

# DISPERSION

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- 1 This working paper describes the expense assessment for Dispersion and provides information on its impact on GST revenue distribution for the 2008 Update. The development of the assessment method is discussed in Volume 7 of the 2004 Review Working Papers, a summary is provided in Attachment A.
- 2 The dispersion assessment measures the impact of the geographical dispersion of a State's population on its costs of providing services. Population dispersion was assessed with reference to the capital city, regional centres and urban centres of a State. The States provided data on dispersion affected expenses and the Commission developed a conceptual model which related per capita dispersion affected expenses to the dispersion of a States' population.
- 3 Queensland, Western Australia and the Northern Territory have the most dispersed populations, so dispersion imposes a greater per capita financial burden on them. The assessment increases their GST revenue shares and reduced the shares of the other five States.

## DERIVING THE DISPERSION FACTOR

### Calculating dispersion factors

- 4 The Commission accepted the following costs were affected by population dispersion:
  - telecommunication;
  - general freight;
  - remote staff turnover costs;
  - travel costs;
  - locality allowances;
  - repairs and maintenance;
  - technology-related repairs; and
  - technology-related support.

- 5 The dispersion assessment was based on a conceptual model that related per capita dispersion affected expenses to measures of the dispersion of population settlement. The assessment method for the 2008 Update was the same as that used for the 2004 Review.
- 6 Estimates of the dispersion affected expenses were made for each category. The dispersion component weights, which reflect the proportion of total category expenses accounted for by dispersion affected expenses, are based on those estimates. The estimates were increased by the rate of increase of expenses in the category in which they were assessed. The dispersion factor had an increased impact on relativities when category expenses increased faster than the growth in GST revenue, it had a decreased impact when category expenses decreased or increased slower than the growth in GST revenue.

#### **Dispersion factors for 2004-05**

- 7 This section shows the dispersion component factors used in the 2008 Update. They represent the effects of population dispersion on each type of dispersion affected expenses. These component factors are used for all years and for all inquiries. They are combined with dispersion component weights and aggregated to produce the assessed dispersion factor. The assessed dispersion factors can differ across inquiries if:
  - the proportion of dispersion related expenses to which the component factors are applied change; or
  - States' shares of the mean resident populations (MRP) change.<sup>1</sup>
- 8 The component factors set out in Table 1 were used for the majority of categories for which dispersion was assessed. For telecommunications, air travel and inter-regional travel, the table shows the factors with and without the adjustments to the input weights to reflect the effects of technology.

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<sup>1</sup> MRP data are used to rescale the factors to ensure the average factor is one.

**Table 1 Dispersion component factors — general categories**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Telecommunications</b>								
Voice <sup>(a)</sup>	1.00309	0.89104	1.16029	1.05113	0.90435	0.89899	0.42346	2.04722
Voice — technology adjusted <sup>(b)</sup>	0.98669	0.86200	1.16646	1.12168	0.91118	0.95545	0.38743	2.38660
Non-voice	0.99837	1.00025	1.00025	1.00315	1.00027	0.99863	1.00453	1.00718
<b>General Freight</b>	1.03794	0.92230	1.25840	0.99052	0.53856	0.94864	0.07864	2.15858
<b>Travel</b>								
Air	1.09955	0.14719	2.35864	0.90159	0.48941	0.00377	0.00000	2.38548
Air — technology adjusted	1.09817	0.14701	2.36050	0.90231	0.48880	0.00470	0.00000	2.39699
Inter-regional	1.08094	0.88196	0.89701	0.91268	1.16048	2.00233	0.14384	1.68551
Inter-regional — technology adjusted <sup>(c)</sup>	1.09499	0.89508	0.89715	0.87004	1.15170	1.95947	0.15679	1.45089
Local	0.96958	0.94752	0.96992	1.22012	0.87213	0.67323	0.54020	4.31793
<b>Remote staff turnover</b>	0.43589	0.03057	1.89891	3.20446	0.79301	0.34761	0.00000	10.64557
<b>Locality allowances</b>	0.41486	0.02444	1.91995	3.07732	0.58078	0.10790	0.00000	14.60689
<b>Repairs and maintenance</b>	0.30256	0.04538	1.28563	2.84653	1.47037	0.61908	0.00000	23.81569

(a) Telephone factor with regional weight = 0.25, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4.

(b) Technology-adjusted telephone factor with regional weight = 0.2, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4, input weight for technology region type 1 and 2 = 0.75.

(c) Applied to Administration of Justice and Government Secondary School Education expense categories only.

9 Table 2 shows the air travel and inter-regional travel component factors assessed for the Inpatient Services and Police categories. They differ from those shown in Table 1 because the Commission accepted that different patterns of travel were associated with these services (refer to Attachment A). The factors for Inpatient Services were adjusted to reflect the effects of technology on travel associated with Inpatient Services.

