



TE MANATŪ WAKA
MINISTRY OF TRANSPORT

Domestic Transport Costs and Charges

Information session – Social, Health and Environmental costs

25 August 2022



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Results included in this file may be subject to revision as the project team finalises the estimates for the DTCC Final Report.

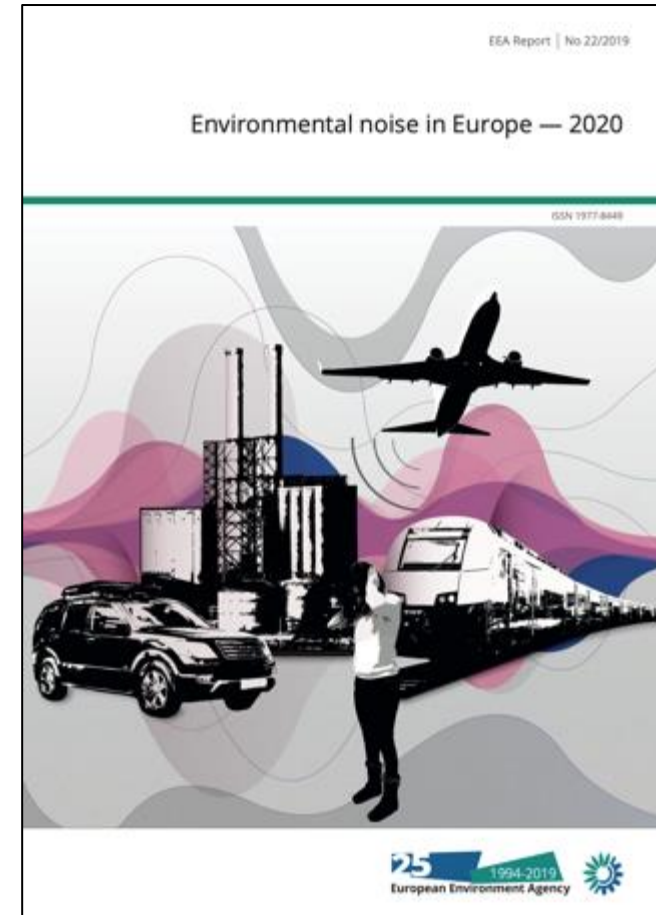
