Abidjan 253–4, 257
accessibility 236, 240–41, 242, 573, 581
definition of 570–72
and equity 342–5
measurement 576–8
as performance measure 578–9
planning 224
accidents see road crashes
acid deposition 140, 145–6, 157
adaptive cities 51–2
Addis Ababa 213
affordability of travel 245–50
Africa
bus rapid transit (BRT) 428
buses 209
cycling 254–5
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport energy use 144
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96, 213
urban form and wealth 79
vulnerable road user mobility 414
agricultural land 45–6, 148
air pollution 100, 108, 137
see also emissions; greenhouse gas emissions
costs of 226
and equity 346–7
evaluation models 317–19
global 145–6
health, impact on 157, 226, 318, 388
local 149–50
in motor car life-cycle 143
reduction, complexities of 156–8, 161, 164
airshed evaluation models 318
algae oil 127–8
Asia 15–17
see also Asia, high-income cities; Asia, low-income cities
bus rapid transit (BRT) 428, 431
development 25–6
transport energy use 144
travel modes split 213
vulnerable road user mobility 410–12
world trade 16
Asia, high-income cities
see also Asia
motor car use 95
motorcycles 95
motorization 105
private transport use 95
public transport service level 91
public transport use 93
road deaths 217
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
urban poor 211
Asia, low-income cities
see also Asia
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
Asian Development Bank (ADB) 205, 399, 401
asset management 321
Association of South East Asian Nations (ASEAN) 394
Athens 78
  motor car use 95
  motorcycles 95
  private transport use 95
  public transport service level 91
  public transport use 93
  taxis 91, 95
  transport costs 103
  transport energy and externalities 98
  transport infrastructure 81, 84, 89
  transport speeds 87
  travel modes split 96
  urban form 79
Australia/New Zealand
  bus rapid transit (BRT) 428
  motor car use 95
  motorcycles 95
  motorization 105
  private transport use 95
  public transport service level 91
  public transport use 93
  taxis 91, 95
  transport costs 103
  transport energy and externalities 98
  transport infrastructure 81, 85, 89
  transport speeds 87
  travel modes split 96
  urban form and wealth 79
  'automobile cities' 75, 76, 110
  automobiles see motor cars
Bajaj Company 152–3
Balassiano, R. 511
Bangalore 204, 213, 392–3
Bangkok 31, 74, 152
  air pollution 149
  bus travel 350, 351
  elevated rail 437
  emissions 100, 153
  informal public transport 500–504
  metro 437
  motor car use 95
  motorcycles 77, 95
  noise control 154
  private transport use 77, 94, 95
  public transport service level 91
  public transport use 93
  sprawl 43, 44
  taxis 91, 95
  transport costs 103
  transport energy and externalities 98
  transport infrastructure 81, 84, 89
  transport speeds 87
  travel affordability 250
  travel modes split 96
  urban form 79
  'Bangkok syndrome' 75, 106–108
Bangladesh 160, 392–3, 422
batteries 153
battery-electric vehicles 133
Beijing 30
  air pollution 149
  metro 437
  motor car use 95
  motorcycles 95
  private transport use 95
  public transport service level 91
  public transport use 93
  road safety 398–9
  taxis 91, 95
  transport costs 102
  transport energy and externalities 98
  transport infrastructure 81, 84, 89
  transport speeds 86
  travel modes split 96, 213
  urban form 79
Benxi 213
bicycle lanes 65, 204, 216, 226, 228
bicycles 156, 164, 212, 223, 227
  see also cycling
  messenger and delivery services 212–13
  road deaths 218
Bill and Melinda Gates Foundation 397
biofuels 122, 126–30, 139, 146, 153
biomass 121, 122, 124, 129
Bogotá 48, 155, 433, 521, 522–3
  bus rapid transit (BRT) 423, 432
  business model 446, 447, 448–9, 450
  costs 437
  and employment 445
  passenger capacity 441, 453
planning and implementation  
time 440  
transit-oriented development 444  
congestion 530–31, 536  
congestion pricing 523, 538, 539, 540, 542  
economic project appraisal 378–9  
motor car use 95  
motorcycles 95  
private transport use 95  
public transport service level 91  
public transport use 93  
sustainable transport policies 226  
taxi 91, 95  
traffic bans 530–32, 534–5, 541, 542  
transport costs 102  
transport energy and externalities 98  
transport infrastructure 81, 82, 84, 89  
transport speeds 86  
travel modes split 96  
urban form 79  
vulnerable road user mobility 412–13  

