



Networks spending millions every day

No part of energy supply needs to find more money for capital works than the organisations managing power distribution infrastructure systems

Power networks are the backbone of Australia's electricity system. The reliability of the high voltage transmission and distribution lines and substations is critical to the nation's secure, cost-effective supply of one of Australian society's two absolutely essential services – the other being water.

The cost of ensuring that these services meet consumer needs is huge and rising. Current estimates indicate that, in addition to the tens of billions of dollars needing to be spent on power generation, service providers will need to outlay about \$30 billion on metropolitan water systems and well more than double that amount on networks in the next decade.

The distribution industry expects that it will need to have a capex expenditure of more than \$40 billion between 2010 and 2020, with the transmission networks predicting they will need to spend about \$16 billion in the same time frame. This will rise by another \$4.5 billion for high

voltage links if the enlarged renewable energy target leads to development of substantial power generation, through wind, solar and geothermal plants, in remote areas.

However, the network operators are warning that, unless government and regulators put in place the right investment incentives, the outlays necessary to achieve timely, efficient and effective supply will not be forthcoming.

The Energy Networks Association, which represents the sector, says that its electricity and gas supply members together have an investment of \$67 billion in assets at present, and are undertaking expenditure currently of more than \$6.6 billion a year to keep up with demand and to replace ageing existing assets, some of which are 50 years old. This breaks down to an outlay of more than \$18 million every day of the year, close to a dollar a day for every Australian.

There are 57,000 kilometres of transmission lines and 800,000 kilometres of distribution networks currently



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installed, including the world's longest interconnected high voltage system – running 4500 kilometres from north Queensland to the western borders of South Australia and across Bass Strait to Hobart.

The nation's largest single electricity consumption area alone – running from the New South Wales South Coast up to the Blue Mountains and across the Central Coast, embracing Wollongong, Sydney and Newcastle – requires electricity capital works outlays of the order of \$30 billion by three operators, Energy Australia, Integral Energy and TransGrid, between 2005 and 2020.

The day-to-day challenge of sustaining these systems to meet not only average power load but also the sudden extreme peaks reached by demand in extreme weather bears heavily enough on the network service providers, but they are now being called upon to take on another challenge: the development of their systems to deal with climate change issues.

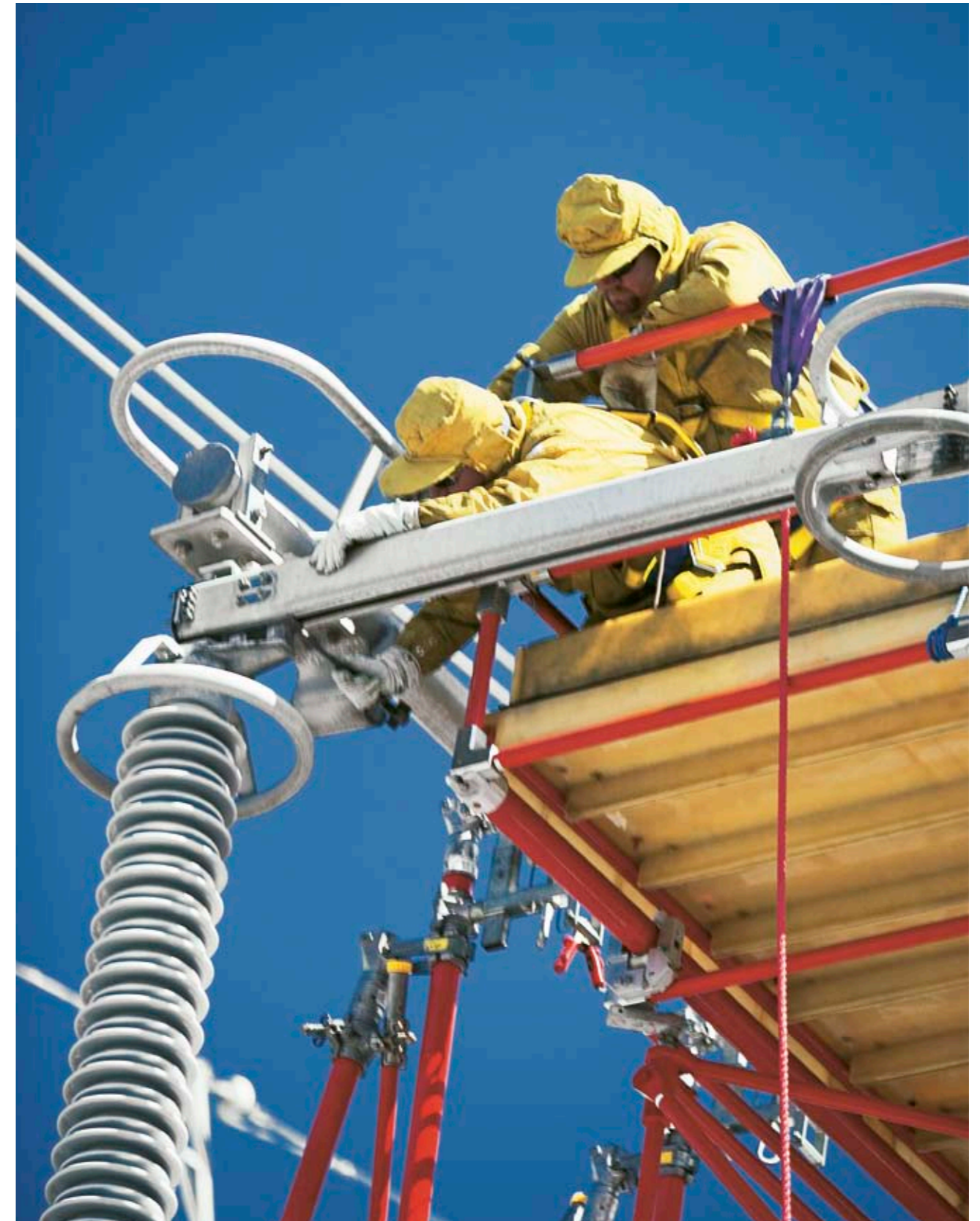
The life expectancy of network-related infrastructure is around 30 to 35 years under optimum circumstances, so the operators now have an urgent need to consider and implement policies and practices to deliver their service in a carbon-constrained environment and possibly under new climatic conditions.