Acoustics

Michael Smith - Altissimo Consulting

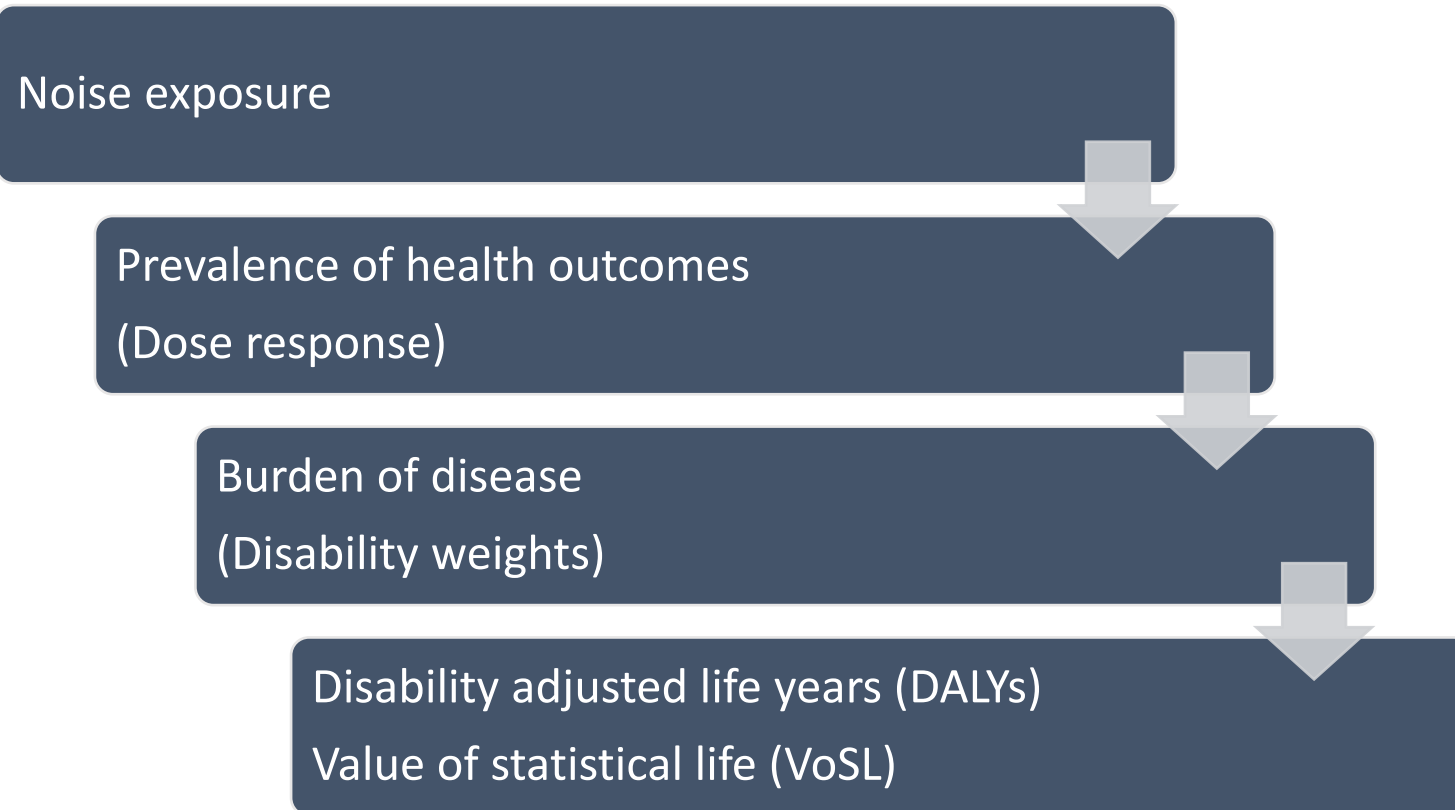


Approaches to monetisation

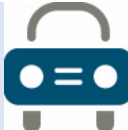
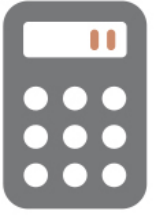





- Stated preference based on willingness to pay surveys
- Revealed preference as observed in changes in house prices (ie. hedonic)
- Health-based damage-cost assessment

