

APPENDIX 9.1

Estimated Air Emissions from Shipping in Port

Estimated Shipping Emissions in Tonnes 2011											
Scenario		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	487,672										
Bitumen in		13	12	4000		7	1	450	1	1	
Bitumen out		0	8	3500							
Fuel		111	12	4000		56	6	3774	8	5	
Dry Products	64839	17	24	4000		18	2	1173	2	1	
Total Vessels		141				81	8	5396	11	7	

Appendix Table 9.1.1 - Estimated Shipping Emissions in Tonnes 2011

Estimated Shipping Emissions in Tonnes High Scenario 2017											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1105000										
Bitumen in		16	12	4500		9	1	603	1	1	
Bitumen out		0	8	4500							
Fuel		60	12	4500		34	4	2298	5	3	
Dry Products	325000	23	24	4500		26	3	1738	4	2	
Total		98				69	7	4639	10	6	

Appendix Table 9.1.2 - Estimated Shipping Emissions in Tonnes High Scenario 2017

Estimated Shipping Emissions in Tonnes Medium Scenario 2017											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	650000										
Bitumen in		10	12	4500		6	1	371	1	0	
Bitumen out		0	8	4500							
Fuel		36	12	4500		20	2	1367	3	2	
Dry Products	307000	21	24	4500		25	3	1646	3	2	
Total Vessels		67				51	5	3384	7	4	

Appendix Table 9.1.3 - Estimated Shipping Emissions in Tonnes Medium Scenario 2017

Estimated Shipping Emissions in Tonnes Low Scenario 2017											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	580000										
Bitumen in		9	12	4500		5	1	335	1	0	
Bitumen out		0	8	4500							
Fuel		32	12	4500		18	2	1224	3	2	
Dry Products	187500	14	24	4500		15	2	1035	2	1	
Total Vessels		54				39	4	2594	5	3	

Appendix Table 9.1.4 - Estimated Shipping Emissions in Tonnes Low Scenario 2017

Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2017											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	550,000										
Bitumen in		15	12	4500		8	1	566	1	1	
Bitumen out		0	8	4500							
Fuel		125	12	4500		71	7	4783	10	6	
Dry Products	170000	44	24	4500		50	5	3336	7	4	
Total Vessels		183				130	13	8684	18	11	

Appendix Table 9.1.5 - Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2017

Estimated Shipping Emissions in Tonnes High Scenario 2022											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1365000										
Bitumen in		8	12	7000		7	1	467	1	1	
Bitumen out		44	8	4500		17	2	1133	2	1	
Fuel		74	12	4500		42	4	2829	6	4	
Dry Products	440000	30	24	4500		35	4	2326	5	3	
Total		156				101	10	6755	14	9	

Appendix Table 9.1.6 - Estimated Shipping Emissions in Tonnes High Scenario 2022

Estimated Shipping Emissions in Tonnes Medium Scenario 2022											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	952000										
Bitumen in		6	12	4500		3	0	221	0	0	
Bitumen out		51	8	4500		20	2	1312	3	2	
Fuel		52	12	4500		30	3	1985	4	3	
Dry Products	366000	25	24	4500		29	3	1948	4	2	
						0	0	0	0	0	
Total Vessels		134				82	8	5466	12	7	

Appendix Table 9.1.7 - Estimated Shipping Emissions in Tonnes Medium Scenario 2022

Estimated Shipping Emissions in Tonnes Low Scenario 2022											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	625000										
Bitumen in		4	12	4500		2	0	158	0	0	
Bitumen out		9	8	4500		3	0	217	0	0	
Fuel		34	12	4500		20	2	1316	3	2	
Dry Products	227500	16	24	4500		19	2	1240	3	2	
Total Vessels		63				44	5	2931	6	4	

Appendix Table 9.1.8 - Estimated Shipping Emissions in Tonnes Low Scenario 2022

Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2022											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	222,000										
Bitumen in		7	12	4500		4	0	251	1	0	
Bitumen out		0	8	4500							
Fuel		51	12	4500		29	3	1953	4	2	
Dry Products	215000	55	24	4500		63	7	4198	9	5	
Total Vessels		112				96	10	6403	14	8	
Road Transport from Dublin								5854			
Potential Scenario	Do Nothing							12257			

Appendix Table 9.1.9 - Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2022

Estimated Shipping Emissions in Tonnes High Scenario 2027											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1525000										
Bitumen in		9	12	7000		8	1	514	1	1	
Bitumen out		28	8	4500		11	1	707	1	1	
Fuel		82	12	4500		47	5	3157	7	4	
Dry Products	490000	34	24	4500		39	4	2582	5	3	
Total		152				104	11	6960	15	9	

Appendix Table 9.1.10 - Estimated Shipping Emissions in Tonnes High Scenario 2027

Estimated Shipping Emissions in Tonnes Medium Scenario 2027											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1146000										
Bitumen in		7	12	4500		4	0	258	1	0	
Bitumen out		33	8	4500		13	1	852	2	1	
Fuel		62	12	4500		36	4	2382	5	3	
Dry Products	396000	27	24	4500		31	3	2101	4	3	
Total Vessels		130				83	9	5593	12	7	

