Technical Report No. 4

Air Emissions Inventory for the Greater Metropolitan Region in New South Wales

2008 Calendar Year

Domestic-Commercial Emissions: Results

ACKNOWLEDGMENTS

This study was performed with the help of organisations and individuals who should be recognised for their efforts.

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EXECUTIVE SUMMARY

An air emissions inventory project for domestic-commercial sources has taken over 2 years to complete. The base year of the domestic-commercial inventory represents activities that took place during the 2008 calendar year and is accompanied by emission projections in yearly increments up to the 2036 calendar year. The area included in the inventory covers the greater Sydney, Newcastle and Wollongong regions, known collectively as the Greater Metropolitan Region (GMR).

The inventory region defined as the GMR measures 210 km (east–west) by 273 km (north–south). The inventory region is presented in Table ES-1 and shown in Figure ES-1.

Table ES-1: Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong regions

Region	South-west corner MGA[1] coordinates		North-east corner MGA coordinates	
	Easting (km)	Northing (km)	Easting (km)	Northing (km)
Greater Metropolitan	210	6159	420	6432
Sydney	261	6201	360	6300
Newcastle	360	6348	408	6372
Wollongong	279	6174	318	6201

The domestic-commercial air emissions inventory includes emissions from the following sources/activities:

- Aerosols and solvents (domestic and commercial);
- Barbecues (domestic);
- Cutback bitumen;
- Gaseous fuel combustion (domestic and unaccounted);
- Graphic arts (domestic and commercial);
- Lawn mowing and garden equipment (domestic and public open space);
- Liquid fuel combustion (domestic);
- Natural gas leakage;
- Portable fuel containers (domestic and public open space);
- Solid fuel combustion (domestic); and

[1] Map Grid of Australia based on the Geocentric Datum of Australia 1994 (GDA94) (ICSM, 2006).

- Surface coatings (domestic, commercial and industrial).

The pollutants inventoried include criteria pollutants specified in the Ambient Air Quality NEPM (NEPC, 2003), air toxics associated with the National Pollutant Inventory NEPM (NEPC, 2008) and the Air Toxics NEPM (NEPC, 2004), and any other pollutants associated with state-specific programs, i.e. Load Based Licensing (Protection of the Environment Operations (General) Regulation 2009 (PCO, 2010b)) and the Protection of the Environment Operations (Clean Air) Regulation 2010 (PCO, 2011).

Figure ES-1: Definition of Greater Metropolitan, Sydney, Newcastle and Wollongong regions

Table ES-2 presents total estimated annual emissions (for selected substances) from all domestic-commercial sources in the whole GMR and the Sydney, Newcastle and Wollongong regions. Total estimated annual emissions are also presented for the region defined as Non Urban. This region is the area of the GMR minus the combined areas of the Sydney, Newcastle and Wollongong regions. The selected substances were chosen because they:

- Are the most common air pollutants found in airsheds, according to the National Pollutant Inventory NEPM (NEPC, 2008);
- Are referred to in the NEPMs for ambient air quality (NEPC, 2003) and air toxics (NEPC, 2004); and
- Have been classified as priority air pollutants (NEPC, 2006).

Table ES-2: Total estimated annual emissions from domestic-commercial sources in each region

Substance	Emissions (tonne/year)				
	Newcastle	Non Urban	Sydney	Wollongong	GMR
1,3-BUTADIENE	7.19	18	89	4.81	119
ACETALDEHYDE	18	44	215	12	289
BENZENE	47	116	585	31	779
CARBON MONOXIDE	6,554	16,226	82,186	4,412	109,377
FORMALDEHYDE	43	109	528	29	709
ISOMERS OF XYLENE	187	453	2,657	133	3,430
LEAD & COMPOUNDS	6.79×10^{-2}	0.17	0.83	4.53×10^{-2}	1.12
OXIDES OF NITROGEN	184	445	2,531	130	3,290
PARTICULATE MATTER ≤ 10 µm	504	1,262	6,088	334	8,189
PARTICULATE MATTER ≤ 2.5 µm	485	1,214	5,853	321	7,873
PERCHLOROETHYLENE	4.67	12	73	3.44	92
POLYCYCLIC AROMATIC HYDROCARBONS	14	35	186	9.59	244
SULFUR DIOXIDE	11	26	131	7.07	175
TOLUENE	185	449	2,619	131	3,384
TOTAL SUSPENDED PARTICULATE	539	1,348	6,501	357	8,745
TOTAL VOLATILE ORGANIC COMPOUNDS	3,757	9,213	53,178	2,660	68,809
TRICHLOROETHYLENE	0.28	0.69	4.38	0.21	5.56

Figure ES-2 shows the proportions of total estimated annual emissions (for selected substances) from domestic-commercial sources in the whole GMR and the Sydney, Newcastle, Wollongong and Non Urban regions.