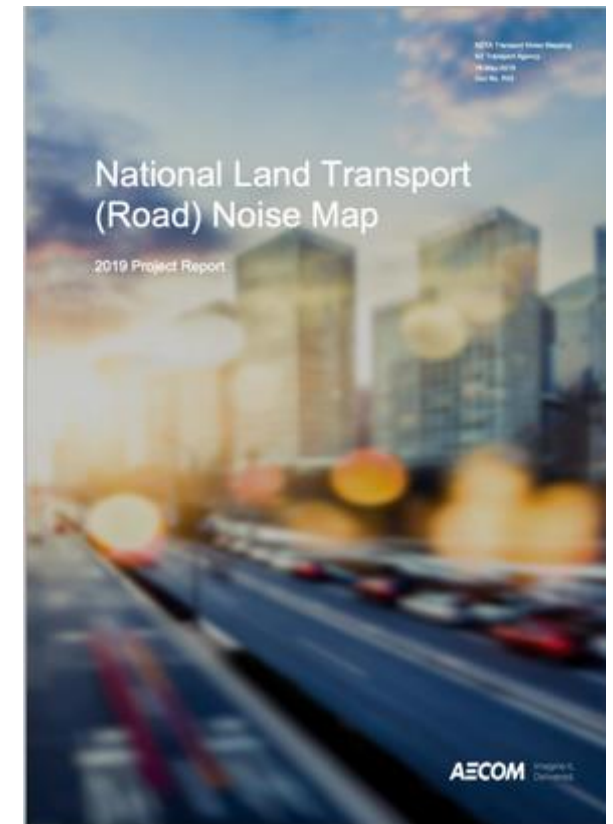


Process for assessing health costs

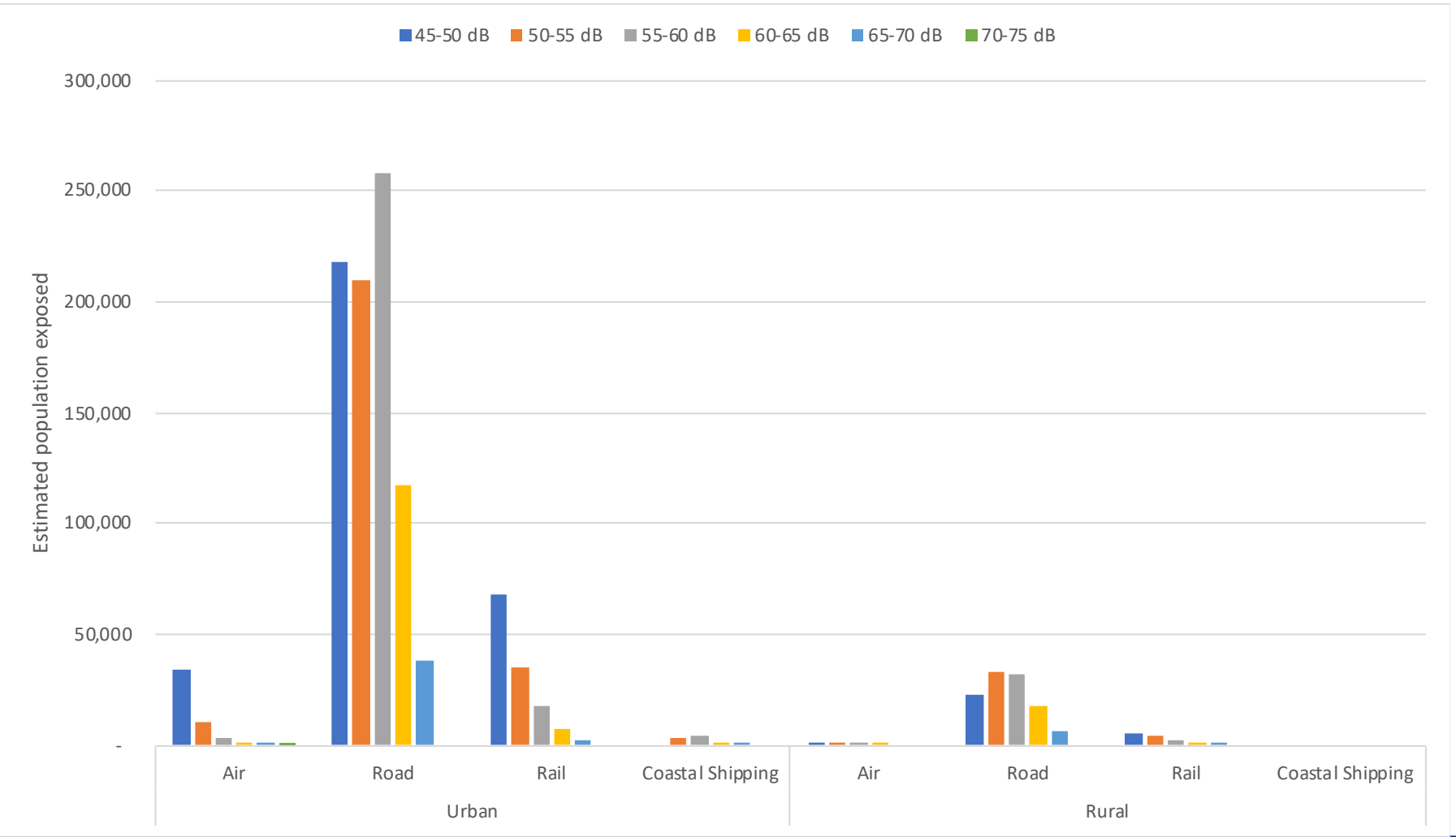


Exposure methodology

Mode	Input	Model	Output
	Existing noise model output Underlying model relies on number of vehicles / heavy vehicles, speed, road surfaces and topography		 Population exposed to noise in 5 dB bands
	Aggregated freight movements in townships Number of commuter trains Distance to dwellings		
	Number of movements by airport / aircraft type Distance to dwellings		
	Existing Resource Management Act district plan contours Dwelling locations Tonnes per port		