Brasilia 439–40, 499  

Brazil  
see also Curitiba; Rio de Janeiro; São Paulo  
air pollution 346–7  
buses 509, 510  
economic project appraisal 380  
ethanol production 132, 153  
national urban transport policy 57–8  
road safety 400  

vale transporte 58–9  

BRT see bus rapid transit (BRT)  

Brundtland Report 27–8, 552  

Budapest  
motor car use 95  
motorcycles 95  
private transport use 95  
public transport service level 91  
public transport use 93  
taxi 91, 95  
transport costs 102  
transport energy and externalities 98  
transport infrastructure 81, 84, 89  
transport speeds 86  
travel modes split 96  
urban form 79  

Buenos Aires, travel affordability 247, 250  
built environment 138–9, 140, 141, 159, 163, 164–5  
and economic project appraisal 366–9  
urban footprints 168  
urban transport impacts 148–9  
air pollution 149–50  
community severance 151  
noise 150  
public space 151–2  
reduction of 154  
road crashes 150–51  

bus rapid transit (BRT) 208–209, 421, 454–5, 479–80  
business model 445–51  
administrative structure 446–8  
competition 447, 448–9  
operator compensation 449, 450  
revenue distribution 447, 449, 451  

cities with 428  
definition 423–4  
economic appraisal 374  
and emissions reduction 155, 156  
features of 424–6  
history of 429, 431–3  

incomplete or failed, reasons for 451–2  
infrasture costs 436, 437–8  
and land use planning 52, 131–2  
mass transit comparisons 434, 437–8, 440  
myths and realities 453  
passenger capacity 441, 442, 443, 456  
planning and implementation time 440  
speed 456  
buses 84, 158, 209, 347–9, 350, 427  
energy characteristics 117  

mass transit comparisons 434  
occupancy 117, 118, 155, 442  
speeds 83, 85, 86–7  

Business Week 115  

busways 425, 427, 462  

Cairo 78  

bus travel 350, 351  
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
taxi affordability 250
travel modes split 96
urban form 79

Calcutta, noise pollution 150

Canada
bus rapid transit (BRT) 428
motor car use 95
motorcycles 95
motorization 105
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96
urban form and wealth 79

Cape Town
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
taxi affordability 250
travel modes split 96
urban form 79

Caracas, bus travel 350, 351
carbon dioxide emissions 98, 99, 126, 127–8, 133, 146, 155
carbon monoxide (CO) 99, 145, 149, 317, 346, 567
cars see motor cars
Centre for Sustainable Transportation (CST) 558
Changzhi 213
Chennai
motorcycles 95
non-motorized transport 206
private transport use 94, 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96, 213
urban form 79

Chicago 76
children
mobility 337, 338–9
road deaths 396

Chile see Santiago
China
see also Beijing; Guangzhou; Ho Chi Minh City; Shanghai
agricultural land 46
bicycles 204, 212, 213
buses 209
energy consumption 26
metro development 482
middle class 18
mobility, access to 214
motor car use 95
motorcycles 95, 207
motorization 19–20, 21, 110
non-motorized transport 213–15
oil consumption 23
population 26
poverty 210
private transport use 95
public transport service level 91
public transport use 93
road accidents 218, 219
road deaths 218
road safety 398–9
sprawl 44–5, 148
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96, 212, 213
urban form and wealth 79
urban population growth 208
urban traffic management 221
urban transport policy-making and planning
business processes 289–91
finance 286, 287–8
global emissions management 285
institutions and governance 270–71
land use planning 283
local emissions control 283–4
local government 277, 278, 279
national government 273–4, 275–6
public consultation 292
road safety 286
strategic policies and long term plans 280, 281
tactical investment programmes 281, 290–91
urban railways integration 282
urbanization 214
vulnerable road user discrimination 411
vulnerable road user mobility 412
Chitere, P.O. 200, 201
cities 9, 13–14
Cities on the Move 49–50, 233, 393–4
Clean Air Act 322–3
clean water laws 323–4
climate change 146, 158, 297, 325–6, 592
CO₂ emissions 98, 99, 126, 127–8, 133, 146, 155
coal 121, 125–6
Colombia 153
see also Bogotá
community severance 151, 351–2
Conakry, poverty and mobility 241, 243–4, 248
congestion 107, 118, 162, 186, 192, 468
policy options for managing 536–7
congestion pricing 374–5, 519–20, 523, 544
implementation, challenges to 537–9
London 225, 520–21, 539
pre-conditions for 540–41
transport experts’ survey findings 533, 536–7
cost–benefit analysis 320–21, 367, 372–3
Cracow
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
taxi and public transport 320, 84, 87
travel modes split 96
urban form 79
Crashes see road crashes
credit crisis 24, 29
Curitiba
bus rapid transit (BRT) 132, 429–31, 437, 453
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transit-oriented development 444
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 87
taxi and public transport 320, 84, 87
travel modes split 96
urban form 79
cycle lanes 65, 204, 216, 226, 228
cycles 156, 164, 212, 223, 227
messenger and delivery services 212–13
road deaths 218
cycling 254–5, 336, 337, 411, 413–14
Dakar
motor car use 95
motorcycles 95
poverty and mobility 241, 242, 246, 249, 256–7
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
Urban transport in the developing world

transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96, 213
urban form 79
Dar el Salaam 213, 440
deaths see road deaths
decentralization 45
see also land use and transport planning
Delhi 76
motorization 54
road deaths 217, 219
travel modes split 213
dependence on the motor car 162–3
deregulation 181, 198
destitution 237, 238
developing world 9–12
development assistance programmes 14
Dhaka, public transport 422
Disease Control Priorities Project (DCPP) 397
Documents of Poverty Reduction Strategy (DPRS) 234
Douala, poverty and mobility 241, 243–4
drink-driving 395–6
Earth Summit 306, 551, 557
Eastern Europe
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
ecological footprints 167–8
economic growth 25, 360–61, 363–5, 600–601
economic project appraisal 359–60, 382–3
alternatives analysis 372–6
and built environment efficiency 366–9
by developing countries 379–82
and growth 360–61
and investment 361–5
microeconomic applications, impacts on
economic downturn 372
environmental health costs 370–71
non-motorized road users 369
parallel urban facilities 370
poverty alleviation 371
resettlement on travel time 370
road safety 371
urban property values 370
risk quantification 371–2
at the World Bank 376–9
The Economist 10, 12, 14, 17–18, 20, 22, 24, 44, 46, 439
ecosystems 138, 148
Egypt 46
see also Cairo
elderly, mobility 337, 339
electric vehicles 133
elevated rail 434, 437, 438, 443
emerging economies 10
EMFAC model 317
see also greenhouse gas emissions
control and management of 267, 283–4, 285
evaluation models 317–18
in fuel life-cycle 123, 124
reduction of 155, 156
and sprawl 47
employment 250–52, 444–5
Endangered Species Act 324–5
energy 144–5
demand and supply, balancing 129–30
demand for 114–19
energy intensity increase 116–19
passenger-kilometres travelled 114–16
urban population growth 114
different modes usage 117, 155
equity of use 347–8
and externalities 97–100
supply of 119–22
use, reduction of 130–31
motor car travel reduction 131–2

technological leapfrogging 132–3

vehicle fuel efficiency 130–31

environment 138, 267–8

see also built environment;
environmental impacts
of motorization; natural
environment