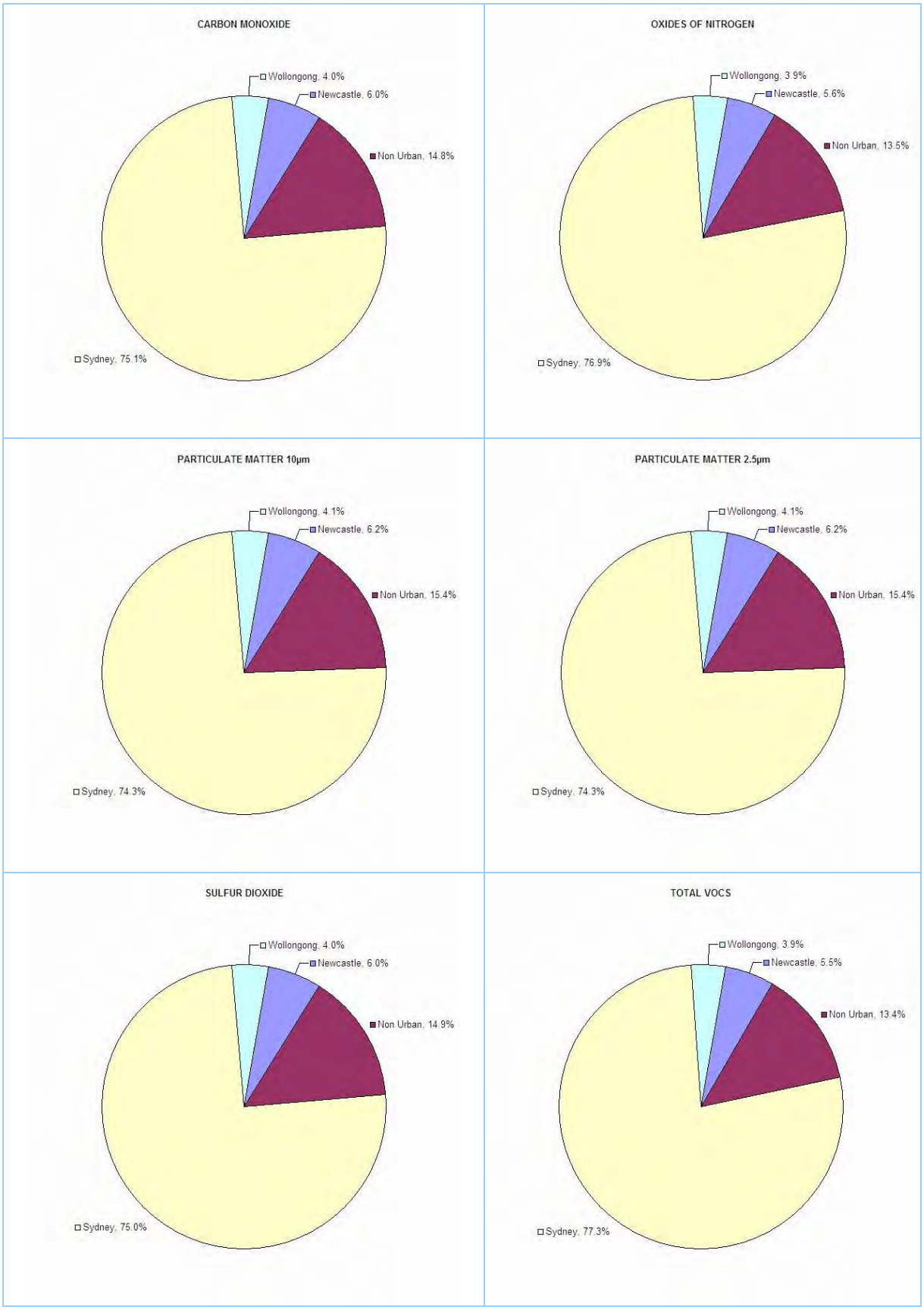

Figure ES-2: Proportions of total estimated annual emissions from domestic-commercial sources in each region

Table ES-3, Table ES-4, Table ES-5, Table ES-6 and Table ES-7 present total estimated annual emissions (for selected substances) from each domestic-commercial source type in the whole GMR and the Sydney, Newcastle, Wollongong and Non Urban regions, respectively.

Figure ES-3, Figure ES-4, Figure ES-5, Figure ES-6 and Figure ES-7 show the proportions of total estimated annual emissions (for selected substances) from each domestic-commercial source type in the whole GMR and the Sydney, Newcastle, Wollongong and Non Urban regions, respectively.

Table ES-3: Total estimated annual emissions by domestic-commercial source type in the GMR

Substance	Emissions (tonne/year)											
	Aerosols and solvents	Barbecues	Cutback bitumen	Gaseous fuel combustion	Graphic arts	Lawn mowing	Liquid fuel combustion	Natural gas leakage	Portable fuel containers	Solid fuel combustion	Surface coatings	Domestic-Commercial Total
1,3-BUTADIENE	-	1.25	-	-	-	44	-	-	-	73	-	119
ACETALDEHYDE	-	18	-	2.78×10^{-4}	-	27	7.54×10^{-3}	-	-	243	0.27	289
BENZENE	1.13×10^{-2}	4.10	-	4.40×10^{-2}	-	389	3.23×10^{-4}	-	17	369	-	779
CARBON MONOXIDE	-	520	-	861	-	54,003	7.70	-	-	53,985	-	109,377
FORMALDEHYDE	12	13	-	1.57	-	70	5.17×10^{-2}	-	-	612	9.07×10^{-2}	709
ISOMERS OF XYLENE	681	0.84	21	-	80	1,167	1.57×10^{-4}	-	12	57	1,412	3,430
LEAD & COMPOUNDS	-	3.04×10^{-3}	-	1.05×10^{-2}	-	0.33	1.94×10^{-3}	-	-	0.77	-	1.12
OXIDES OF NITROGEN	-	100	-	1,996	-	356	28	-	-	811	-	3,290
PARTICULATE MATTER ≤ 10 µm	-	34	-	159	-	347	3.66	-	-	7,645	-	8,189
PARTICULATE MATTER ≤ 2.5 µm	-	31	-	159	-	320	3.28	-	-	7,359	-	7,873
PERCHLOROETHYLENE	92	4.83×10^{-5}	-	-	-	-	-	-	-	-	9.52×10^{-2}	92
POLYCYCLIC AROMATIC HYDROCARBONS	91	0.47	-	1.46×10^{-2}	7.30	3.53	1.84×10^{-3}	-	-	135	5.90	244
SULFUR DIOXIDE	-	11	-	13	-	10	11	-	-	129	-	175
TOLUENE	846	1.69	11	7.12×10^{-2}	10	1,134	8.91×10^{-3}	-	41	103	1,237	3,384
TOTAL SUSPENDED PARTICULATE	-	46	-	159	-	358	5.08	-	-	8,177	-	8,745
TOTAL VOLATILE ORGANIC COMPOUNDS	25,274	162	169	115	3,475	14,916	1.10	2,973	2,136	8,027	11,561	68,809
TRICHLOROETHYLENE	5.56	-	-	-	-	-	-	-	-	-	-	5.56