**Table 2 Dispersion component factors — Inpatient Services and Police**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Air travel</b>								
Inpatient Services <sup>(a)</sup>	0.75520	0.09540	2.50732	1.37893	0.83606	0.05869	0.00000	4.99481
Police	0.80217	0.10245	2.48636	1.31447	0.78986	0.05081	0.00000	4.63831
<b>Inter-regional travel</b>								
Inpatient Services <sup>(b)</sup>	1.16161	0.95097	0.90462	0.65687	1.13257	1.79390	0.09938	0.40180
Police	1.15936	0.93653	0.92508	0.69405	1.12507	1.65813	0.10192	0.47807

(a) The air and inter-regional travel cost components were assessed differently for Inpatient Services and Police. Details of assessment are in Volume 7, Chapter 10 of 2004 Review Working Papers.

(b) Technology-adjusted travel components applied to Inpatient Services.

- 10 Table 3 shows the component factors applied to the Government Secondary School Education and Administration of Justice categories to reflect the effects of technology on the costs associated with repairs to equipment, and inter-regional travel for technology related support, maintenance and training. The repairs and inter-regional cost weights for these two categories were split to separate technology related costs from other costs, so that the relevant expenses can be matched with the relevant component factor.

**Table 3 Dispersion component factors — Government Secondary School Education and Administration of Justice**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Technology-related repairs<sup>(a)</sup></b>								
Government secondary school education	0.91018	0.98610	1.20399	1.11992	0.69627	0.78968	0.12013	3.73023
Administration of Justice	0.93399	0.99840	1.19842	1.07699	0.69873	0.85141	0.12599	2.96321
<b>Technology related support, maintenance and training<sup>(b)</sup></b>								
Government secondary school education	0.95391	0.70169	1.15942	1.47286	0.99132	0.55432	0.23913	4.79040
Administration of Justice	1.00827	0.73502	1.15078	1.31285	0.99602	0.59238	0.23909	3.71860

(a) Calculated by adjusting the general freight factors with the standard ratio of students to workstations in each region.

(b) Calculated by adjusting the inter-regional travel factors with the standard ratio of students to workstations in each region.

- 11 Table 4 to Table 7 set out the component factors for Primary Industry, Mining, Fuel and Energy, Services to Indigenous Communities and National Parks and Wildlife Services. For these assessments, an indicator was used that better reflected the geographic distribution of the locations where services were delivered. For example, in the case of Primary Industry and Mining, Fuel and Energy, the indicator of dispersion was based on the distribution of employment in those industries.

**Table 4 Dispersion component factors — Primary Industry**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Telecommunications</b>								
Voice <sup>(a)</sup>	0.84021	0.68481	1.38562	1.41463	1.39854	1.08699	0.02683	1.21311
Voice — technology adjusted <sup>(b)</sup>	0.82858	0.66116	1.39323	1.48703	1.39851	1.11102	0.02237	1.29345
Non-voice	0.82691	0.88195	1.24088	1.13710	1.42111	1.50465	0.12322	0.82285
<b>General Freight</b>	0.84202	0.80943	1.45182	1.26384	0.91925	1.32016	0.00641	1.49965
<b>Travel</b>								
Air	1.20606	0.21906	2.01786	0.91132	0.80124	0.01263	0.00000	0.84338
Inter-regional	0.71299	0.89677	1.16889	1.18314	1.90052	1.73848	0.00744	1.06031
Local	0.59086	0.51204	1.46022	2.06673	1.45902	1.58321	0.02852	4.47031
<b>Remote staff turnover</b>	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
<b>Locality allowances</b>	0.63434	0.05715	2.35774	2.34854	0.72603	0.24253	0.00000	3.79219
<b>Repairs &amp; maintenance</b>	0.42836	0.08112	1.78392	2.76774	1.62521	0.92806	0.00000	8.10796
(a)	Telephone factor with regional weight = 0.25, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4.							
(b)	Technology-adjusted telephone factor with regional weight = 0.2, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4, input weight for technology region type 1 and 2 = 0.75.							