environmental evaluation 305–308, 325–9

air pollution dispersion models 318–19

air pollution models 317

airshed models 318

greenhouse gas emission models 317

land use analysis 315–17

legal framework

Clean Air Act 322–3

clean water laws 323–4

community, historic resource and
park protections 325

cost–benefit analysis 320–21

Endangered Species Act 324–5

National Environmental Policy
Act 321–2

public participation 328

transport analysis 308–15

travel analysis 312–15

water quality modelling 319–20

environmental impacts of motorization
137, 139–42

air pollution 145–6, 149–50

built environment 148–52, 154

community severance 151

energy use 144–5

equity 163–6

interconnectivities of 139, 140

material cycles 143–4

natural environment 142–8, 153

noise 150

public spaces 151–2

reduction, complexities of 156–63

human perception 157–8

motor car dependence and sprawl 162–3

motor vehicles, focus on 161–2

physical complexity 157

pressure to motorize 159–61

socio-political complexity 159

reduction methods 152–6

modal shift 154–6

motor vehicles 152–3

non-motorized transport 156

pedestrian facilities 155–6

public transport 155

road crashes 150–51

urban sprawl 147–8

watershed impacts 146–7

Environmentally Sustainable
Transport (EST) project 557, 558

equity 163–6, 333–4

equity audit of urban transport 340

accessibility 342–5

accidents 345

air pollution 346–7

energy, use of 347–8

mobility constraints 335–40

reason for 332

road investment and use 340–42

São Paulo 352–6

social interaction 349, 351–2

traffic delays 349, 350, 351

ethanol fuel 132–3, 153, 157

Europe

see also Eastern Europe; Western
Europe

bus rapid transit (BRT) 428

motorization 105

European Union, road deaths 403–404

externalities 97–100, 207, 212, 352–3, 355–6

fares 257–8, 288–9

ferries 86–7, 88

FIA Foundation for the Automobile
and Society 396, 399, 401–402

Financial Times 14

foreign direct investment 25

France, bus rapid transit (BRT) 431, 432

freeways 28, 30–31, 81, 82, 105, 106, 110

freight transport energy use 119

fuel consumption 117

fuel efficiency 130–31, 153

fuels

biofuels 122, 126–30, 139, 146, 153

ethanol fuel 132–3, 153, 157

from fossil feedstocks 123–9

life-cycle characteristics 123, 124
gender and mobility 337, 339
Ghana, road deaths 392–3
GHG emissions 146, 163, 559–60
see also emissions
evaluation of 317–18, 327–8
in fuel life-cycle 123, 124, 125–7, 129, 133
institutional management of 284–5
reduction of 134
global credit crisis 24, 29
Global Environmental Facility (GEF) 205, 222, 299
Global Road Safety Facility (GRSF) 398
Global Road Safety Fund 395
Global Road Safety Partnership (GRSP) 396, 398–9, 400
‘Speed Management’ manual 399, 401
Global Transport Knowledge Partnership (gTKP) 402–403
global warming 158, 592
see also climate change
globalization 14, 56, 165, 591
green belts 47
greenhouse gas emissions 146, 163, 559–60
see also emissions
evaluation of 317–18, 327–8
in fuel life-cycle 123, 124, 125–7, 129, 133
institutional management of 284–5
reduction of 134
growth 25, 360–61, 363–5, 600–601
Guangzhou
economic project appraisal 378
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
taxi affordability 250
travel modes split 96, 213
urban form 79
handicapped people and mobility 337, 339
Harare 78
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96
urban form 79
health, impact of air pollution 157, 226, 318, 388
helmet use 395, 396
high-income countries, road safety 403–404, 409–10
Netherlands 405
Sweden 404–405
UK 405, 407–409
high-rise developments 28, 30–31
Ho Chi Minh City 78
emissions 100
motor car use 95
motorcycles 95
private transport use 94, 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96
urban form 79
holistic thinking 224, 293, 593–4
Hong Kong 78
informal public transport 493, 499
Mass Transit Railway (MTR) 437, 480
sustainable transport development 99
Hungary 377–8
see also Budapest
Hyderabad, sprawl 148
hydrocarbons 99, 149, 317, 346
hydrogen 24, 153
hyper-car 161
hypermobility 19

IMF (International Monetary Fund)
19, 28, 182
income inequality 211, 214
Index of Sustainable Economic
Welfare (ISEW) 554–5

India
\textit{see also} Chennai; Delhi; Mumbai
air pollution 346
bicycles 213, 411
buses 209
economic project appraisal 380–82
energy consumption 26
middle class 18
mobility, access to 214
motorcycles 207
motorization 20, 21, 22, 206
national urban transport policy 56–7
non-motorized transport 156,
213–15
oil consumption 23
population 26
poverty 210–11
public transport problems 209–10
road accidents 218–19
road deaths 218, 219
sprawl 47, 148
traffic management, lack of 215
travel modes split 213
urban population growth 208
urban transport policy-making and
planning
business processes 290–91
finance 286–8
global emissions management 285
institutions and governance 271–2
land use planning 283
local emissions control 283–4
local government 277, 279
national government 273–4, 275–6
public consultation 292
road safety 286
strategic policies and long term
plans 280, 281
suburban railways integration 282
tactical investment programmes
281, 290–91
urbanization 214