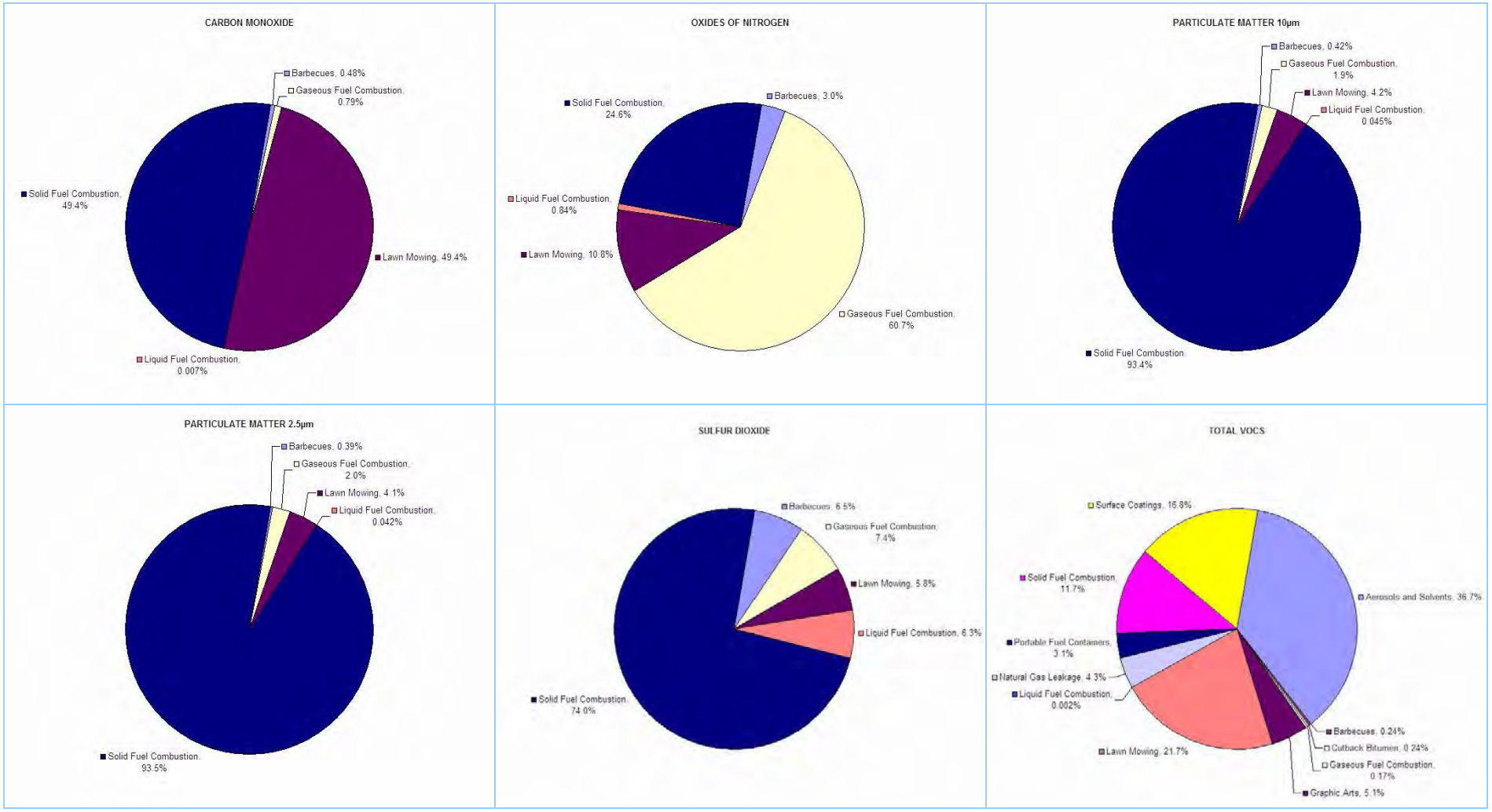

Figure ES-3: Proportions of total estimated annual emissions by domestic-commercial source type in the GMR

Table ES-4: Total estimated annual emissions by domestic-commercial source type in the Sydney region

Substance	Emissions (tonne/year)											
	Aerosols and solvents	Barbecues	Cutback bitumen	Gaseous fuel combustion	Graphic arts	Lawn mowing	Liquid fuel combustion	Natural gas leakage	Portable fuel containers	Solid fuel combustion	Surface coatings	Domestic-Commercial Total
1,3-BUTADIENE	-	0.98	-	-	-	33	-	-	-	54	-	89
ACETALDEHYDE	-	14	-	2.17×10^{-4}	-	21	5.88×10^{-3}	-	-	180	0.21	215
BENZENE	8.91×10^{-3}	3.20	-	3.43×10^{-2}	-	295	2.52×10^{-4}	-	12	274	-	585
CARBON MONOXIDE	-	406	-	671	-	41,069	6.00	-	-	40,034	-	82,186
FORMALDEHYDE	9.08	9.76	-	1.22	-	53	4.03×10^{-2}	-	-	454	7.07×10^{-2}	528
ISOMERS OF XYLENE	536	0.65	16	-	63	890	1.22×10^{-4}	-	8.74	42	1,101	2,657
LEAD & COMPOUNDS	-	2.37×10^{-3}	-	8.16×10^{-3}	-	0.25	1.51×10^{-3}	-	-	0.57	-	0.83
OXIDES OF NITROGEN	-	78	-	1,556	-	275	22	-	-	601	-	2,531
PARTICULATE MATTER ≤ 10 µm	-	27	-	124	-	265	2.86	-	-	5,669	-	6,088
PARTICULATE MATTER ≤ 2.5 µm	-	24	-	124	-	245	2.56	-	-	5,457	-	5,853
PERCHLOROETHYLENE	73	3.77×10^{-5}	-	-	-	-	-	-	-	-	7.42×10^{-2}	73
POLYCYCLIC AROMATIC HYDROCARBONS	72	0.37	-	1.14×10^{-2}	5.75	2.68	1.43×10^{-3}	-	-	100	4.60	186
SULFUR DIOXIDE	-	8.91	-	10	-	7.71	8.52	-	-	96	-	131
TOLUENE	666	1.32	8.48	5.55×10^{-2}	8.21	863	6.95×10^{-3}	-	30	76	965	2,619
TOTAL SUSPENDED PARTICULATE	-	36	-	124	-	273	3.96	-	-	6,064	-	6,501
TOTAL VOLATILE ORGANIC COMPOUNDS	19,905	126	132	90	2,737	11,317	0.86	2,318	1,589	5,952	9,012	53,178
TRICHLOROETHYLENE	4.38	-	-	-	-	-	-	-	-	-	-	4.38