**Table 5 Dispersion component factors — Mining, Fuel and Energy**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Telecommunications</b>								
Voice <sup>(a)</sup>	0.42320	0.11361	1.46059	4.37056	0.85744	0.60107	0.01340	4.72190
Voice — technology adjusted	0.38555	0.09939	1.47344	4.46863	0.87707	0.60541	0.01093	4.98800
Non-voice	0.58037	0.23349	1.38330	3.94177	0.66637	0.83266	0.06578	2.91163
<b>General Freight</b>	0.48155	0.13313	1.54397	4.13681	0.53902	0.72252	0.00239	5.19690
<b>Travel</b>								
Air	0.18193	0.01403	2.54843	4.24089	0.36318	0.00000	0.00000	1.54027
Inter-regional	0.55580	0.11889	1.05411	3.68015	1.68139	1.56915	0.00387	5.66031
Local	0.14193	0.07281	0.97587	5.77465	0.91114	0.23568	0.01053	11.12922
<b>Remote staff turnover</b>	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
<b>Locality allowances</b>	0.12803	0.00065	1.67902	5.41369	0.73980	0.00101	0.00000	5.63703
<b>Repairs &amp; maintenance</b>	1.00000	1.00000	1.00000	1.0000	1.00000	1.0000	1.00000	1.00000
(a)	Telephone factor with regional weight = 0.25, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4.							
(b)	Technology-adjusted telephone factor with regional weight = 0.2, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4, input weight for technology region type 1 and 2 = 0.75.							

**Table 6 Dispersion component factors — Services to Indigenous Communities**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Telecommunications</b>								
Voice <sup>(a)</sup>	0.61407	0.12296	1.48344	1.85430	0.60880	0.72605	0.10278	23.65483
Voice — technology adjusted	0.57312	0.10784	1.47742	1.92133	0.58954	0.70164	0.08308	25.11655
<b>Travel</b>								
Air	0.63716	0.02907	2.43427	1.90519	0.30438	0.00308	0.00000	11.17818
Inter-regional	0.63070	0.15485	0.78023	2.80875	1.65896	1.55330	0.03312	16.05083
Local	0.23348	0.05374	1.02311	2.29483	0.99722	0.38535	0.06143	40.44050
<b>Remote staff turnover</b>	1.00000	1.00000	1.00000	1.0000	1.00000	1.0000	1.00000	1.00000
<b>Locality allowances</b>	1.00000	1.00000	1.00000	1.0000	1.00000	1.0000	1.00000	1.00000
<b>Repairs &amp; maintenance</b>	0.08904	0.00103	0.83332	2.68705	1.18860	0.10930	0.00000	45.64839

(a) Telephone factor with regional weight = 0.25, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4.

(b) Technology-adjusted telephone factor with regional weight = 0.2, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4, input weight for technology region type 1 and 2 = 0.75.

**Table 7 Dispersion component factors — National Parks and Wildlife Services**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Telecommunications</b>								
Voice <sup>(a)</sup>	0.11311	0.10383	0.58051	4.00566	4.49816	0.83790	0.01553	6.38659
Voice — technology adjusted	0.11040	0.10170	0.57986	4.01003	4.50377	0.83783	0.01550	6.45675
Non-voice	0.20578	0.17576	0.54779	3.70767	4.22531	1.30249	0.10015	5.84888
<b>General Freight</b>	0.13505	0.10472	0.88773	3.95344	3.51715	0.66884	0.01509	8.47119
<b>Travel</b>								
Air	0.16899	0.11120	0.99454	4.80399	3.08736	0.00278	0.00000	1.89419
Inter-regional	0.06581	0.05006	0.17582	3.52447	7.09365	0.52767	0.00416	2.03897
Local	0.03863	0.02636	0.38111	5.84364	3.45730	0.27757	0.00745	6.20471
<b>Remote staff turnover</b>	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
<b>Locality allowances</b>	0.04049	0.02150	0.57104	5.00103	4.36977	0.07129	0.00000	4.27242
<b>Repairs &amp; maintenance</b>	0.02219	0.01093	0.33667	6.02090	3.62838	0.17848	0.00000	5.16315

(a) Telephone factor with regional weight = 0.25, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4.

(b) Technology-adjusted telephone factor with regional weight = 0.2, input weight for remote area = 3, input weight for rainfall affected areas and isolated islands = 4, input weight for technology region type 1 and 2 = 0.75.

## GST REVENUE DISTRIBUTION FOR THE 2008 UPDATE

12 Table 8 shows the factor's contribution to the distribution of GST revenue and Health Care Grants (hereafter described as GST revenue) for the 2008 Update.

**Table 8 Dispersion, contribution to GST revenue distribution, 2008 Update**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total redist'd
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Contribution to the 2008 Update</b>	-230.3	-328.6	138.6	171.5	-42.9	-23.3	-56.4	371.4	681.5

**Differences from an equal per capita assessment**

- 13 Queensland, Western Australia and the Northern Territory are the most dispersed States. The dispersion assessment is based on an assumption that these States incur higher per capita costs to provide the average level of services to their dispersed populations. The assessment recognises the greater per capita financial burden imposed on them, so it increases their GST revenue share by \$679.9m and reduces the share of the other five States by the same amount.

