Environmental Factor	Effect on NSPs' Costs
Location and types of generation on each network and location of points of interconnection with other TNSPs or Market Network Service Providers	The fewer the major generating precincts, the lower the number of circuits required to provide capacity between generation and load (but the higher the capacity of individual circuits). The greater the number of generating precincts with small generation capacity, the greater the number of circuits required to required to connect this generation to the shared network. The greater the number of interconnectors, the greater the number and distance of circuits required to make these connections.
Variability of generation dispatch patterns due to intermittent generation, for example, where contributions from hydro or wind generation are material	Intermittent generation requires capacity to be available in the transmission network but the amount of capacity used at time of peak demand will be variable. Also, where intermittent generation is connected to existing shared network circuits it can constrain other generation. This may be reflected in varying utilisation of some network elements.
Location and distribution of loads, whether centralised or distributed among major flow paths, across each network	The fewer the major load centres, the lower the number of circuits required to provide capacity between generation and load (but the higher the capacity of individual circuits).
Length/distance and topology of the network, that is, the degree of meshing or extension of each transmission network	A heavily meshed network will inherently have higher reliability than an extended network. In particular, length/distance increases the likelihood of impacts.
System operating voltages and power carrying capabilities of network assets	A network with a large number of voltage transformation steps due to historical design will have more assets between generators and loads. It is most often not economically efficient to remove a voltage level across an entire network, but it does impose additional costs given the larger number of assets to maintain. Also for a given capacity, in general the higher the voltage the fewer but larger assets required to meet the capacity. This will lead to a difference in capital stock and operating expenditure by voltage.
Different ranges of nominal operating voltages at which TNSPs connect to DNSPs and direct connect consumers	This has a similar effect to the range of operating voltages within a TNSP's network.
Major circuit structures (for example, single circuit or double circuit, which can impact on credible contingencies in the NEM)	Credible contingencies would sometimes reflect a lower asset base e.g. a double circuit line rather than two single circuit lines. These tend to occur during significant natural events such as bushfires or storms. The capital and maintenance costs of single circuit paths would generally be higher for the same capacity than double circuit paths, but with the advantage of greater robustness against contingency events.

Environmental Factor	Effect on NSPs' Costs
Weather and climatic effects, that is, performance characteristics of the network and the extent to which these may be affected by storms, bushfires and other weather-related events (which in turn can depend on factors such as altitude, wind and the propensity for natural phenomena such as cyclones)	Greater storm activity will imply a higher number of lightning strikes, which will impact on design levels for transmission lines and earthing, and may reduce reliability. Designs for equipment more exposed to extreme weather such as strong winds or snow will need to be more robust, and hence will be more costly than in other areas. Greater bushfire or cyclone activity can reduce reliability.
Terrain and vegetation	Altitude will affect design costs for equipment, particularly in snow and wind exposed areas. Steeper terrain, regardless of altitude, will make access to assets for construction and maintenance more difficult and increase cost. Higher growth rates of vegetation will increase vegetation management costs.
Peak demand	Peak demand will affect the transmission capacity required. The 'peakiness' experienced by a network comparing peak demand to average demand is sometimes referred to as load factor.
Different jurisdictional standards such as planning standards	Jurisdictional planning standards will affect the level of redundancy in the transmission network. A more stringent standard will lead to higher capital (and consequentially operating) costs compared to a more relaxed standard.
The age profile and rating of existing network assets	Asset maintenance costs can vary with the asset age profile. Assets reaching the end of their serviceable lives will drive asset replacement strategies.
The effect of scale economies (that is, "lumpy" investment profiles) on network performance and future capital expenditure requirements	The lumpiness of transmission investment makes augmentation capex benchmarking difficult where a project will satisfy a need for several years (not just the year in which the investment is made).
Implications of technical requirements and standards set out in the schedules to Chapter 5 of the NER	Schedule S5.1 of the NER sets out system stability and security requirements. The requirements are the same on all TNSPs, but the cost impact on different parts of networks will vary depending on the location of particular circuits in the whole interconnected NEM. It will affect investment as static reactive plant, dynamic reactive plant (e.g. SVCs) or particular network layouts may be required in certain situations such as on interconnectors or particular intra-regional cut sets.
Variations in cost drivers between jurisdictions	Jurisdictional requirements around urban planning approvals can vary, which can lead to variances in costs for capital projects between jurisdictions. Other external factors, such as competition for resources from other sectors, vary by jurisdiction and over time.