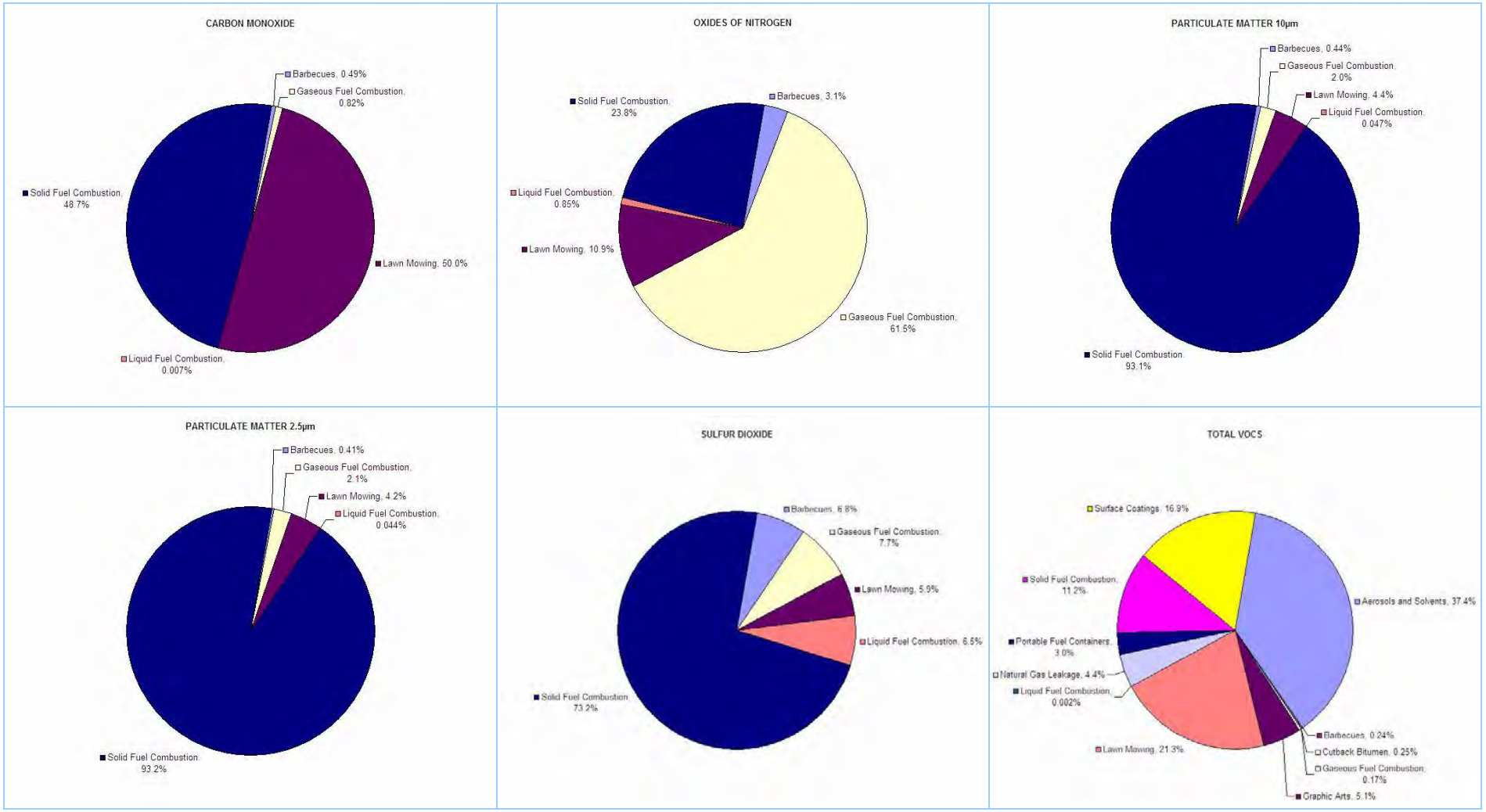

Figure ES-4: Proportions of total estimated annual emissions by domestic-commercial source type in the Sydney region

Table ES-5: Total estimated annual emissions by domestic-commercial source type in the Newcastle region

Substance	Emissions (tonne/year)											
	Aerosols and solvents	Barbecues	Cutback bitumen	Gaseous fuel combustion	Graphic arts	Lawn mowing	Liquid fuel combustion	Natural gas leakage	Portable fuel containers	Solid fuel combustion	Surface coatings	Domestic-Commercial Total
1,3-BUTADIENE	-	6.74×10^{-2}	-	-	-	2.57	-	-	-	4.55	-	7.19
ACETALDEHYDE	-	0.98	-	1.50×10^{-5}	-	1.57	4.06×10^{-4}	-	-	15	1.46×10^{-2}	18
BENZENE	5.71×10^{-4}	0.22	-	2.36×10^{-3}	-	23	1.74×10^{-5}	-	1.02	23	-	47
CARBON MONOXIDE	-	28	-	46	-	3,134	0.41	-	-	3,345	-	6,554
FORMALDEHYDE	0.58	0.67	-	8.45×10^{-2}	-	4.10	2.78×10^{-3}	-	-	38	4.88×10^{-3}	43
ISOMERS OF XYLENE	34	4.50×10^{-2}	1.16	-	4.04	67	8.42×10^{-6}	-	0.72	3.53	76	187
LEAD & COMPOUNDS	-	1.63×10^{-4}	-	5.63×10^{-4}	-	1.92×10^{-2}	1.04×10^{-4}	-	-	4.79×10^{-2}	-	6.79×10^{-2}
OXIDES OF NITROGEN	-	5.35	-	107	-	20	1.49	-	-	50	-	184
PARTICULATE MATTER ≤ 10 µm	-	1.84	-	8.57	-	20	0.20	-	-	474	-	504
PARTICULATE MATTER ≤ 2.5 µm	-	1.65	-	8.57	-	18	0.18	-	-	456	-	485
PERCHLOROETHYLENE	4.66	2.60×10^{-6}	-	-	-	-	-	-	-	-	5.12×10^{-3}	4.67
POLYCYCLIC AROMATIC HYDROCARBONS	4.61	2.53×10^{-2}	-	7.86×10^{-4}	0.37	0.21	9.89×10^{-5}	-	-	8.38	0.32	14
SULFUR DIOXIDE	-	0.61	-	0.69	-	0.60	0.59	-	-	8.01	-	11
TOLUENE	43	9.11×10^{-2}	0.61	3.83×10^{-3}	0.53	66	4.79×10^{-4}	-	2.50	6.36	67	185
TOTAL SUSPENDED PARTICULATE	-	2.46	-	8.57	-	21	0.27	-	-	507	-	539
TOTAL VOLATILE ORGANIC COMPOUNDS	1,276	8.71	9.42	6.19	175	871	5.90×10^{-2}	160	131	497	622	3,757
TRICHLOROETHYLENE	0.28	-	-	-	-	-	-	-	-	-	-	0.28