**CHANGES IN THE GST REVENUE DISTRIBUTION: 2008 UPDATE COMPARED WITH THE 2007 UPDATE**

- 14 Table 9 shows the contribution of dispersion factors to the 2007 and the 2008 Updates.
- 15 Compared with an equal per capita assessment, the 2008 Update redistributed \$677.7 million to Queensland, Western Australia and the Northern Territory from the other five States, more than in the 2007 Update.
- 16 Dispersion costs are set as fixed proportions of category expenses (that is, an unchanged set of dispersion factors is applied to changing levels of dispersion related expenses).. A dispersion factor therefore has an increased impact on relativities if category expenses increase faster than the growth in GST revenue. It has a reduced impact if category expenses decreased or increased more slowly than the growth in GST revenue.
- 17 While category expenses (and hence dispersion expenses) have increased, most have not increased as fast as GST revenue. However, some have increased faster than GST revenue, and in this Update the overall impact of dispersion on relativities has increased.

**Table 9 Dispersion, effect of assessment on GST revenue distribution, 2007 Update and 2008 Update**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total redist'd
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<b>Redistribution from EPC resulting from the 2007 Update assessment (a)</b>	-236.4	-327.0	138.4	173.8	-41.9	-23.5	-44.4	361.0	673.3
<b>Redistribution from EPC resulting from the 2008 Update assessment (a)</b>	-236.7	-329.8	136.7	170.1	-43.2	-23.5	-44.6	371.0	677.8
<b>Total effect of revisions and updating<sup>(b)</sup></b>	-0.3	-2.8	-1.7	-3.7	-1.3	0.0	-0.2	10.0	10.0

(a) Assuming the same pool and constant population.

(b) This figure shows the change in the amount redistributed among the States between the 2007 Update and the 2008 Update. It does not necessarily equal the difference in the total redistribution from EPC between the two inquiries.

18 This chapter was prepared by the Expense — Education section of the Commonwealth Grants Commission. If you have any questions about its content please contact Nick Reddan on (02) 6229 8869 or Nick.Reddan@cgc.gov.au.



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## ATTACHMENT A – DESCRIPTION OF 2004 REVIEW METHOD

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- 19 This attachment provides a summary of the method used to assess dispersion factors.
- 20 Dispersion factors allow for the effects of the geographic dispersion of population on the costs of providing State government services. The per capita costs of providing services to populations in remote areas is higher than the per capita costs of providing services to urban centres. An important driver of dispersion factors is the proportion of a State's population living in remote areas. People's location and their distance from urban centres affect a range of costs such as communication, freight, travel and locality allowances paid to employees in remote areas.
- 21 The assessment was based on a conceptual model that related per capita dispersion expenses to measures of the dispersion of population settlement. These measures related to:
- distance from selected centres in a State. These were the capital city, regional centres and urban centres<sup>2</sup>. These centres reflected the general policy of the States to use a hierarchical or regional approach to service delivery. Dispersion factors are sensitive to the choice of regional centres. To minimise the effects of differences in State policies on the choice of regional centres, the Commission selected the regional centres in each State. The selection was based on an examination of population clusters, regional characteristics such as the availability of services and employment in administrative functions. The regional centres used for each State are shown in Table A-1; and
  - the remoteness of localities.

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<sup>2</sup> Different sets of reference' centres were used for different cost components as appropriate.

**Table A-1 Regional Centres**

NSW	Vic	Qld	WA	SA	TAS	ACT	NT
Sydney	Melbourne	Brisbane	Perth	Adelaide	Hobart	Canberra	Darwin
Albury	Ballarat	Bundaberg	Albany	Mt. Gambier	Burnie-Somerset		Alice Springs
Broken Hill	Bendigo	Cairns	Bunbury	Whyalla	Launceston		
Coffs Harbour	Geelong	Mackay	Geraldton				
Dubbo	Mildura	Maroochydore-Mooloolaba	Kalgoorlie-Boulder				
Goulburn	Shepparton-Mooroopna	Mount Isa	Port Hedland				
Lismore	Traralgon	Rockhampton					
Newcastle	Warrnambool	Toowoomba					
Orange	Wodonga	Townsville					
Tamworth							
Wagga							
Wollongong							

