

FACT SHEET Power System Review 2016-17

The Utilities Commission's 2016-17 Power System Review details the performance and capacity of the Northern Territory's regulated power systems, namely Darwin-Katherine, Alice Springs and Tennant Creek power systems.

It also reports on demand and generation reliability forecasting over a 10-year period. The commission has been assisted in this work by the Australian Energy Market Operator to ensure consistency with assessments in the National Electricity Market.

Performance of the power system

There are currently no immediate major issues of concern across the Darwin-Katherine and Tennant Creek regulated systems. However, there are some areas of concern in Alice Springs.

The number of single generation trips in Alice Springs has significantly increased in 2016-17 leading to an overall deterioration of generation performance as evidenced, for example, by an increase in the level of customer minutes without supply. It is expected that performance will improve with the introduction of new generation assets at the Owen Springs power station.

Across the three systems, the number of major incidents has been relatively stable at around 30 per year, but total customer minutes without supply have decreased by about 57 per cent since 2014-15, indicating improvements in the ability to recover from an incident. Also customer minutes per customer have more than halved over this period.

Demand

Modelling was undertaken, forecasting electricity demand across the 10 year period to 2026-27. The modelling included a 'base' scenario (current growth pattern) and a RE50% renewable scenario – that is, achievement by 2030 of the Territory Government's 50 per cent target for renewable energy contribution to electricity supply. This scenario allows the commission to evaluate the possible system impacts associated with this policy.

Figure 1: Annual energy system consumption forecast, Northern Territory

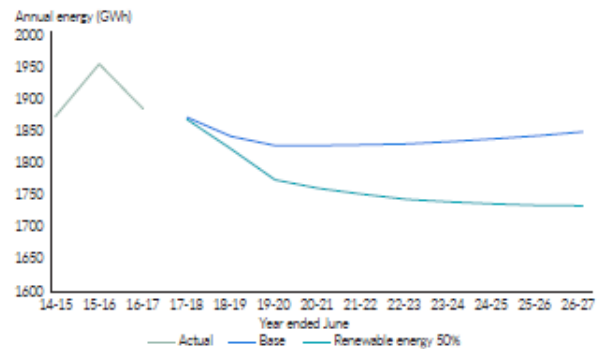


Figure 1 shows the forecast energy system consumption for the three systems from 2017-18 to 2026-27 (also included is actual consumption for the previous 3 years). Annual electricity consumption is forecast to decrease a little (-1.5 per cent per annum) over the next few years under the base scenario as more behind the meter solar photovoltaic (PV) systems are installed. Consumption growth will remain low (0.3 per cent per annum) from around 2019-20 to 2026-27. Under the RE50% scenario annual system consumption would see a more significant decrease (-2.9 per cent per annum) over the next few years with a steady decline (-0.2 per cent per annum) continuing from around 2019-20 to 2026-27.

The increasing level of solar penetration is forecast to have an impact on maximum system demand. Overall maximum system demand is forecast to decline from 2017-18 to 2019-20 (-2 per cent per annum) in Darwin-Katherine and Alice Springs. Beyond 2019-20 no growth in maximum demand is forecast in Darwin-Katherine with a negative growth (-1.2 per cent per annum) in Alice Springs. Tennant Creek is expected to see an increase (13.4 per cent per annum) in maximum demand over the next few years due to the Northern Gas Pipeline project, beyond this there will be no growth for the remaining forecast period.

However, minimum system demand is forecast to significantly decrease, especially under the RE50% scenario (-10.6 per cent and -13.4 per cent per annum in Darwin-Katherine and Alice Springs respectively). This introduces significant challenges in managing system security. Of the three systems, minimum system demand issues are forecast to arise first in Alice Springs.

Table 1 shows the current and modelled 2026-27 (base and RE50%) installed capacity of residential, commercial and large-scale PV installations in the three regulated systems and combined.

Table 1: Northern Territory installed capacity (MW) of PV systems

System	2016-17	2026-27	
		Base	RE50%
Regulated Systems	52	163	438
Darwin-Katherine	37	137	379
Alice Springs	15	25	51
Tennant Creek	0.3	0.7	8.1

It suggests that about 390 MW of solar PV will need to be installed above current levels by 2026-27 to meet the 50 per cent renewable energy target.

Challenges

Increased levels of renewable energy are likely to increase system costs, especially in the provision of ancillary services necessary to ensure system security. However, new solar generation will potentially increase generation capacity, investment and diversity of supply. Existing higher-cost generation capacity may be retired earlier than planned as it is displaced by new low-cost generation. This will impact both returns to the asset owner and future system reliability.

If left to grow unmanaged, solar generation will detrimentally affect the secure operation of the power system. This is a significant issue when system demand is reduced to the spinning reserve requirements, and also when system demand is being met primarily by large-scale solar generation and the level of online dispatchable synchronous generation (for example gas or diesel generation) reaches the spinning reserve requirement. Spinning reserve is generation in addition to system demand to ensure a secure system. Where system demand or the amount of dispatchable generation drops further, System Control may have to constrain solar generation, to ensure there is sufficient levels of dispatchable synchronous generation online. In the longer term, investment may be required in equipment such as batteries and synchronous condensers to maintain a secure system, leading to higher operating costs.

Careful coordination of solutions to these issues will be required to ensure an efficient outcome. This will

include understanding the trade-offs between strengthened Generation Performance Standards (GPS) currently being considered by System Control, ancillary services and network investment.

It is noted that the three regulated systems have different levels of solar PV penetration, and weather patterns. It is likely that the regulated systems may require different solutions at different times. This may include different pricing regimes in the individual systems, to provide appropriate incentives for customers.

The modelling highlights that, with a continuous growth in solar generation, there will likely be technical issues in a few years in Alice Springs. For simplicity, the modelling has assumed that the 50 per cent renewable energy target is achieved on a pro rata basis across the various systems. However, in practice and taking into account the technical issues of each system, it is likely that a more holistic approach will be required to achieve that target.

Future consideration by the Commission

As has been highlighted, there are significant technical issues around how to incorporate greater levels of renewable energy into the three regulated power systems in the Territory. While there are potential benefits that renewable energy can bring to capacity, diversity and choice for customers, there are also potential increased costs. The challenge is to deal with those technical issues at least cost to the system and ultimately consumers.

Other major upcoming changes that could have a significant impact include the government's current market reforms (e.g. development of a wholesale market, additional phases introduced of the previously adopted National Electricity Rules), System Control's review of GPS and reforms to the Territory gas markets.

The commission will consider the cost trade-offs between GPS, ancillary services and network investment as part of its assessment of System Control's proposed GPS. It will also examine the impact on system costs of introducing renewables while maintaining system security requirements.

The commission will engage with the relevant stakeholders and monitor these developments over the next year and report on their impacts in the 2017-18 Power System Review.