Indonesia
\textit{see also} Jakarta
motorization 20, 21
palm oil production 153
population 26
urban transport policy-making and
planning
business processes 291
finance 286, 287–8
institutions and governance 272–3
local emissions control 283–4
local government 277, 279
national government 273–4, 275–6
public consultation 292
strategic policies and long term
plans 280–81
suburban railways integration 282
tactical investment programmes
291
informal public transport 488–9,
515–16, 598
Bangkok 500–504
benefits of 494
cooperatives 490, 499, 502–504
costs 495–6
demand side 494–5
developed world 493
developing world 490–93
institutional structure 186–7
Kingston 504–509
monitoring and evaluation 500,
508–509
Nairobi 176–7, 183–4, 199–
202, 492–3
organizational structures 497–8,
502–504
regulation 497, 498–500, 504, 508,
512–14
Rio de Janeiro 509–15
route associations 490, 498, 499
safety 496
supply side 489–90
types 491
Institute for Transportation and
Development Policy (ITDP) 410
institutional capacity-building 292–3
governance and accountability
296–7
Urban transport in the developing world

knowledge transfer 296
political leaders’ training 294
political-professional dialogue 295
private sector, working with 295–6
professional staff training 293–4
road safety 299
sustainable development 297
sustainable finance 298
urbanization 298–9
institutional responsibilities
see also under China; India; Indonesia
local government 265, 266, 277–9
national government 263–5, 273–7
non-transport institutions 266–9
institutions 176–80
international aid programmes, road safety 393–5
Asian Development Bank 399, 401
Disease Control Priorities Project 397
FIA Foundation for the Automobile and Society 401–402
Global Road Safety Facility 397–9
Global Road Safety Partnership 396, 398–9, 400–401
Global Transport Knowledge Partnership 402–403
UK Department for International Development 402–403
World Bank 393, 397–9
World Health Organization 395–7
International Monetary Fund (IMF) 19, 28, 182
International Roads Assessment Programme (iRAP) 399
International Vehicle Emissions (IVE) model 317
investment 362–5
Iran see Tehran
Iraq 165
ISO standards 305–306
Jakarta 141
air pollution 149, 150
bus rapid transit (BRT) 155, 156
economic project appraisal 381–2
emissions 154, 156
informal public transport 492
modal shift 156
motor car use 95
motorcycles 95
non-motorized transport 156
private transport use 94, 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89, 159
transport speeds 86
travel modes split 96
urban form 79
Jamaica, informal public transport 504–509
Japan
energy consumption 26
sustainable transport development 99
Johannesburg
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96
urban form 79
Journal of the American Planning Association 41
Kenya 179–80
see also Nairobi
road safety 397–8
vulnerable road user discrimination 411
Kenya Institute for Public Policy Research and Analysis (KIPPRA) 186
Kingston, informal public transport 504–509
Kinshasa 213
knowledge transfer 296
Krakow see Cracow
Kuala Lumpur 30
elevated rail (PUTRA) 437, 439
monorail 437, 439, 443
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
rail systems 439
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 87
travel modes split 96
urban form 79
watershed 147

land use analysis 315–17
land use and transport planning 131–2, 267, 283
guidance 49–54
sprawl, position against 42, 43–6
sprawl constraint, position against 46–9
urban transport planning framework 54–5
budget and finance possibilities 58–9
land development plans 59–61
national urban transport policy 55–8
prior project commitments review 61–2
strategic objectives, design of 62–5
Latin America
air pollution 346
bus rapid transit (BRT) 428, 431
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport energy use 144
transport infrastructure 81, 84, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
vulnerable road user mobility 412–14
less-developed countries (LDCs) 11
LICs see low-income countries
light rail transit (LRT) 434
cost 437, 438
infrastructure 84–5
passenger capacity 441, 442
speed 86–7
local government 265, 266, 277–9
London
congestion charge 225, 520–21, 539
Crossrail project 476
Los Angeles 163
low-income countries, road crashes 386–7
casualties 389–90
costs and consequences 391–2
deaths 386, 388–9, 390, 414–15
and poverty 392–3
road safety 393–5
Asian Development Bank 399, 401
Disease Control Priorities Project 397
FIA Foundation for the Automobile and Society 401–402
Global Road Safety Facility 397–9
Global Road Safety Partnership 396, 398–9, 400–401
Global Transport Knowledge Partnership 402–403
UK Department for International Development 402–403
World Bank 393, 397–9
World Health Organization 395–7
road user modes 390–91
vulnerable road user mobility
Africa 414
Asia 410–12
Latin America 412–14
low-income nations 11
lower-income cities, motorization comparisons
car ownership 80, 81
emissions 98, 99–100
freeways 81, 82
modal split 94, 96–7
motorcycle ownership 80, 81
parking 81, 82–3
private transport use 94, 95
public transport service 90–92, 107–108
public transport use 92–4
road supply 81, 82, 107
taxi 80–82, 90–92
transport deaths 98, 100
transport energy and externalities 97–100
transport infrastructure 80–83, 84–5, 88–90, 107
transport speeds 83, 85–8
urban form and wealth 78–80
LRT see light rail transit (LRT)