Appendix Table 9.1.11 - Estimated Shipping Emissions in Tonnes Medium Scenario 2027

Estimated Shipping Emissions in Tonnes Low Scenario 2027											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	650000										
Bitumen in		4	12	4500		2	0	163	0	0	
Bitumen out		5	8	4500		2	0	132	0	0	
Fuel		36	12	4500		20	2	1367	3	2	
Dry Products	247500	18	24	4500		20	2	1342	3	2	
Total Vessels		63				45	5	3004	6	4	

Appendix Table 9.1.12 - Estimated Shipping Emissions in Tonnes Low Scenario 2027

Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2027											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	0										
Bitumen in		1	12	4500		1	0	38	0	0	
Bitumen out		0	8	4500							
Fuel		1	12	4500		1	0	38	0	0	
Dry Products	210000	54	24	4500		61	6	4102	9	5	
Total Vessels		56				62	6	4179	9	5	
Road Transport from Dublin								10475			
Potential Scenario	Do Nothing							14654			

Appendix Table 9.1.13 - Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2027

Estimated Shipping Emissions in Tonnes High Scenario 2032											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1600000										
Bitumen in		9	12	7000		8	1	537	1	1	
Bitumen out		14	8	4500		5	1	345	1	0	
Fuel		86	12	4500		49	5	3310	7	4	
Dry Products	520000	36	24	4500		41	4	2735	6	3	
Total		145				103	11	6927	15	9	

Appendix Table 9.1.14 - Estimated Shipping Emissions in Tonnes High Scenario 2032

Estimated Shipping Emissions in Tonnes Medium Scenario 2032											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1250000										
Bitumen in		7	12	4500		4	0	278	1	0	
Bitumen out		18	8	4500		7	1	469	1	1	
Fuel		68	12	4500		39	4	2594	5	3	
Dry Products	425000	29	24	4500		34	3	2249	5	3	
Total Vessels		123				83	9	5590	12	7	

Appendix Table 9.1.15 - Estimated Shipping Emissions in Tonnes Medium Scenario 2032

Estimated Shipping Emissions in Tonnes Low Scenario 2032											
High Scenario	2009	Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	650000										
Bitumen in		4	12	4500		2	0	163	0	0	
Bitumen out		1	8	4500		0	0	26	0	0	
Fuel		36	12	4500		20	2	1367	3	2	
Dry Products	257000	18	24	4500		21	2	1390	3	2	
Total Vessels		59				44	5	2946	6	4	

Appendix Table 9.1.16 - Estimated Shipping Emissions in Tonnes Low Scenario 2032

Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2032											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	0										
Bitumen in		1	12	4500		1	0	38	0	0	
Bitumen out		0	8	4500							
Fuel		1	12	4500		1	0	38	0	0	
Dry Products	205000	52	24	4500		60	6	4007	8	5	
Total Vessels		54				61	6	4083	9	5	
Road Transport from Dublin								10578			
Potential Scenario	Do Nothing							14661			

Appendix Table 9.1.17 - Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2032

Estimated Shipping Emissions in Tonnes High Scenario 2035											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1875000										
Bitumen in		10	12	7000		9	1	619	1	1	
Bitumen out		47	8	4500		18	2	1197	3	2	
Fuel		101	12	4500		58	6	3872	8	5	
Dry Products	550000	38	24	4500		43	4	2888	6	4	
Total		196				128	13	8576	18	11	

Appendix Table 9.1.18 - Estimated Shipping Emissions in Tonnes High Scenario 2035

Estimated Shipping Emissions in Tonnes Medium Scenario 2035											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	1250000										
Bitumen in		7	12	4500		4	0	278	1	0	
Bitumen out		1	8	4500		0	0	26	0	0	
Fuel		68	12	4500		39	4	2594	5	3	
Dry Products	450000	31	24	4500		35	4	2377	5	3	
Total Vessels		107				79	8	5275	11	7	

Appendix Table 9.1.19 - Estimated Shipping Emissions in Tonnes Medium Scenario 2035

Estimated Shipping Emissions in Tonnes Low Scenario 2035											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	650000										
Bitumen in		4	12	4500		2	0	163	0	0	
Bitumen out		1	8	4500		0	0	26	0	0	
Fuel		36	12	4500		20	2	1367	3	2	
Dry Products	272500	19	24	4500		22	2	1470	3	2	
Total Vessels		60				45	5	3026	6	4	

Appendix Table 9.1.20 - Estimated Shipping Emissions in Tonnes Low Scenario 2035

Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2035											
		Vessels	Hrs in Port	Engine kW		NOx	SO2	CO2	HC	PM	
Liquid Products	0										
Bitumen in		1	12	4500		1	0	38	0	0	
Bitumen out		0	8	4500							
Fuel		1	12	4500		1	0	38	0	0	
Dry Products	205000	52	24	4500		60	6	4007	8	5	
Total Vessels		54				61	6	4083	9	5	
Road Transport from Dublin								10578			
Potential Scenario	Do Nothing							14661			

Appendix Table 9.1.21 - Estimated Shipping Emissions in Tonnes Do Nothing Scenario 2035

