EXECUTIVE SUMMARY

This report discusses the performance of Power and Water Corporation's Power Networks (PWPN) electricity distribution business in 2001–02 compared to ten other Australian distribution businesses (DBs). The project is being undertaken on behalf of PWPN and the Utilities Commission. This report builds on work the authors originally undertook on behalf of four Victorian DBs and, subsequently, the Queensland Competition Authority where a database of ten Australian DBs was assembled comprising ACTEW, AGL, Aurora, Citipower, Energex, Ergon Energy, Great Southern Energy, Powercor, United Energy and Western Power. Comparable data for PWPN has been added in the current project.

The main focus of the current study is on comparing operating and maintenance (O&M) costs. However, to ensure these comparisons are made in the appropriate context, we have assembled a suite of performance indicators which also covers financial measures, price, reliability, service quality, labour and capital productivity. Participation in the original study was conditional on maintenance of data confidentiality. The report for each of the participating DBs compares performance for that DB with the rest of the sample without disclosing the identity of other participants.

Partial performance indicators of PWPN's operations

Before examining PWPN's rankings across a range of performance indicators, it is important to recognise PWPN's relatively unusual characteristics. PWPN is a very small distributor compared to the other ten participating distribution businesses. It supplied the least amount of power at around 1,400 GWh, which was only around 20 per cent of the group average of 6,614 GWh and less than 9 per cent of that supplied by the largest distributor in the sample. PWPN also had the smallest customer base, with around 66,000 customers compared to an average of 436,000. This is only 15 per cent of the average and around 6 per cent of the number of customers of the largest distributor.

PWPN is also unusual in that while it effectively services all of the Northern Territory and, hence, operates in a very remote area, its regulated service is concentrated on four remote towns – Darwin, Katherine, Tennant Creek and Alice Springs. While a 132 kV line links the Darwin and Katherine distribution systems, the Tennant Creek and Alice Springs systems are both isolated. Hence, while PWPN has some aspects that are similar to a remote rural distributor, it is also essentially an urban distributor.

In addition to its unusual size and remoteness characteristics, PWPN also faces a number of unusual climatic challenges as one of only two DBs operating in Australia's northern tropics. These include a high incidence of lightning strikes and heavy storm activity around Darwin

and Katherine in the wet season and infestations of a particularly voracious species of termite.

Bearing these circumstances in mind, Appendix Table A shows that PWPN's performance across the majority of the indicators reported was below average for the 11 participating Australian DBs.

PWPN ranked ninth and eighth, respectively, out of the sample of nine responding DBs in terms of domestic and combined commercial/small industrial network charges. It ranked eleventh in terms of the overall average distribution network charge for the full sample, in part reflecting its high costs of operation in a remote location with difficult climatic extremes and small scale of operation. PWPN ranked sixth and seventh, respectively, for the net profit margin and rate of return on assets of the participating DBs. However, revisions to asset values currently underway may further worsen its ranking on the rate of return.

PWPN's reliability performance was mixed. It had the largest number of interruptions per customer and the eighth highest total number of minutes off supply per customer. However, it had the shortest average interruption length indicating that it is relatively efficient at restoring supply. It had the fifth fewest complaints per customer in the sample.

PWPN had the third lowest labour productivity when measured as customers per employee but the fifth lowest when measured as throughput per employee, reflecting its relatively low proportion of domestic sales despite the lack of a large industrial base. It had relatively low capital productivity with the second lowest utilisation of its distribution transformers and the second lowest utilisation of its zone substation transformers, although the latter improves to a rank of sixth when assets functionally equivalent to transmission are removed.

Comprehensive measures for PWPN

In this study we require a comprehensive measure of distribution outputs to normalise O&M costs to allow more like–with–like comparisons. Combining a comprehensive output measure with a comprehensive input measure also allows us to calculate total factor productivity (TFP) – a key measure of overall efficiency comparing total outputs per unit of total inputs.

In previous work on distribution efficiency we have estimated both supply side and demand side output models. Demand side models concentrate on throughput measures while supply side models concentrate on network length as a major output. In the present study we have further advanced the output specification by combining the key elements of the demand and supply models to form a comprehensive output measure which contains three components – throughput, network length and customer numbers. This specification has the advantage of

incorporating key features of the main density variables (customers per kilometre and sales per customer). This study also uses what is known as a 'multilateral' index methodology which has the advantage of being invariant to the ordering of the data. The weights for the three outputs are derived from an econometric cost function.

On the input side we include labour, materials and services, and four separate types of capital — transformers, overhead poles and wires, underground cables and other assets.

PWPN ranked eleventh on the comprehensive TFP measure. Excluding the top performer on this measure which has quite different characteristics to the rest of the sample and taking an average of the second, third and fourth ranked DBs as Australian best practice (one of which has a substantial element of remote supply and the other two of which are predominantly urban), PWPN is around 40 per cent behind Australian best practice. As noted above, PWPN's small scale of operation, remote location and climatic extremes will all impact heavily on this result. Preliminary econometric estimates using the TFP data indicate that operating environment differences could account for around 20 per cent of PWPN's input use.

O&M Efficiency

We assess operating and maintenance efficiency levels by comparing multilateral unit O&M costs for the 11 DBs. Multilateral unit O&M costs are derived by dividing distribution O&M costs by the comprehensive multilateral output index.

PWPN has the highest multilateral unit O&M cost. We adopt the conservative policy of taking the second lowest score as a reasonable estimate of Australian best practice. Relative to PWPN having an index value of 1.00, three DBs have the second lowest score of 0.55. These comprise the least dense of the urban distributors and rural DBs with the second and third lowest densities (in terms of customers per network kilometre). Consequently, for PWPN to reach best practice it would involve a reduction in its unit O&M costs of 45 per cent. This does not, however, allow for the difference in functional responsibilities of the DBs nor for the impact of the adverse conditions PWPN faces.

Allowing for the transmission equivalent component of PWPN's O&M costs reduces the gap between PWPN and best practice by 5 per cent to 40 per cent. The transmission equivalent component arises from activities undertaken by PWPN which would be undertaken by transmission entities in other jurisdictions such as taking power from the power stations to distribution nodes.

Allowing for PWPN's adverse conditions beyond management control using engineering based estimates reduces the gap to best practice by another 20 per cent. The adverse

conditions include climatic extremes such as the high incidence of lightning strikes and associated wear and tear, higher vegetation trimming and pest control costs associated with the tropical climate in the north, the higher prevalence of cyclones and higher material costs resulting from the remote location and small scale of operation.

Overall Assessment

After allowing for differences in functional coverage and factors beyond management control, PWPN's current unit O&M costs would have to be reduced by around 20 per cent to reach best practice. Ten years appears to be a reasonable timeframe for removing the performance gap implying a reduction in the current unit O&M cost of two per cent per annum.

Removal of the 20 per cent gap to best practice could be achieved in a number of different ways. Apart from output remaining unchanged and current O&M costs of $29.1 million per annum being reduced by 20 per cent, this reduction could also be achieved by O&M costs remaining unchanged and output increasing by 25 per cent. Consequently, normal growth in system output over several years could be expected to go part way towards achieving the target if O&M costs are held in check.