- 22 For simplicity, the level of dispersion related costs was assumed to be proportional to population usually resident at a location — rather than service population.
- 23 To measure the disability, the Commission:
- estimated the Australian average proportion of the category costs accounted for by each dispersion affected cost (hereafter ‘component’ weights). These estimates were derived from expense data provided by the States; and
  - derived cost schedules which related the level of each type of cost to the distance (or remoteness) of each location from capital cities, regional centres and/or urban centres.
- 24 ***Cost component weights.*** The cost components were derived from expense data provided by the States. The component weight is the proportion of category costs accounted for by that dispersion related expense. Some States said their accounting systems were not suited to identifying dispersion related expenses. The Commission examined the data provided by States and made some adjustments for the problems of interstate comparability and over or under estimation in the data supplied. The need for such adjustments was determined following comparison of expense data provided for the 1999 and 2004 Reviews. Where there were material differences, other information provided by the States was examined to determine whether the differences could be explained. Where they could be explained, the 2004 Review data were used. If the differences could not be adequately explained, the 1999 Review data were retained.
- 25 For example, the Commission adjusted the freight cost data provided by the States in the 2004 Review. There were reasons to suspect these data were understated. As was the case in

the 1999 Review, the Commission concluded State accounting systems could not fully separate freight costs from other costs. For example, freight costs were often embedded in the price of goods and services purchased locally. The Commission accepted the underestimation was large. In the absence of better information, it decided to retain the 1999 Review adjustment, under which the cost weights for freight expenses were set at twice those implied by the data provided by States.

- 26 **Cost schedules.** The cost schedules were derived from pricing schedules of private sector providers, an average of the observed policies of the States or, in some cases where the nature of the cost supported it, an assumption that costs varied proportionately with distance from urban centres.
- 27 The cost schedules were generally subject to two adjustments to recognise that:
- some inputs were used more intensively in providing services in remote areas than in non-remote areas<sup>3</sup> — called ‘input weights’; and
  - many costs were affected in different ways by the distances between a location and the nearest regional centre, and between that regional centre and the capital city — called ‘regional weights’.
- 28 **Deriving the factors.** For each component, notional costs were derived by:
- combining the nominal costs estimated for each location — based on the cost schedule as weighted by ‘input’ and ‘regional’ weights — and the share of the State’s population resident in that location; and
  - aggregating to the State level.
- 29 Disability factors were derived for each component by dividing the aggregate State level notional costs per capita by the Australian per capita figure.
- 30 An overall dispersion factor was obtained by aggregating the factors for each component using the ‘component’ weights.

## Method

- 31 The model accounted for the following cost components:
- telecommunication;
  - general freight;
  - remote staff turnover;
  - travel costs;
  - locality allowances;
  - repairs and maintenance;

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<sup>3</sup> For example, average number of telephone calls per school student was demonstrably higher in remote areas than in non-remote areas.

- technology-related repairs; and
- technology-related support.

32 The Census Collection Districts (CDs) were used as the small area locations. The resident population in each CD and distances of the CDs from reference centres were the basic data used in the assessment. The SARIA (State-based Accessibility and Remoteness Index of Australia) classification was used to determine remote CDs.

33 A brief description of the processes for each cost component follows.

34 **Telecommunication.** This factor recognised that a facility's (for example, a school, health centre, police station, office, etc) telecommunication costs were affected by the distance of the facility from the capital city and nearest regional centre. Telecommunication costs were assumed to vary with distance. Two sub-factors were assessed:

- voice communication; and
- non-voice communication.

35 Table A-2 and Table A-3 set out the telecommunication sub-factors assessed in the 2008 Update.

**Table A-2 Voice communication factor, general category**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Voice <sup>(a)</sup>	1.00309	0.89104	1.16029	1.05113	0.90435	0.89899	0.42346	2.04722
Voice — technology adjusted <sup>(b)</sup>	0.98669	0.86200	1.16646	1.12168	0.91118	0.95545	0.38743	2.38660

Note: The difference between these two was because different weights were applied to different regions to reflect the impact of technology.

(a) Default telephone factor with regional weight = 0.25, input weight for remote area = 3, input weight for rainfall affected areas and isolated island = 4.

(b) Technology-adjusted telephone factor with regional weight = 0.2, input weight for remote area = 3, input weight for rainfall affected areas and isolated island = 4, input weight for technology region type 1 and 2 = 0.75.

**Table A-3 Non-voice communication factor**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
General categories	0.9984	1.0002	1.0002	1.0032	1.0003	0.9986	1.0045	1.0072
Inpatient services	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Primary industry categories	0.8269	0.8820	1.2409	1.1371	1.4211	1.5046	0.1232	0.8229
Mining, fuel and energy	0.5804	0.2335	1.3833	3.9418	0.6664	0.8327	0.0658	2.9116
Services to Indigenous communities	0.8604	0.2409	1.4826	1.4846	0.7062	1.5266	0.5134	12.6169
National Parks and wildlife services	0.2058	0.1758	0.5478	3.7077	4.2253	1.3025	0.1002	5.8489

36 The voice and non-voice sub-factors were combined into one communication factor according to the proportions of expenses in those two areas. The proportions varied across expenses categories. For example, weights of 0.4 and 0.6 were used for the Government Secondary Education category and weights of 0.8 and 0.2 were used for the Administration and Justice category.