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If, as the scientific models predict, the number of days with temperatures above 35 degrees Celsius rises, additional air-conditioning use will place considerable pressure on networks, where the need to deal with occasional peaks already requires investments of over \$1 billion in plant in areas such as western Sydney and south-east Queensland which will need to be available for less than a month a year.

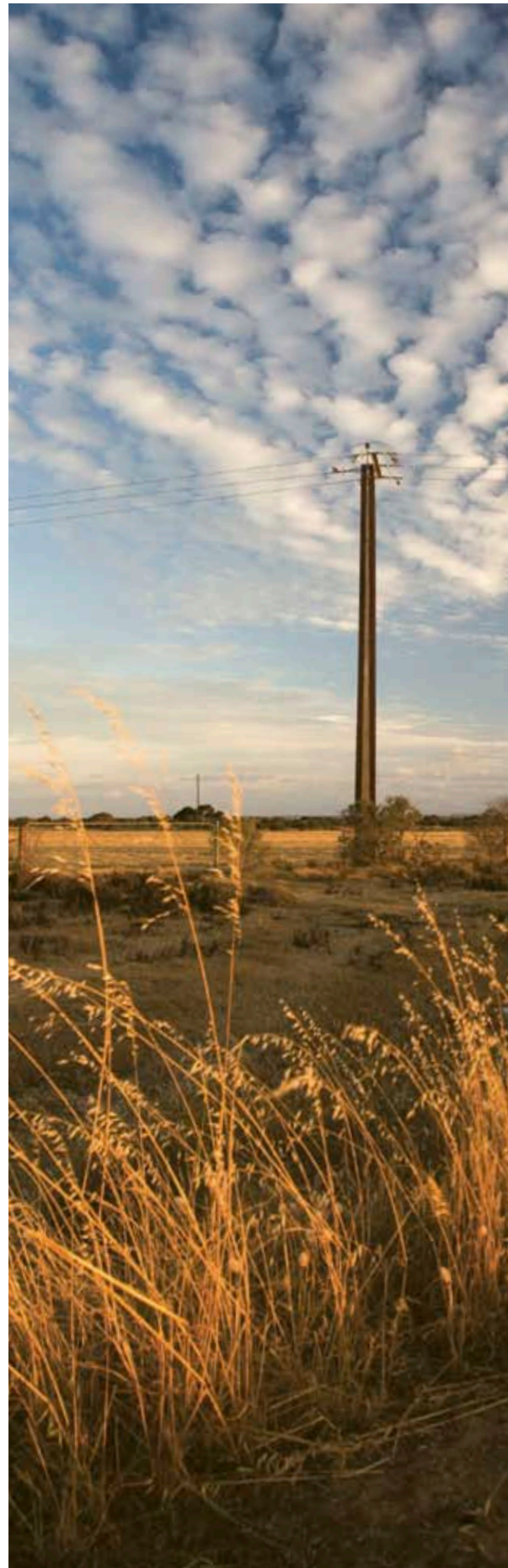
Lurking in the background is a major, and currently unpredictable, additional challenge: the prospect that society could move en masse to use of electric vehicles inside the next quarter century. This has the potential to drive electricity demand to levels well beyond any current modelling. Assuming a typical daily power requirement of a commuter car at 10 kilowatt hours, for example, would see average household consumption of electricity effectively doubled.

