Professor Peter Wolfs
[redacted]

1st December 2011

Mr Tyson Self,
Manager Projects, Access,
Economic Regulation Authority,
publicsubmissions@erawa.com.au

RE: WESTERN POWER ACCESS ARRANGEMENT 3

SMART METERING INFRASTRUCTURE PROPOSAL

Dear Sir,

I am writing to you as an electricity consumer in the State of Western Australia to express my support for Western Power's AA3 submission with respect to their proposal on a Smart Metering Infrastructure.

It is my belief that smart metering provides tangible benefits to the communities of Western Australia.

I note Western Power is seeking the opportunity to replace 280,000 non-compliant meters with smart meter technology at a small incremental cost. I also note they have successfully completed a trial deployment of 11,500 meters.

Early smart meter infrastructures (SMIs) focused on operational benefits such as remote meter reading and consumer connection and disconnection. A modern SMI, as proposed by Western Power bring substantial additional benefits that are discussed below.

Peak Demand Management

A smart meter infrastructure (SMI) collects energy consumption data on a 30 minute basis, and includes other technical capabilities such as a demand response control channel. Intelligent software systems can be readily constructed to offer customers a wide range of tariff structures for energy supply.

The SMI will support a range of demand management and/or demand response options. The existence of a SMI allows a high degree of flexibility and future choice. The SMI itself is agnostic with regard to the exact consumer billing mechanism and is capable of supporting any customer product that the community is prepared to collectively adopt. Importantly energy supply arrangements can be quickly changed to respond to rapid changes in consumer behaviour whereas the physical infrastructure cannot.

West Australia maintains a transmission and distribution network that is designed to cater for a peak demand. The load duration curve in West Australia and the other Australian states is

changing over time to have a more pronounced peak with the top 10% of the network load persisting for only tens of hours each year. Consumer loads are stochastic in nature and this behaviour is consistent with a change in customer load diversity. Loads such as air-conditioning are synchronised by weather patterns. As this has increased as a proportion of the consumer load, the load co-incidence factors will increase.

The future will present growth in existing loads or new load groups that can either challenge or support the existing networks. The SMI will play a key role in managing loads to reduce or at least control the growth rate of the peak demand.

The replacement time for network assets is several decades. Electric vehicles are one load group that will certainly emerge within the lifetime of the existing network assets. Domestic air-conditioning with thermal energy storage is another existing technology that is likely to gain a market share. An SMI is an ideal mechanism to directly manage loads from the network side in a demand management system or to strongly incentivise a demand response from the consumer side. Once more the SMI is agnostic as to the adopted method and facilitates either or any combination.

The West Australian community has the choice to continue to invest in poles and wires or seek to better optimise the usage of the existing asset base. I strongly encourage ERA to support Western Power's willingness to adopt new technologies to achieve a better economic outcome.

Network Power Quality Management

Variations in network voltage are a major power quality issue. It is current practice to deploy small numbers of voltage recorders either proactively or in response to customer complaints to monitor the network voltage. Smart meters record the voltages observed at the consumer premises and return this data with the energy billing data. Western Power has not explicitly identified some additional opportunities that will be facilitated by the SMI.

An SMI will facilitate the deployment of conservation voltage (CV) setting or integrated voltage and VAR control (IVVC) systems. Like all distribution network services provider (DSNP) companies, Western Power provides an energy supply that is managed to remain within a prescribed voltage range.

Like most DNSPs Western Power targets light load distribution voltages that are towards the top of the allowable voltage range. The expectation is that voltages will fall under load and this approach ensures that consumer voltages are always higher than the minimum allowable voltages. This technical approach has the following consequences:

- Consumer voltages are generally at the higher end of the allowable voltage range;
- The efficiency of consumer appliances is reduced at higher operating voltages, higher voltages increase consumer energy costs and CO_2 footprint;
- Higher background voltages limit the allowable penetrations of roof top PV systems which themselves tend to cause voltage rise.

In the presence of an SMI, Western Power is able to observe the consumer voltages at fine granularity across the distribution network. It is technically possible to adjust the voltages in the HV distribution network to more closely regulate consumer voltages in real time. Voltage regulation can be introduced at a small incremental cost through zone substation tap changing or through capacitor bank switching. This improves energy efficiency and reduces the voltage rise impacts of domestic PV systems.

Sincerely

Professor Peter Wolfs

PhD, C.P.Eng, FIEAust, SMIEEE, RPEQ.