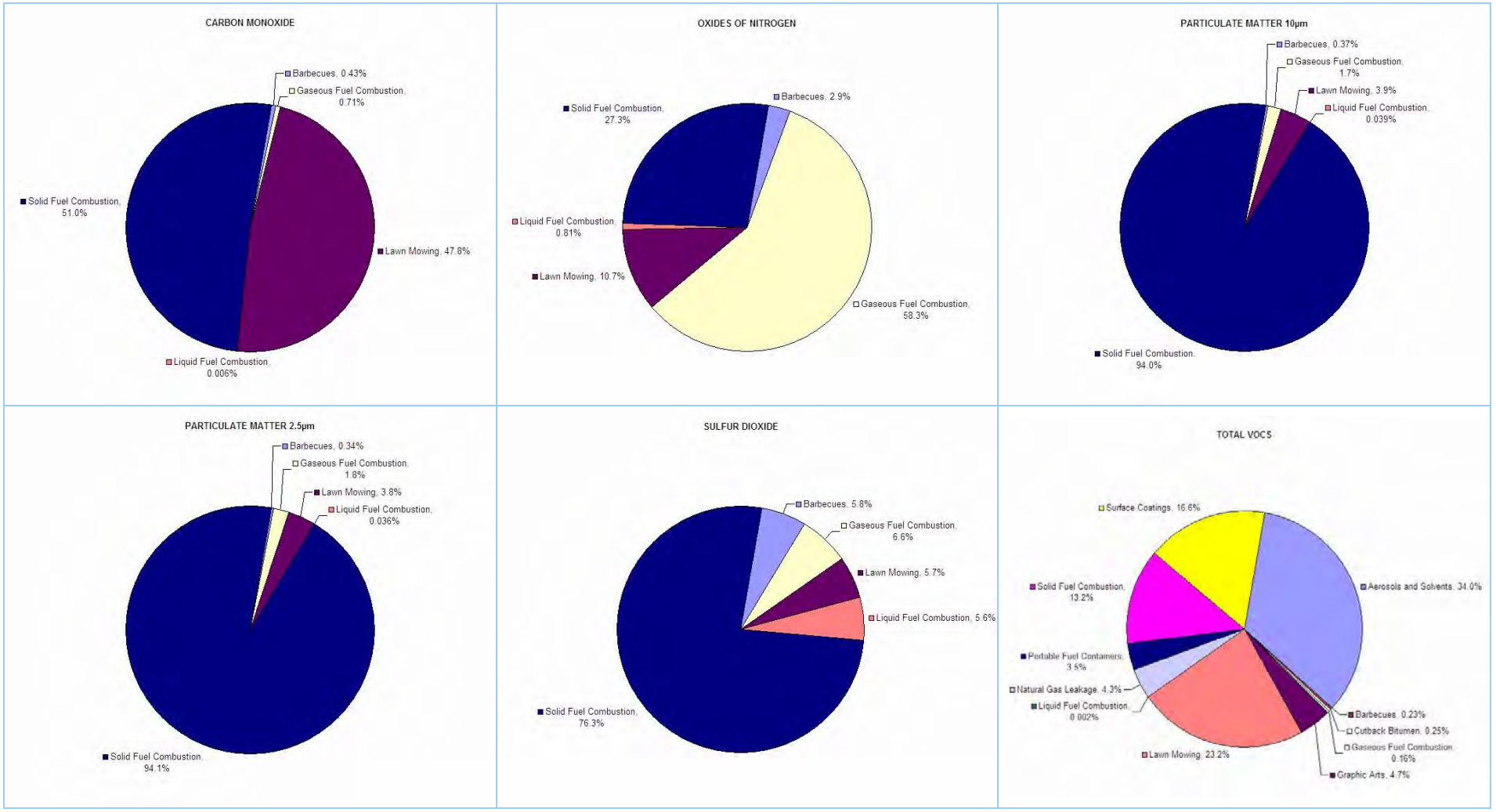

Figure ES-5: Proportions of total estimated annual emissions by domestic-commercial source type in the Newcastle region

Table ES-6: Total estimated annual emissions by domestic-commercial source type in the Wollongong region

Substance	Emissions (tonne/year)											
	Aerosols and solvents	Barbecues	Cutback bitumen	Gaseous fuel combustion	Graphic arts	Lawn mowing	Liquid fuel combustion	Natural gas leakage	Portable fuel containers	Solid fuel combustion	Surface coatings	Domestic-Commercial Total
1,3-BUTADIENE	-	4.87×10^{-2}	-	-	-	1.76	-	-	-	3.00	-	4.81
ACETALDEHYDE	-	0.71	-	1.08×10^{-5}	-	1.08	2.93×10^{-4}	-	-	9.94	1.06×10^{-2}	12
BENZENE	4.21×10^{-4}	0.16	-	1.71×10^{-3}	-	16	1.26×10^{-5}	-	0.68	15	-	31
CARBON MONOXIDE	-	20	-	33	-	2,148	0.30	-	-	2,209	-	4,412
FORMALDEHYDE	0.43	0.49	-	6.10×10^{-2}	-	2.81	2.01×10^{-3}	-	-	25	3.53×10^{-3}	29
ISOMERS OF XYLENE	25	3.25×10^{-2}	0.66	-	2.97	46	6.09×10^{-6}	-	0.48	2.33	55	133
LEAD & COMPOUNDS	-	1.18×10^{-4}	-	4.07×10^{-4}	-	1.31×10^{-2}	7.54×10^{-5}	-	-	3.16×10^{-2}	-	4.53×10^{-2}
OXIDES OF NITROGEN	-	3.87	-	78	-	14	1.08	-	-	33	-	130
PARTICULATE MATTER ≤ 10 µm	-	1.33	-	6.19	-	14	0.14	-	-	313	-	334
PARTICULATE MATTER ≤ 2.5 µm	-	1.19	-	6.19	-	13	0.13	-	-	301	-	321
PERCHLOROETHYLENE	3.43	1.88×10^{-6}	-	-	-	-	-	-	-	-	3.70×10^{-3}	3.44
POLYCYCLIC AROMATIC HYDROCARBONS	3.39	1.83×10^{-2}	-	5.68×10^{-4}	0.27	0.14	7.15×10^{-5}	-	-	5.53	0.23	9.59
SULFUR DIOXIDE	-	0.44	-	0.50	-	0.41	0.42	-	-	5.29	-	7.07
TOLUENE	31	6.58×10^{-2}	0.34	2.77×10^{-3}	0.39	45	3.46×10^{-4}	-	1.66	4.20	48	131
TOTAL SUSPENDED PARTICULATE	-	1.77	-	6.19	-	14	0.20	-	-	335	-	357
TOTAL VOLATILE ORGANIC COMPOUNDS	940	6.29	5.35	4.48	129	595	4.27×10^{-2}	116	87	328	449	2,660
TRICHLOROETHYLENE	0.21	-	-	-	-	-	-	-	-	-	-	0.21