- 37 **General freight.** This component recognised the costs of transporting goods and materials to a facility (for example, a school, health centre, police station, office, etc) were affected by its distance from the capital city and nearest regional centre.
- 38 Information obtained from freight carriers indicated that there were differences in freight rates payable for goods and materials transported to different regions within States. Information from the States indicated that in remote areas a higher proportion of goods and materials were freighted in. In general, freight rates to remote areas were higher than those to non-remote areas.
- 39 The Commission assumed that most goods originated in capital cities. The notional cost of freight for each CD was based on commercial freight charges for transporting 50 kilograms of goods. It consisted of two parts:
- freight costs between the CD and its nearest regional centre; and
  - freight costs between the regional centre and the capital city.
- 40 Table A-4 sets out the general freight factors for the 2008Update.

**Table A-4 General freight factor**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
General categories	1.0379	0.9223	1.2584	0.9905	0.5386	0.9486	0.0786	2.1586
Inpatient services	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Primary industry categories	0.8420	0.8094	1.4518	1.2638	0.9193	1.3202	0.0064	1.4997
Mining, fuel and energy	0.4815	0.1331	1.5440	4.1368	0.5390	0.7225	0.0024	5.1969
Services to Indigenous communities	0.5645	0.1221	1.8562	1.6858	0.4271	0.7120	0.0157	21.5899
National Parks and wildlife services	0.1351	0.1047	0.8877	3.9534	3.5172	0.6688	0.0151	8.4712

Note: Regional weight = 1, input weight for remote area = 1.25, input weight for rainfall-affected areas and isolated islands = 1.5.

- 41 **Remote staff turnover costs.** This component allowed for interstate differences in the per capita costs of locating and relocating employees to or from remote areas, and to other staff turnover related costs.
- 42 The notional cost of remote removals was estimated for remote CDs only. It was based on the price of transporting 50 kilograms of goods — the same data used to calculate the general freight factor — to that CD, and the population in the CD.
- 43 The total notional cost of remote removals for a remote CD consisted of two parts:
- freight costs between the remote CD and its nearest regional centre; and
  - freight costs between its regional centre and the capital city.
- 44 Table A-5 sets out the remote removals factors for the 2008Update. These factors reflected differences between States in the proportion of their population resident in remote CDs and the distance of those CDs from their nearest regional centre and the capital city.

**Table A-5 Remote removals factor**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Factors	0.43589	0.03057	1.89891	3.20446	0.79301	0.34761	0.00000	10.64557

Note: Regional weight = 1.

45 **Travel.** This factor reflected differences between States in staff travel and its effects on the costs of service delivery. Because the nature of travel and its costs may be affected by different things, the factor had three sub-components:

- air travel;
- inter-regional travel; and
- local travel.

46 **Air travel.** The air travel sub-factor recognised differences in the need for and cost of air travel in the delivery of services. Because of differences in the nature of services and the role and pattern of air travel in delivering them, two sets of air travel factors were estimated, one for general categories and the other for the Inpatient Services and Police categories.

47 For most categories, it was assumed that air travel would be restricted to travel between:

- regional centres and the State capital city, provided the distance was over 250 kilometres; and
- very remote CDs and their nearest regional centre<sup>4</sup>.

48 For the Inpatient Services and Police categories, it was assumed that air travel would be restricted to travel between:

- regional centres and the State capital city, provided the distance was over 250 kilometres;
- very remote CDs and their nearest regional centre; and
- other remote CDs and their nearest regional centre, provided the distance was over 250 kilometres.

49 To simplify the analysis, a dollar value of air travel per kilometre was calculated for each Statistical Subdivision (SSD) in a State on the basis of:

- one way economy fares between a regional centre and the State capital city<sup>5</sup>; and
- an assumption that the cost of air travel was the same for all CDs within a SSD.

50 The notional cost of air travel for a CD to its nearest regional centre was a function of the distance travelled, the cost per kilometre for the SSD in which the CD was located and the population of the CD. The cost of travel from regional centres to the capital was also based on the one way economy fare data.

<sup>4</sup> Very remote CDs were CDs defined as being in rainfall affected areas or on isolated islands.

<sup>5</sup> These were based on economy fare charges by Qantas, Regional Express, Virgin Blue and various charter flight operators.

