## GREEN LOGISTICS

Improving the environmental sustainability of logistics



















## **Contents**

Cor	ıtril	outor biographies	iχ		
Par	t 1	ASSESSING THE ENVIRONMENTAL EFFECTS OF LOGISTICS	1		
1	ma Ala Int Gre log	vironmental sustainability: a new priority for logistics nagers in McKinnon roduction 3; A brief history of green logistics research 5; seen logistics: rhetoric and reality 17; A model for green istics research 19; Outline of the book 22; Notes 25; ferences 25	3		
2	Sha Int	sessing the environmental impacts of freight transport aron Cullinane and Julia Edwards roduction 31; Environmental impacts 32; Environmental indards 39; measuring the environmental impact of freight insport 42; Notes 45; References 45	31		
3	Inti- car foo tra	rbon auditing of companies, supply chains and products <i>ija Piecyk</i> roduction 49; Guidelines for carbon footprinting 50; The bon footprinting process 51; Success factors in carbon otprinting 59; Case study: carbon auditing of road freight insport operations in the UK 60; Conclusions 65; ferences 66	49		

4 Evaluating and internalizing the environmental costs of logistics 68 Maja Piecyk, Alan McKinnon and Julian Allen Introduction 68; Arguments for and against the internalization of environmental costs 69; Monetary valuation of environmental costs 72; Internalization of the external costs imposed by road freight vehicles in the UK 79; Conclusions 93; Notes 95; References 95

## Part 2 STRATEGIC PERSPECTIVE

99

167

- 5 Restructuring of logistics systems and supply chains
  Irina Harris, Vasco Sanchez Rodrigues, Mo Naim and
  Christine Mumford
  Introduction 101; Current state of knowledge of traditional
  supply chains 102; Green supply chains 111; Gaps in our
  understanding and priorities for research 116; Consequences
  and conclusions 119; References 120
- 6 Transferring freight to 'greener' transport modes
  Allan Woodburn and Anthony Whiteing
  Background 124; Characteristics of the main freight transport
  modes 126; Environmental impacts of the main freight
  transport modes 129; Case study: container train load factors
  130; The policy framework 131; Examples of measures aimed
  at achieving modal shift for environmental benefit 133; Rail
  and water industries 135; Conclusions 138; References 139
- 7 Development of greener vehicles, aircraft and ships
  Alan McKinnon, Julian Allen and Allan Woodburn
  Introduction 140; Road freight 141; Rail freight operations 150;
  Air freight 153; Shipping 157; Conclusions 162; Notes 162;
  References 163
- 8 Reducing the environmental impact of warehousing *Clive Marchant*Introduction 167; Scale of the environmental impact 168;
  Increasing resource intensity 171; Framework for assessing the environmental impact of warehouses 173; Ways of reducing the environmental impact 173; Conclusion 189; References 190

Pa	rt 3 OPERATIONAL PERSPECTIVE	193
9	Opportunities for improving vehicle utilization <i>Alan McKinnon and Julia Edwards</i> Introduction 195; Measuring vehicle utilization 196; Factors affecting the utilization of truck capacity 199; Conclusion 210; Note 210; References 210	195
10	Optimizing the routing of vehicles Richard Eglese and Dan Black Introduction 215; Vehicle routing problems 216; Types of problem 217; Environmental impact 221; Conclusions 224; References 225	215
11	Increasing fuel efficiency in the road freight sector <i>Alan McKinnon</i> Introduction 229; Fuel efficiency of new trucks 230; Vehicle design: aerodynamic profiling 231; Reducing the vehicle tare weight 232; Vehicle purchase decision 233; Vehicle maintenance 234; Increasing the fuel efficiency of trucking operations 235; Benchmarking the fuel efficiency of trucks 237; More fuel-efficient driving 238; Fleet management 239; Conclusions 240; References 240	229
12	Reverse logistics for the management of waste Tom Cherrett, Sarah Maynard, Fraser McLeod and Adrian Hickford Introduction 242; Waste management in the context of reverse logistics 243; The impact of waste treatment legislation 246; Reuse, refurbishment markets and take-back schemes 250; Managing waste as part of a sustainable reverse process 253; Conclusions 256; References 259	242
Par	t 4 Key issues	263
13	The food miles debate  Tara Garnett  Introduction 265; Transport and GHGs: is further worse? 266;  Transport, the second order impacts and the implications for GHGs 272; Local versus global and the self-sufficiency question 274; Notes 277; References 277	265

14	Sustainability strategies for city logistics <i>Julian Allen and Michael Browne</i> Introduction 282; Urban freight research and policy making 283; Efficiency problems in urban freight transport 285; Urban freight transport initiatives 288; urban consolidation centres 290; Joint working between the public and private sectors 294; Environmental zones 296; Conclusions 301; References 302	282
15	Benefits and costs of switching to alternative fuels Sharon Cullinane and Julia Edwards Introduction 306; The main types of alternative fuels 307; Current use of AFs in the freight industry 316; The future 318; Notes 318; References 319	306
16	E-business, e-logistics and the environment <i>Julia Edwards, Yingli Wang, Andrew Potter and Sharon Cullinane</i> Introduction 322; Business-to-business (B2B) 323; Business-to-consumer (B2C) 327; Restructuring of the supply chain 330; the environmental impact of e-commerce 330; Case study: online book supply chain 333; The future 335; References 335	322
Par	rt 5 Public policy perspective	339
17	The role of government in promoting green logistics <i>Alan McKinnon</i> Introduction 341; Objectives of public policy on sustainable logistics 344; Policy measures 344; Reducing freight transport intensity 347; Shifting freight to greener transport modes 349; Improving vehicle utilization 351; Increasing energy efficiency 353; cutting emissions relative to energy use 355; Government-sponsored advisory and accreditation programmes 356; Conclusion 357; Note 358; References 358	341
Ind	ex	361