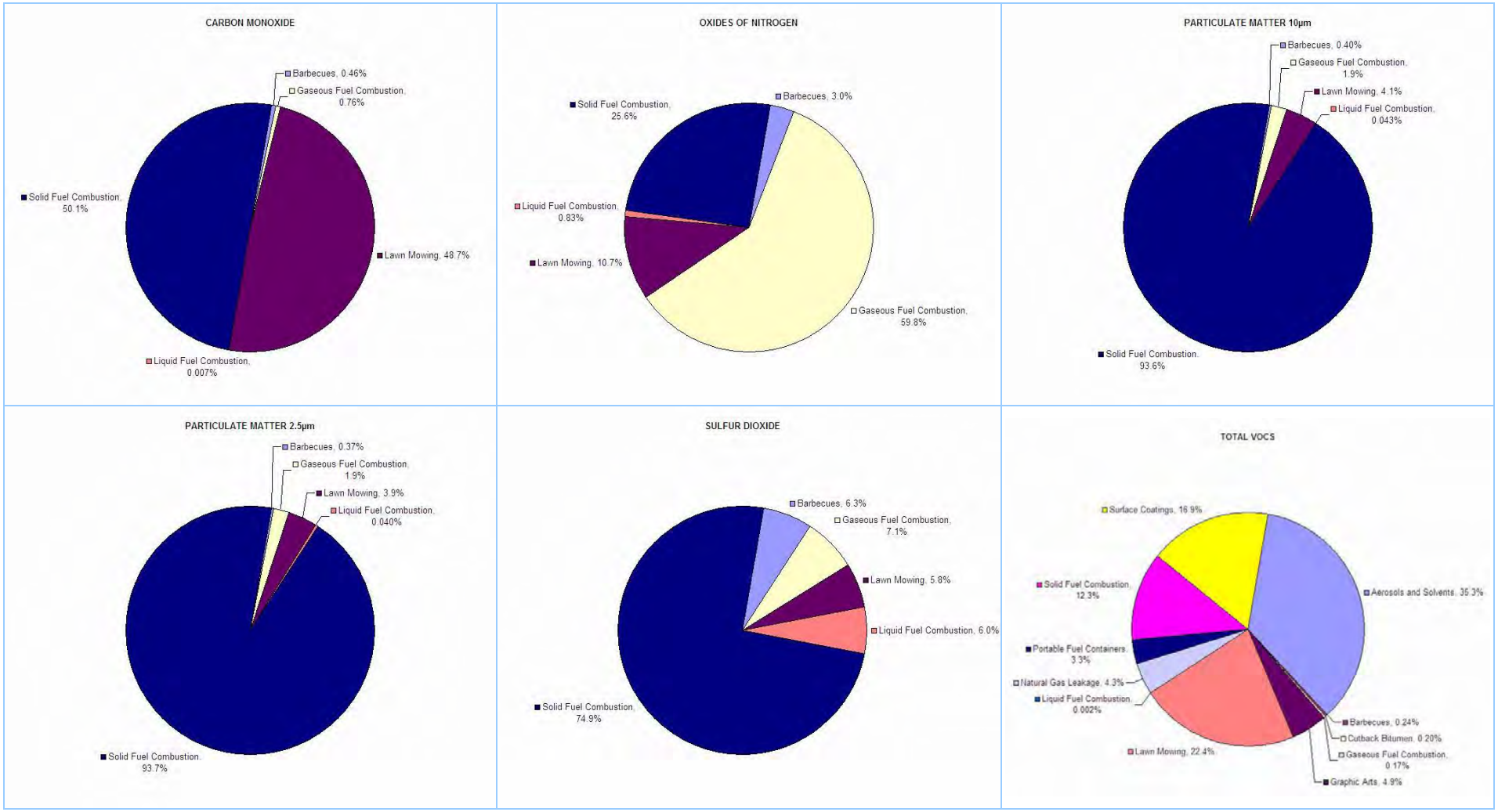

Figure ES-6: Proportions of total estimated annual emissions by domestic-commercial source type in the Wollongong region

Table ES-7: Total estimated annual emissions by domestic-commercial source type in the Non Urban region

Substance	Emissions (tonne/year)											
	Aerosols and solvents	Barbecues	Cutback bitumen	Gaseous fuel combustion	Graphic arts	Lawn mowing	Liquid fuel combustion	Natural gas leakage	Portable fuel containers	Solid fuel combustion	Surface coatings	Domestic-Commercial Total
1,3-BUTADIENE	-	0.16	-	-	-	6.30	-	-	-	11	-	18
ACETALDEHYDE	-	2.33	-	3.56×10^{-5}	-	3.81	9.65×10^{-4}	-	-	38	3.48×10^{-2}	44
BENZENE	1.41×10^{-3}	0.52	-	5.62×10^{-3}	-	55	4.13×10^{-5}	-	2.56	57	-	116
CARBON MONOXIDE	-	67	-	110	-	7,652	0.98	-	-	8,396	-	16,226
FORMALDEHYDE	1.44	1.60	-	0.20	-	10	6.61×10^{-3}	-	-	95	1.16×10^{-2}	109
ISOMERS OF XYLENE	85	0.11	2.73	-	9.98	164	2.0×10^{-5}	-	1.81	8.86	180	453
LEAD & COMPOUNDS	-	3.88×10^{-4}	-	1.34×10^{-3}	-	4.72×10^{-2}	2.48×10^{-4}	-	-	0.12	-	0.17
OXIDES OF NITROGEN	-	13	-	255	-	47	3.54	-	-	126	-	445
PARTICULATE MATTER ≤ 10 µm	-	4.38	-	20	-	48	0.47	-	-	1,189	-	1,262
PARTICULATE MATTER ≤ 2.5 µm	-	3.93	-	20	-	45	0.42	-	-	1,145	-	1,214
PERCHLOROETHYLENE	12	6.18×10^{-6}	-	-	-	-	-	-	-	-	1.22×10^{-2}	12
POLYCYCLIC AROMATIC HYDROCARBONS	11	6.0×10^{-2}	-	1.87×10^{-3}	0.91	0.51	2.35×10^{-4}	-	-	21	0.75	35
SULFUR DIOXIDE	-	1.46	-	1.65	-	1.47	1.40	-	-	20	-	26
TOLUENE	106	0.22	1.43	9.10×10^{-3}	1.30	160	1.14×10^{-3}	-	6.24	16	158	449
TOTAL SUSPENDED PARTICULATE	-	5.84	-	20	-	50	0.65	-	-	1,272	-	1,348
TOTAL VOLATILE ORGANIC COMPOUNDS	3,154	21	22	15	434	2,133	0.14	380	329	1,248	1,478	9,213
TRICHLOROETHYLENE	0.69	-	-	-	-	-	-	-	-	-	-	0.69

