family has an electricity demand and consumption requirement significantly greater than the retired couple.
However, as the family's consumption is off-set by the PV system, and they do not pay a demand charge, the family ultimately pays the same network costs as the retired couple, even though the family has a far greater demand on the system.

Power and Water will draw on interstate experience in developing network tariffs that address these important issues.

6. SYSTEM OPERATION AND CONTROL

The System Control business unit within Power and Water is responsible for monitoring and controlling the three main electricity systems in the NT (Darwin-Katherine, Tennant Creek and Alice Springs) to ensure safe, secure and reliable power system operation. In addition to ensuring a secure and reliable power supply, System Control is also responsible for providing safe access to the electricity network for asset maintenance and repair, operations planning, incident reporting and generation dispatch.

The current System Control charge is a flat rate energy charge that has remained unchanged since it was first introduced in 2000, even though System Control costs have increased over the same period, leaving System Control with a revenue shortfall.

The Utilities Commission is currently conducting a review into wholesale electricity market arrangements for the NT, and once the outcomes of the review are known, Power and Water will make a submission to the Utilities Commission to propose a new, cost reflective tariff.

7. ELECTRICITY RETAILING

Pricing Framework

Any changes to network and system control tariffs charged to electricity retailers currently have a limited impact on the behaviour of the majority of electricity customers. The majority of residential and small commercial customers are subject to electricity retail tariffs that are set by the Northern Territory Government's Electricity Pricing Order, which does not allow for a direct pass through of the electricity network and system operation and control cost components.

Therefore, implementing network tariffs to manage peak demand are limited in their effectiveness if the end use electricity customer is not subject to these pricing signals.

A formal retail electricity pricing framework may solve this, should it include (at a minimum) a direct pass-through of regulated network and system control charges to Electricity Pricing Order customers. It will also require electricity retailers to be willing to provide different tariff options, similar to those found interstate, to their customers.

The Solar Cities trial in Alice Springs, over the period March 2008 to June 2013, tested domestic customer response to time of use price signals. The results were quite positive and were aided by new technology.

Indigenous Essential Services (IES) funding

From 1 July 2014, the electricity customers that Power and Water retail to are Electricity Pricing Order customers in remote communities and retailing centres (in some mining communities) only.

Indigenous Essential Services (IES) is a not-for-profit subsidiary company of Power and Water that provides electricity, water and sewerage services at pricing order tariffs in remote communities. The NT Government (Department of Community Services) funds the provision of these services and the Remote Operations business unit of Power and Water acts as the service provider for this agreement. The fee for service agreement is not fully cost reflective and is also dependent on achieving forecast revenues.

Electricity retail tariff design and different tariff options are not as relevant to IES customers, as a significant number of IES customers are on prepayment meters and have limited discretionary electricity consumption. A prepayment meter is an electricity credit meter where credit is purchased and applied to the meter. The customer is not issued with an account as the meter deducts electricity use from the customer's credit. However, Power and Water is currently trialling a new prepayment meter technology that has a time of use capability.