Madagascar, emissions 153
Madrid, metro 480
‘Make Roads Safe’ report (FIA Foundation) 401–402

Malaysia see also Kuala Lumpur
motorization 206
road deaths 218
road safety 399

Manila
motor car use 95
motorcycles 95
non-motorized transport 156
private transport use 95
public transport service level 91
public transport use 93
road deaths 151
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel affordability 250
travel modes split 96
urban form 79
marketing of motor cars 159–61, 169
mass transit options, comparisons 433–6
employment generation 444–5
infrastructure costs 436–40
passenger capacities 441, 442, 443
planning and implementation time 440
transit-oriented development 441, 443–4
metro systems 434, 482–3
costs 437, 439–40, 462–3, 481
effectiveness in policy terms 459–61
essential, seen as 458–9
future development challenges 477–80
future development opportunities 480–82
infrastructure 84
operational sustainability 461–2, 484–5
operations management 480
passenger capacities 441, 442, 443
planning 463–4, 465–7, 469–70, 472–4, 483–4
popularity 458
private sector participation 474–6, 481, 485
project development 470, 472, 484
and public policy 457–8
risk 466, 470, 471, 475
speeds 86–8, 456
stakeholder behaviour 463–5
and sustainable development 468–9
Mexico, road safety 396
Mexico City 521, 522–3
air pollution 157, 526, 527
bus rapid transit (BRT) 374
congestion 527, 536
congestion pricing 537, 540
informal public transport 491–2, 498
metro 437, 480
motorization 54
pollution 346
traffic bans 526–7, 534–5, 541–2
travel affordability 250
vulnerable road user mobility 413–14
micro-algae 124, 127–8
middle classes 17–18
Middle East
motor car use 95
motorcycles 95
private transport use 95
Subject Index