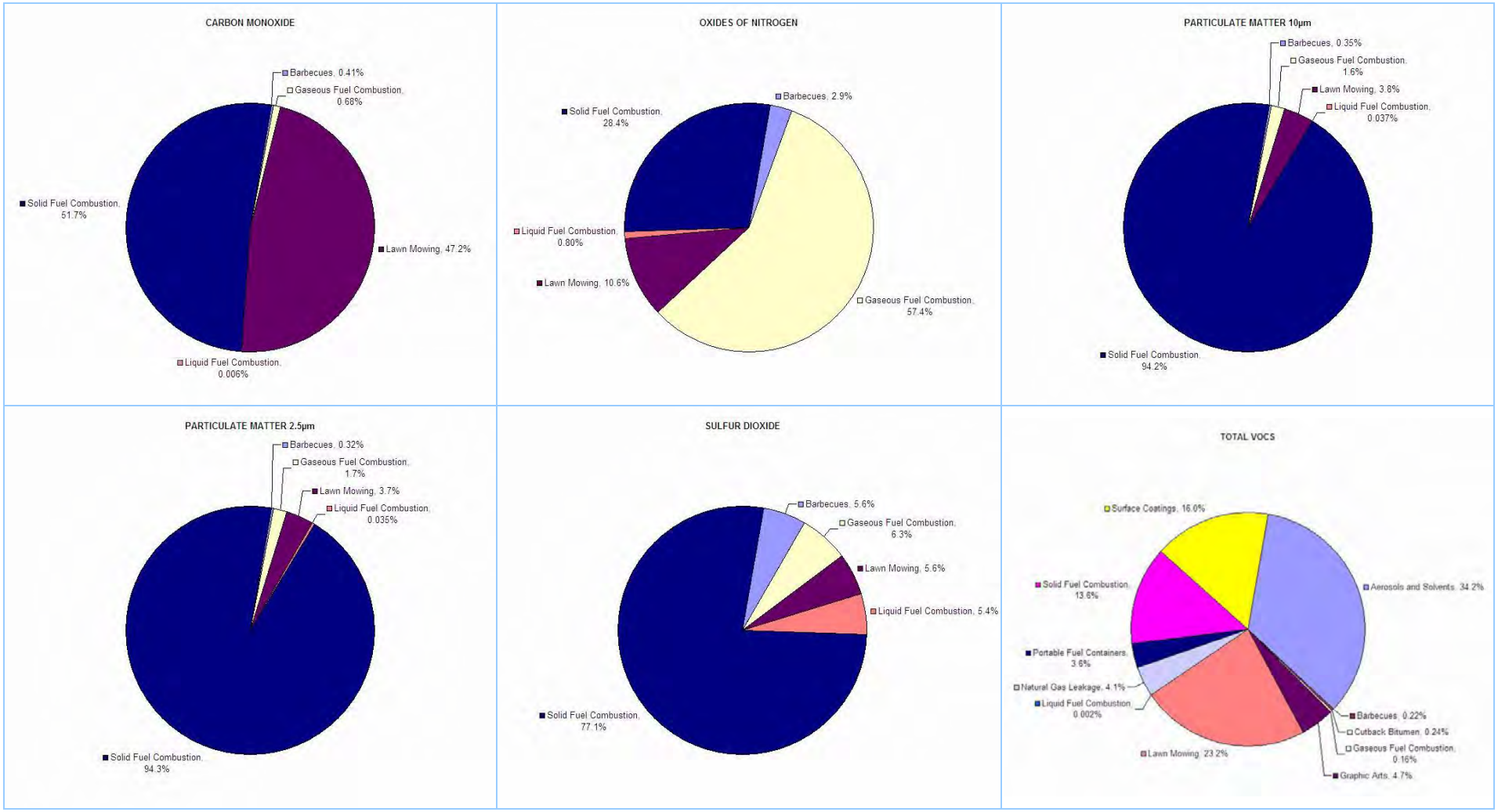

Figure ES-7: Proportions of total estimated annual emissions by domestic-commercial source type in the Non Urban region

Table ES-8 presents total estimated fuel consumption from all domestic-commercial sources in the GMR by volume and energy content.

Table ES-8: Total estimated annual fuel consumption from domestic-commercial sources by volume and energy content in the GMR

Fuel	Annual fuel consumption		
	Volume	Volume units	Energy content (TJ/year)
2-Stroke petrol	25,680	kL/year	878
4-Stroke petrol	39,736		1,359
Diesel	3,336		129
Heating oil	12,848		483
Kerosene	305		11
LPG	99,870		2,547
Natural gas	1,309	Mm^3/year	50,126
Charcoal	2,247	tonne/year	56
Wood	647,802		10,494

Figure ES-8 shows total estimated fuel consumption from all domestic-commercial sources in the GMR by energy content.

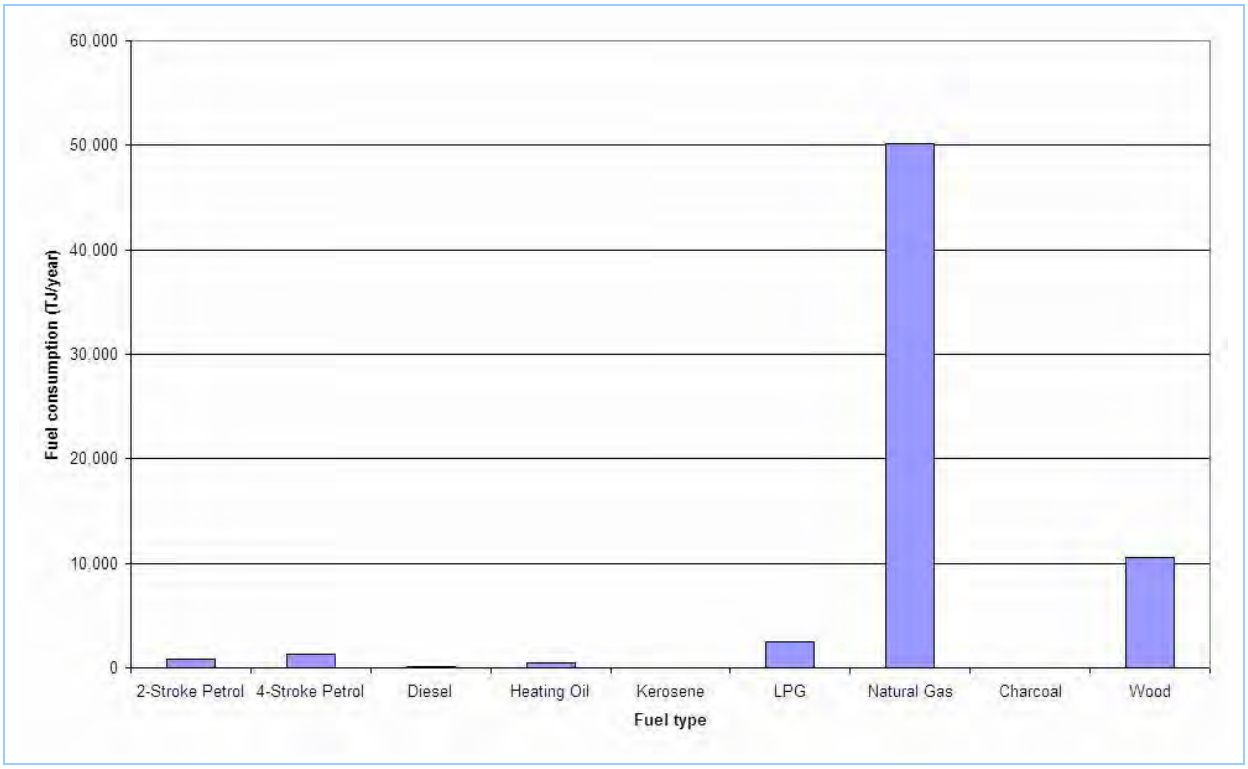

Figure ES-8: Total estimated annual fuel consumption from domestic-commercial sources by energy content in the GMR

Table ES-9 and Table ES-10 present total estimated fuel consumption by domestic-commercial source type in the GMR by volume and energy content, respectively. Figure ES-9 shows total estimated fuel consumption by domestic-commercial source type in the GMR by energy content.

Table ES-9: Total estimated annual fuel consumption by domestic-commercial source type and volume in the GMR

Source type	2-Stroke petrol	4-Stroke petrol	Diesel	Heating oil	Kerosene	LPG	Natural gas	Charcoal	Wood
	kL/year						Mm^3/year	tonne/year	
Barbecues – briquettes	-	-	-	-	-	-	-	2,247	-
Barbecues – LPG and butane	-	-	-	-	-	49,885	-	-	-
Barbecues – natural gas	-	-	-	-	-	-	7	-	-
Barbecues – wood	-	-	-	-	-	-	-	-	1,285
Cutback bitumen	-	-	-	-	305	-	-	-	-
Lawn mowing (domestic) – petrol 2 stroke	15,665	-	-	-	-	-	-	-	-
Lawn mowing (domestic) – petrol 4 stroke	-	30,525	-	-	-	-	-	-	-
Lawn mowing (public open space) – diesel	-	-	3,336	-	-	-	-	-	-
Lawn mowing (public open space) – petrol 2 stroke	10,014	-	-	-	-	-	-	-	-
Lawn mowing (public open space) – petrol 4 stroke	-	9,212	-	-	-	-	-	-	-
Liquid fuel combustion (domestic)	-	-	-	12,848	-	-	-	-	-
LPG combustion (domestic)	-	-	-	-	-	49,984	-	-	-
Natural gas combustion (domestic)	-	-	-	-	-	-	508	-	-
Natural gas combustion (unaccounted commercial business equipment)	-	-	-	-	-	-	766	-	-
Natural gas leakage	-	-	-	-	-	-	28	-	-
Wood combustion – open fireplace	-	-	-	-	-	-	-	-	182,471
Wood combustion – pot belly stove	-	-	-	-	-	-	-	-	44,296
Wood combustion – slow combustion heater with AS[2]	-	-	-	-	-	-	-	-	292,435
Wood combustion – slow combustion heater without AS	-	-	-	-	-	-	-	-	127,314
Grand Total	25,680	39,736	3,336	12,848	305	99,870	1,309	2,247	647,802

[2] Appliances certified in accordance with Standards Australia, 1992a and Standards Australia, 1992b or Standards Australia, 1999a and Standards Australia 1999b).