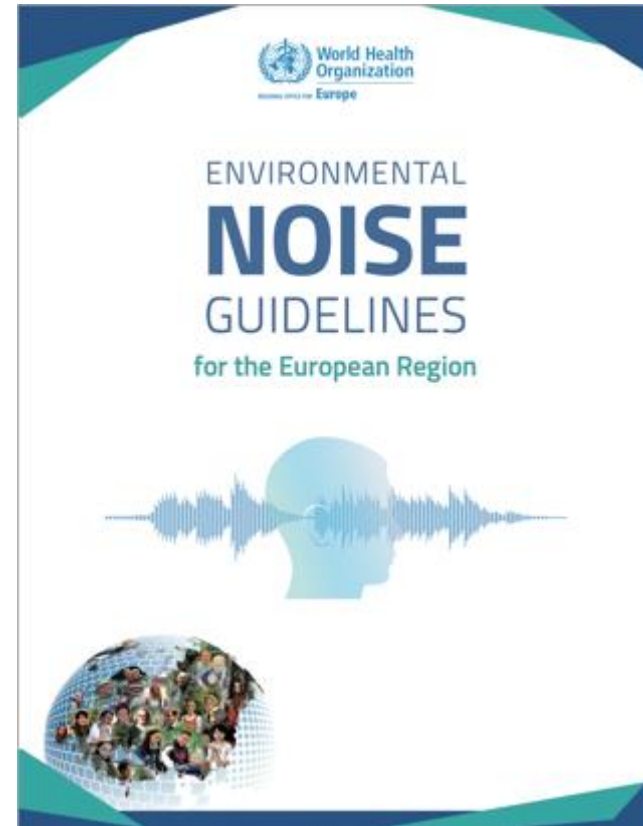


Exposure summary



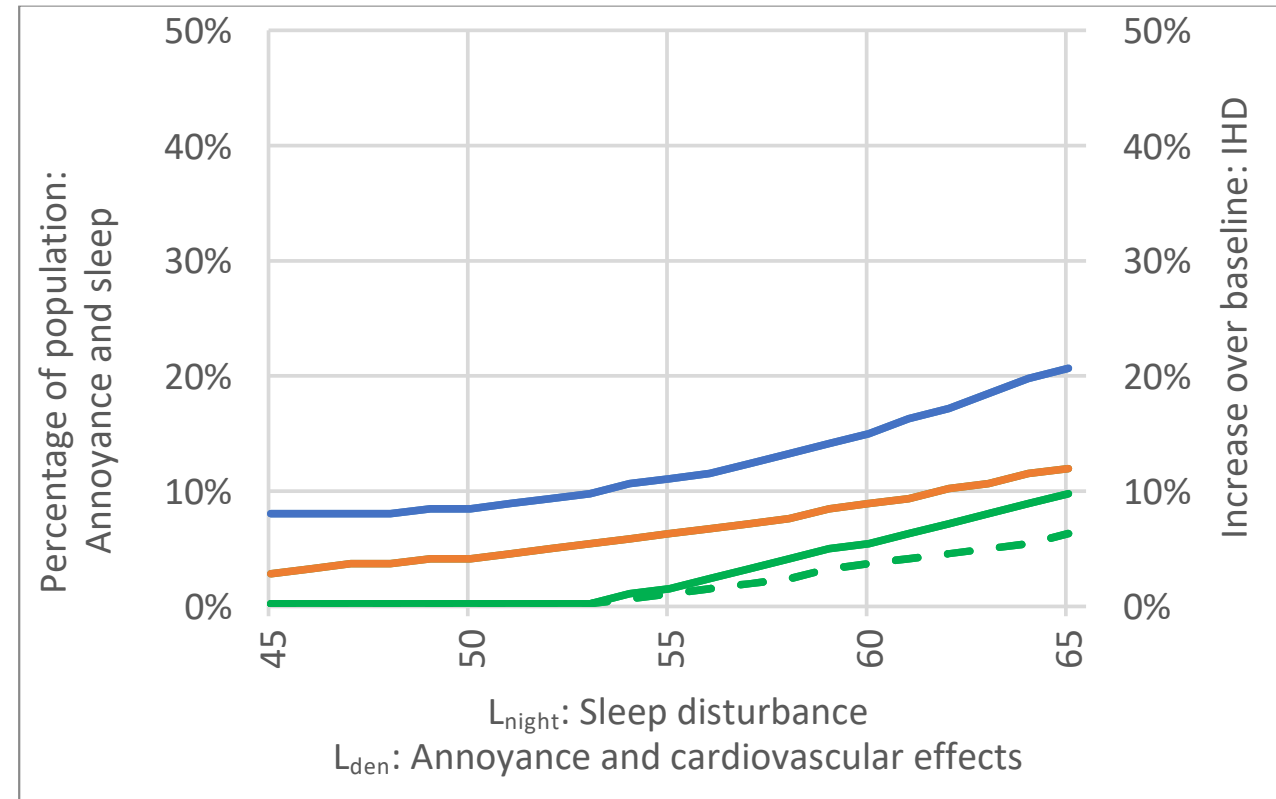
Health effects

- Annoyance
- Sleep disturbance
- Increased risk of heart disease
- Death from heart disease