51 Table A-6 sets out the air travel factors applied in the 2008 Update.

**Table A-6 Air travel factors**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
General categories	1.0995	0.1472	2.3586	0.9016	0.4894	0.0038	0.0000	2.3855
Police	0.8022	0.1025	2.4864	1.3145	0.7899	0.0508	0.0000	4.6383
Primary industry categories	1.2061	0.2191	2.0179	0.9113	0.8012	0.0126	0.0000	0.8434
Mining, fuel and energy	0.1819	0.0140	2.5484	4.2409	0.3632	0.0000	0.0000	1.5403
Services to Indigenous communities	0.6372	0.0291	2.4343	1.9052	0.3044	0.0031	0.0000	11.1782
National Parks and wildlife services	0.1690	0.1112	0.9945	4.8040	3.0874	0.0028	0.0000	1.8942

52 **Inter-regional travel.** Inter-regional travel recognised differences in the need for and cost of road travel associated in the delivery of services. This factor complemented the air travel factor. As for air travel, two sets of inter-regional travel factors were calculated — one for general categories and the other for the Inpatient Services and Police categories. For general categories, it was assumed that inter-regional road travel took place between:

- regional centres and the capital city in a State where the distance was less than 250 kilometres; and
- remote CDs (excluding very remote CDs) and their nearest regional centre.

53 For the Inpatient Services and Police categories, it was assumed that inter-regional road travel took place between:

- regional centres and the capital city in a State where the distance was less than 250 kilometres; and
- remote CDs (excluding very remote CDs) where the distance to its nearest regional centre was less than 250 kilometres.

54 The costs of inter-regional road travel was a function of the distances involved and the population of the relevant CDs and regional centres.

55 The straight-line distances between each pair of locations were adjusted by:

- a region-specific road sinuosity factor. The adjusted distances better approximated actual road distances; and
- a cost weight of 1.3 for travel on unsealed roads. This adjustment took account of the higher costs associated with 4WD vehicles normally used on those roads and differences in the proportion of unsealed roads in each State (particularly in remote locations).

56 Table A-7 sets out the inter-regional road travel factors applied for the 2007 Update.

**Table A-7 Inter-regional travel factors**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
General categories	1.0809	0.8820	0.8970	0.9127	1.1605	2.0023	0.1438	1.6855
Police	1.1594	0.9365	0.9251	0.6940	1.1251	1.6581	0.1019	0.4781
Primary industry categories	0.7130	0.8968	1.1689	1.1831	1.9005	1.7385	0.0074	1.0603
Mining, fuel and energy	0.5558	0.1189	1.0541	3.6802	1.6814	1.5691	0.0039	5.6603
Services to Indigenous communities	0.6307	0.1549	0.7802	2.8087	1.6590	1.5533	0.0331	16.0508
National Parks and wildlife services	0.0658	0.0501	0.1758	3.5245	7.0937	0.5277	0.0042	2.0390

57 **Local travel.** This sub-factor recognised differences in the need for and cost of local travel in the delivery of services. The factor is based on travel between a CD and its nearest urban centre of 1000 or more people (including the capital city when relevant).

58 Because local travel was predominantly by road, costs were assumed to be proportional to the road distance involved. Adjustments for the sinuosity of roads and the proportion of unsealed roads were also made using methods similar to those for inter-regional travel.

59 Table A-8 sets out the estimated local travel factors for the 2008Update.

**Table A-8 Local travel factors, general categories**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Factors	0.96958	0.94752	0.96992	1.22012	0.87213	0.67323	0.54020	4.31793

Note: Input weight for remote areas = 1.25 and for rainfall affected areas and isolated islands = 1.75.

60 **Impact of technology on long distance travel.** A separate study by the Commission of the impact of technology on the way States deliver services suggested that the availability of reliable non-voice communication had reduced the need for air and inter-regional travel between technology rich regions, such as capital cities and regional centres. The study also suggested that the introduction of appropriate input and regional weights into the calculation of the air and inter-regional travel factors would capture the effects on costs of the substitution of technology for travel in such regions. The technology-adjusted factors, set out in Table A-9, were applicable to the four categories where the evidence of the substitution of technology for travel was strongest.

**Table A-9 Technology-adjusted air and inter-regional travel factors**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Air travel</b>								
Government secondary school	1.0982	0.1470	2.3605	0.9023	0.4888	0.0047	0.0000	2.3970
Administration of justice	1.0982	0.1470	2.3605	0.9023	0.4888	0.0047	0.0000	2.3970
Inpatient services	0.7552	0.0954	2.5073	1.3789	0.8361	0.0587	0.0000	4.9948
<b>Inter-regional travel</b>								
Government secondary school	1.0950	0.8951	0.8972	0.8700	1.1517	1.9595	0.1568	1.4509
Administration of justice	1.0950	0.8951	0.8972	0.8700	1.1517	1.9595	0.1568	1.4509
Inpatient services	1.1616	0.9510	0.9046	0.6569	1.1326	1.7939	0.0994	0.4018

61 **Locality allowances.** Locality allowances recognised the additional direct and indirect benefits paid to employees who worked in specific locations — in particular, remote areas. Data from

New South Wales, Queensland, WA and South Australia were used to establish a functional relationship between the level of locality allowances and distance from capital cities and regional centres. The locality allowance factors were based on:

- the functional relationship;
- the distances of CDs from their capital city and their nearest regional centre; and
- the population located in each CD.