Table ES-10: Total estimated annual fuel consumption by domestic-commercial source type and energy content in the GMR

Source type	Energy content (TJ/year)									
	2-Stroke petrol	4-Stroke petrol	Diesel	Heating oil	Kerosene	LPG	Natural gas	Charcoal	Wood	Grand Total
Barbecues – briquettes	-	-	-	-	-	-	-	56	-	56
Barbecues – LPG and butane	-	-	-	-	-	1,272	-	-	-	1,272
Barbecues - natural gas	-	-	-	-	-	-	252	-	-	252
Barbecues - wood	-	-	-	-	-	-	-	-	21	21
Cutback bitumen	-	-	-	-	11	-	-	-	-	11
Lawn mowing (domestic) - petrol 2 stroke	536	-	-	-	-	-	-	-	-	536
Lawn mowing (domestic) - petrol 4 stroke	-	1,044	-	-	-	-	-	-	-	1,044
Lawn mowing (public open space) - diesel	-	-	129	-	-	-	-	-	-	129
Lawn mowing (public open space) - petrol 2 stroke	342	-	-	-	-	-	-	-	-	342
Lawn mowing (public open space) - petrol 4 stroke	-	315	-	-	-	-	-	-	-	315
Liquid fuel combustion (domestic)	-	-	-	483	-	-	-	-	-	483
LPG combustion (domestic)	-	-	-	-	-	1,275	-	-	-	1,275
Natural gas combustion (domestic)	-	-	-	-	-	-	19,455	-	-	19,455
Natural gas combustion (unaccounted commercial business equipment)	-	-	-	-	-	-	29,332	-	-	29,332
Natural gas leakage	-	-	-	-	-	-	1,087	-	-	1,087
Wood combustion - open fire place	-	-	-	-	-	-	-	-	2,956	2,956
Wood combustion - pot belly stove	-	-	-	-	-	-	-	-	718	718
Wood combustion – slow combustion heater with AS[3]	-	-	-	-	-	-	-	-	4,737	4,737
Wood combustion – slow combustion heater without AS	-	-	-	-	-	-	-	-	2,062	2,062
Grand Total	878	1,359	129	483	11	2,547	50,126	56	10,494	66,084

[3] Appliances certified in accordance with Standards Australia, 1992a and Standards Australia, 1992b or Standards Australia, 1999a and Standards Australia 1999b).

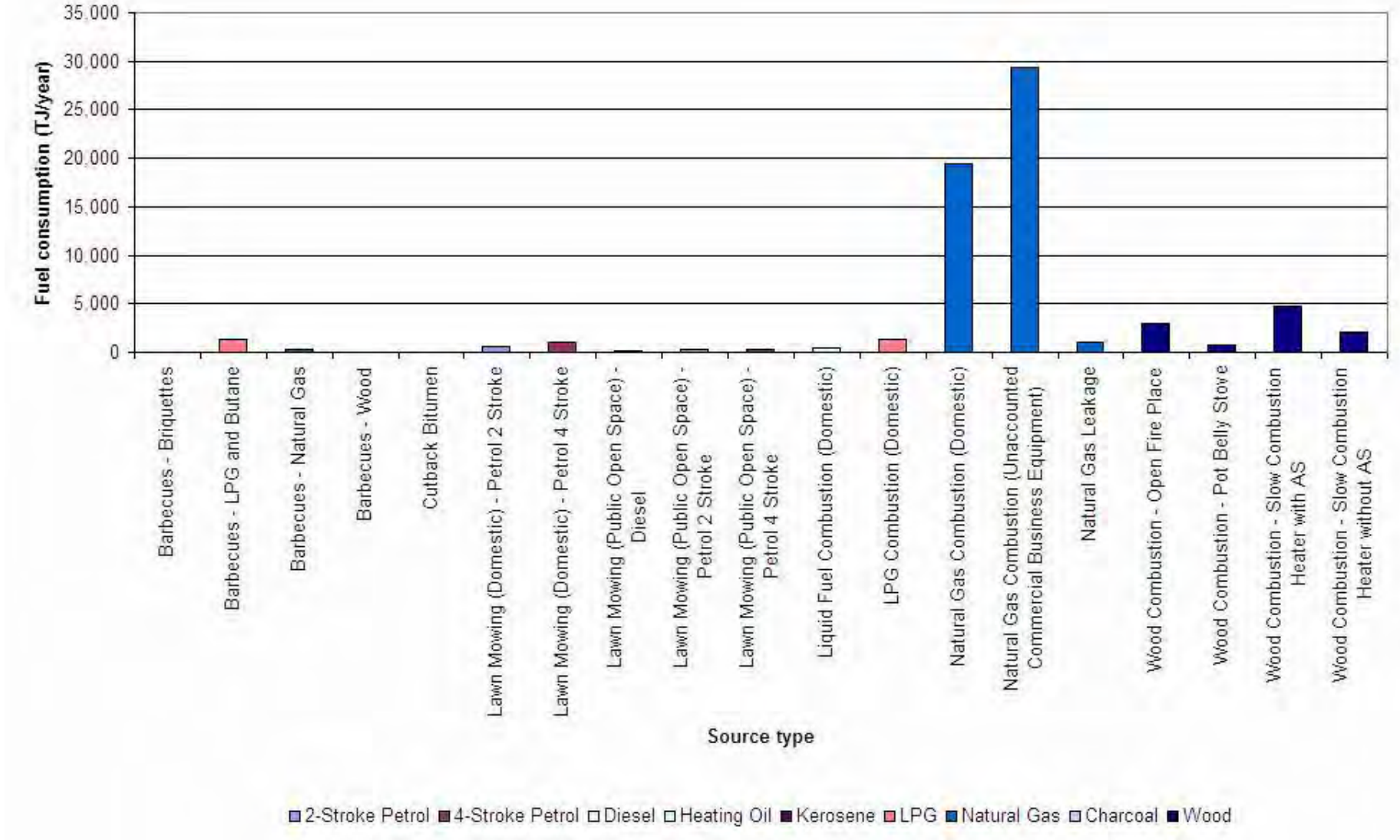

Figure ES-9: Total estimated annual fuel consumption by domestic-commercial source type and energy content in the GMR