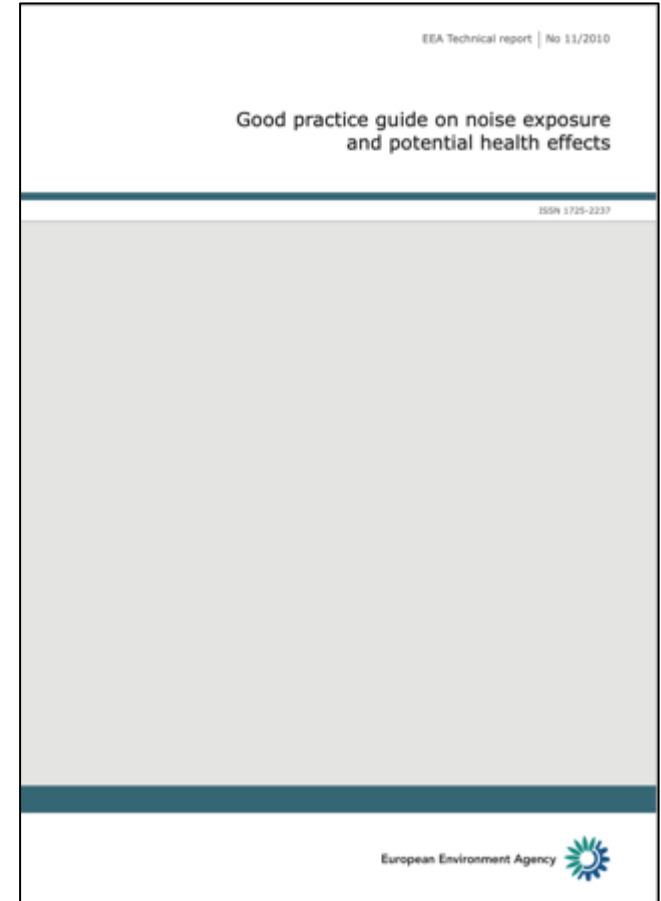
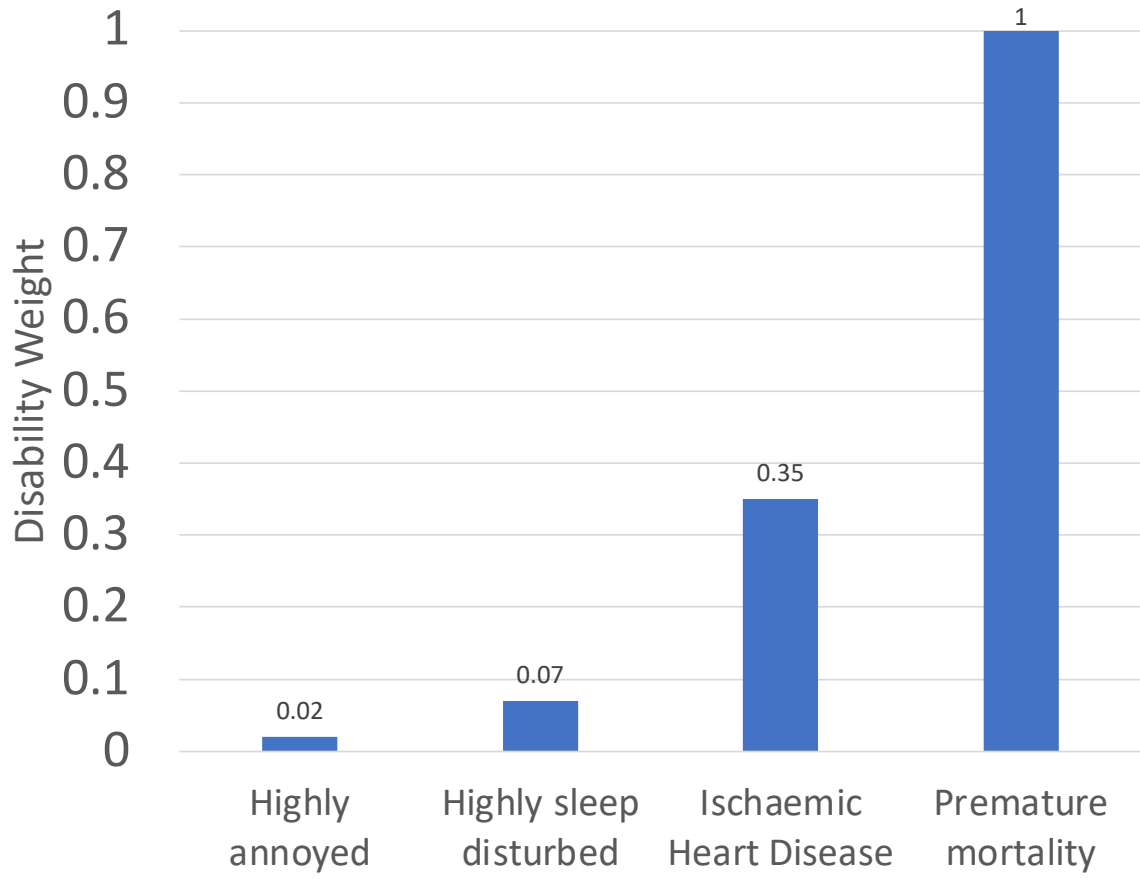


Dose response / exposure relationship

- Identifies percentage of population affected by each condition
- Determined by longitudinal health studies and surveys



Disability Weight



Example calculation

External sound level	Effect	Per 1000 people		Total cost
		Population	DALYs	
57 dB Lden	Highly annoyed	124	2.5	\$1266 per person per year
	Highly sleep disturbed	50	3.5	
	IHD	1.53	0.536	
	PM	0.01	0.010	

Total costs

Source	Health sector discount rate	Transport discount rates			
	3.50%	3%	4%	5%	6%
Road	838.6	770.1	909.7	1059.1	1216.6
Rail	66.4	61.0	72.1	83.9	96.4
Air	33.9	31.1	36.8	42.8	49.2
Coastal shipping	4.1	3.8	4.4	5.2	5.9
Total - all modes	943.0	866.0	1023.0	1190.9	1368.2

Total costs – road-traffic (by ONRC and Location)

Classification	Speed	Urban	Rural	Total
National (High Volume)	>= 80 km/h	75	7	82
National		6	11	17
Regional		17	15	32
Arterial		12	27	38
National (High Volume)	< 80 km/h	44	1	45
National		14	3	18
Regional		108	3	111
Arterial		506	13	520
Other		20	27	47
Total	All speeds	802	108	910

]**Total costs - Key assumptions**

Cost of life – currently under review. Discount rate.