These scenarios raise considerable political issues for both the service providers and state and territory governments, with those in Queensland, New South Wales, Tasmania, Western Australia and the Northern Territory also being owners of the supply organisations.



OPPOSITE Operators have urgent need to implement policies and practices appropriate to doing business in a carbon-constrained environment.

ABOVE As the number of 35°C+ days rises, additional air-conditioning use will place considerable pressure on networks to manage demand peaks.



ABOVE Insufficient investment may be made available to maintain the levels of service and reliability electricity customers expect.

OPPOSITE Electricity networks can make a vital contribution to meeting the challenge of climate change, according to Andrew Blyth.

Electricity prices must rise considerably under the combined weight of emissions trading and the renewable energy target – and network charges, which account for half of end-use retail bills, must rise substantially in order to pay for the multi-billion dollar capital investment.

With electricity demand notoriously inelastic – consumption continues to rise even under higher prices, as was well-illustrated in South Australia earlier this decade when electricity reform saw retail prices increase by more than 30 per cent without stemming demand for power – the outlook over the next decade is for considerable tension between suppliers, consumers (both residential and business) and governments and regulators.

A study undertaken for the Energy Networks Association and its members by consultants Parsons Brinckerhoff (PB) as part of the process of responding to federal government and Senate inquiries related to carbon policy has made a strong point that regulators today and in the years ahead will have to respond adequately to the changing needs of the power businesses resulting from climate change.

“Unless,” says the PB report, “network businesses can recover the predicted additional cost of climate change impacts, it is likely that insufficient investment will be made [in the systems] to maintain the levels of service and reliability that customers expect.

“In some cases,” the report adds, “additional costs, such as the need to increase spares holdings to improve the



response to storm damage, will be relatively easy to forecast.

“In other cases, such as the impact on networks of large numbers of photovoltaic embedded generators, the costs will be uncertain.

“Additionally, there are likely to be some events, such as cyclones or extensive bushfires, that are outside the normal expectations of network operators.

“Regulatory processes,” warns PB, “will need to be sufficiently flexible to accommodate the changing and sometimes unpredictable nature of the costs facing network businesses.”

The Energy Networks Association stresses that its members will need a strong incentive to pursue innovative solutions to achieve swiftly the major change that the new policy environment envisages. “If regulated returns to capital are set too low,” it argues, “not only will innovation be absent, but no significant action will occur in response to emissions trading unless and until a series of detailed, mandatory investments are identified and imposed.”

Unless these issues can be addressed adequately, the action options identified and the necessary solutions implemented, says ENA’s chief executive, Andrew Blyth, the vital contribution that energy networks can make towards meeting the climate change challenge will be compromised. “Market and regulatory measures are complementary and need to be addressed together.”

The list of potential cost increase pressures is long, and seemingly continuously expanding as governments

and consumers react to new issues. Industry members, for example, see it as inevitable that there will be increasing environmental advocacy pressure, as the community concern over global warming grows, for high voltage line losses to be addressed to mitigate emissions. The Parsons Brinckerhoff study points out that a high level of investment will be needed to reduce such losses. It estimates that a 10 per cent reduction would require a capital investment of \$1.2 billion in today’s money values.

Also looming over the distribution networks is the likely requirement for “smart meters” to be rolled out to help residential consumers to better understand their power usage and to better manage demand. Current estimates suggest that the roll-out in the eastern seaboard National Electricity Market will require capital expenditure of about \$7.5 billion, a cost that will need to be recovered over time from consumers.

The cost pressure situation will be even more stressful if the predictions of electric car use come true and consumers add their existing angst about vehicle fuel prices to their concern about rising electricity bills in an environment where households are continuously increasing their use of energy-consuming goods.

On the other hand, one of the cornerstone demands of the electricity industry – and the energy industries more widely – is that governments allow the full recovery of supplier costs and, in particular, do not impede the passing-on of climate change-related prices to end-users.