62 The locality allowances factors are set out in Table A-1.

**Table A-10 Locality allowances factors**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
General categories	0.4149	0.0244	1.9199	3.0773	0.5808	0.1079	0.0000	14.6069
Primary industry categories	0.6343	0.0572	2.3577	2.3485	0.7260	0.2425	0.0000	3.7922
Mining, fuel and energy	0.1280	0.0006	1.6790	5.4137	0.7398	0.0010	0.0000	5.6370
National Parks and wildlife services	0.0405	0.0215	0.5710	5.0010	4.3698	0.0713	0.0000	4.2724

63 **Repairs and maintenance.** This factor recognised the impact of remoteness on the costs of repairs and maintenance of assets used by the States in providing services. It included costs of repairs and maintenance of buildings and equipment in remote areas.

64 Data provided by the States (particularly New South Wales, Queensland, Western Australia and the Northern Territory) indicated that the most common arrangements for repairs and maintenance in remote areas were for tradespeople from the nearest urban centre to be engaged on an hourly basis. The repairs and maintenance factor was based on:

- a standard hourly payment rate;
- the distances between those remote CDs and their nearest population centre of 1000 people or more;<sup>6</sup> and
- the number of people living in remote CDs.

65 The assessment took account of travel time costs only. The Commission did not accept that remoteness affected the time taken to complete the repairs.

66 Table A-11 sets out the estimated repair and maintenance factor for the 2008 update.

**Table A-11 Repair and maintenance factors**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
General categories	0.3026	0.0454	1.2856	2.8465	1.4704	0.6191	0.0000	23.8157
Primary industry categories	0.4284	0.0811	1.7839	2.7677	1.6252	0.9281	0.0000	8.1080
Services to Indigenous communities	0.0890	0.0010	0.8333	2.6871	1.1886	0.1093	0.0000	45.6484
National Parks and wildlife services	0.0222	0.0109	0.3367	6.0209	3.6284	0.1785	0.0000	5.1631

67 Data provided by the States on expenses incurred in repairs and maintenance covered labour-related expenses, materials and freight on locally purchased materials — these freight costs were over and above those included in the State's estimates of general freight costs. The

<sup>6</sup> The Commission assumed average travel speeds were similar in all States.

Commission applied different disabilities to the three components of repairs and maintenance costs, as follows:

- the repairs and maintenance factors shown in Table A-11, were applied to the labour-related component, which was estimated to be 60 per cent<sup>7</sup> of repairs and maintenance costs;
- the freight disability factors shown in Table A-4 were applied to the freight cost component, which was estimated to be 5 per cent of repairs and maintenance costs;
- an equal per capita assessment (that is no disability) was applied to the remaining material costs, which were estimated to be 35 per cent of repairs and maintenance costs.

68 Other modifications for ICT related factors (technology related repairs and technology related support, maintenance and training). These modifications were based on the work the Commission undertook in its Technology Study. Two technology-related component factors were assessed.

- **Technology related repairs.** This was derived by modifying the dispersion general freight factors using the standard ratio of student to workstations to reflect the ICT related repair disabilities and ICT related capital costs.
- **Technology related support, maintenance and training.** This was calculated by modifying the inter-regional travel factors using the standard ratio of student to workstations to reflect the ICT related support, maintenance and training disabilities.

69 The technology related component factors were applied to Administration and Justice and Secondary Schools categories. For these categories, the evidence strongly suggested that technology was extensively applied in dispersed areas. Table A-12 sets out these two factors for these categories.

**Table A-12 Technology related factors**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
<b>Repairs</b>								
Government secondary school	0.9102	0.9861	1.2040	1.1199	0.6963	0.7897	0.1201	3.7302
Administration of justice	0.9340	0.9984	1.1984	1.0770	0.6987	0.8514	0.1260	2.9632
<b>Support, maintenance and training</b>								
Government secondary school	0.9539	0.7017	1.1594	1.4729	0.9913	0.5543	0.2391	4.7904
Administration of justice	1.0083	0.7350	1.1508	1.3128	0.9960	0.5924	0.2391	3.7186

<sup>7</sup> The standard proportions used to dissect repairs and maintenance costs into the three components were based on data from the Northern Territory, the only State that was able to provide the necessary disaggregation.