Exposure modelling:

- Road: detailed, but currently under review
- Rail: approximate, but currently under review
- Airports: approximate
- Ports: approximate

Normalised costs

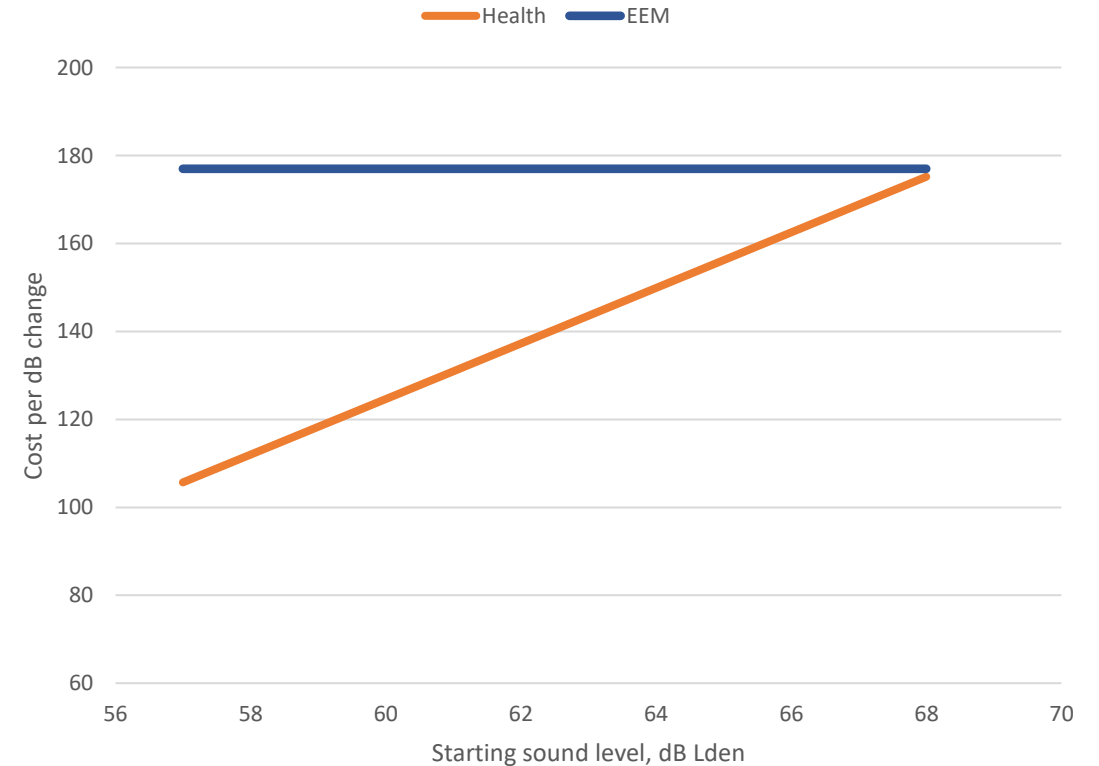
Mode	Person travel	Freight travel
Road	2.57 c/VKT or 1.49 c/PKT	1.25 c/NTK
Rail	1.90 c/PKT*	1.50 c/NTK
Air (passenger)	\$79/LTO	N/A
Shipping (domestic)	N/A	6.81c / tonne

Normalised costs - Key assumptions

- Costs occur at the receivers
- Dwelling density and proximity to road determine rates
- Rates influenced by extremes

Comparison with MCBM

- MCBM does not calculate the absolute cost
- Marginal cost (per dB change)
- MCBM appropriate for higher noise exposures



Summary

DTCC Outcomes

- Framework for developing health-based costs from noise levels at dwellings
- Estimate of Total Costs based on available data, and high-level estimates where data not available
- Consideration of normalizing by passenger and freight movements

Potential future work

- Case studies on how costs used
- Consideration of outputs from ART19-01 (exposure and methodology)
- Updated value of statistical life (VoSL)
- Periodic updates of input data