public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport energy use 144
transport infrastructure 81, 84, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
middle-income nations 11
Millennium Cities Database for
Sustainable Transport 72–3
Millennium Development Goals 205, 234
MOBILE model 317
mobile phone use 395
mobility 207, 238–40, 258
and accessibility 214, 240–41, 337
planning 224–5, 227–9
socio-economic categories 336–40
modal shift 154–6
‘modern transit cities’ 75
monorail 381, 437, 439, 443
motor cars 140–41, 336
dependence on 162–3
energy characteristics 117
low-cost 115
marketing of 159–61, 169
ownership 80, 81, 105–106
use 94, 95
waste from 143, 144
motor vehicle industry 22, 24, 26, 152–3, 267
motorcycles 20, 77, 94, 95, 158,
206–207, 336
energy characteristics 117
ownership 80, 81, 105, 116
road deaths 391
motorization 19–23, 48, 206–208, 595–6
see also motorization, environmental
impacts of; motorization
in lower-income cities, comparisons
cycle of 160–61
higher-income regions 105–106
and land use planning 54
lower-income regions 106–108
motorization, environmental impacts
of 137, 139–42
see also motorization
air pollution 145–6, 149–50
built environment 148–52, 154
community severance 151
energy use 144–5
equity 163–6
interconnectivities of 139, 140
material cycles 143–4
natural environment 142–8, 153
noise 150
public spaces 151–2
reduction, complexities of 156–63
human perception 157–8
motor car dependence and sprawl
162–3
motor vehicles, focus on 161–2
physical complexity 157
pressure to motorize 159–61
socio-political complexity 159
reduction methods 152–6
modal shift 154–6
motor vehicles 152–3
non-motorized transport 156
pedestrian facilities 155–6
public transport 155
road crashes 150–51
urban sprawl 147–8
watershed impacts 146–7
motorization in lower-income cities,
comparisons
see also motorization
car ownership 80, 81
emissions 98, 99–100
freeways 81, 82
modal split 94, 96–7
motorcycle ownership 80, 81
parking 81, 82–3
private transport use 94, 95
public transport service 90–92,
107–108
public transport use 92–4
road supply 81, 82, 107
taxi 80–82, 90–92
transport deaths 98, 100
transport energy and externalities
97–100
transport infrastructure 80–83, 84–5, 88–90, 107
transport speeds 83, 85–8
urban form and wealth 78–80
Mumbai 78, 215, 216, 218
land use and transport planning 283
motor car use 95
motorcycles 95
private transport use 94, 95
public transport service level 91
public transport use 93
road deaths 219
suburban railway 282
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel affordability 247, 250
travel modes split 96, 212, 213
urban form 79
Myanmar, road safety 399, 401
Nagoya 74
Nairobi 187–9
buses 196–7, 350, 351
land use and transport planning 190–93
road crashes 392
slums 187–8, 192
taxi 95
suburban railway 282
travel affordability 247, 250
travel modes split 96, 212, 213
urban form 79
Netherlands, Sustainable Safety 405
New Zealand/Australia
bus rapid transit (BRT) 428
motor car use 95
motorcycles 95
motorization 105
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
nitrogen oxides 99, 131, 145, 149, 317, 346
NMT see non-motorized transport (NMT)
noise 150, 154, 223, 327
non-motorized transport (NMT) 108, 155–6, 254–5
benefits of 222–3
modal share 118, 203–204, 212–13
neglect of 204–206
reasons for 213–15
road crashes 216–19
road safety 394
traffic management 215–16, 220–22, 228
obesity 151, 387, 388, 409
Observer, The 12
OECD 557, 558
oil consumption 23–4
oil crisis 431
oil prices 371
oil reserves 119–20, 121
oil resources 120–21
oil sands 124, 125, 128
oil spills 145
Organisation for Economic Co-operation and Development (OECD) 557, 558
Ouagadougou 246, 254–5
Our Common Future (Brundtland Report) 27–8
ozone 140, 145, 169

Harry T. Dimitriou and Ralph Gakenheimer - 9781849808392
Downloaded from Elgar Online at 03/04/2019 06:05:49AM via free access
palm oil production 153
PAMU 235
parking 81, 82–3, 227, 520
particulates 140, 149–50, 157–8, 346, 567
path-dependency theory 368
pavements 192, 216, 226, 227–8
pedestrians 155–6, 165, 168, 336, 337
see also walking
discrimination against 411
facilities for 159, 164, 216, 227–8
road crashes 217, 390–91
road deaths 217, 218, 391
Peru, economic project appraisal 380
Philippines 279
see also Manila
informal public transport 500
metro projects 463
road safety 399, 412
policy-making and planning
see also under China; India;
Indonesia
institutional capacity-building 292–3
governance and accountability 296–7
knowledge transfer 296
political leaders’ training 294
political-professional dialogue 295
private sector, working with 295–6
professional staff training 293–4
road safety 299
sustainable development 297
sustainable finance 298
urbanization 298–9
institutional responsibilities
local government 265, 266, 277–9
national government 263–5, 273–7
non-transport institutions 266–9
political support 269–70
pollution see air pollution
poverty 210, 232, 235–8
see also urban poverty
Prague
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 87
travel modes split 96
urban form 79
private transport
costs 101
energy use 98, 105, 106
infrastructure 80–83
use 94, 95
privatization 181, 183, 198
Pro-Alcool programme 132
PROSPECTS project 559, 568–9
public consultation 291–2
public spaces 151–2, 163
public transport 155, 158, 596–7
see also informal public transport
crisis in 208–10
economics of 101
employment generation 444–5
energy use 98, 99
facilities 159
infrastructure 83, 84–5
infrastructure costs 436–40
mass transit options, comparisons 433–6
passenger capacities 441, 442, 443
planning and implementation time 440
service levels 90–92
transit-oriented development 441, 443–4
use 92–4, 108
public-good, urban transport as 183–5
public-private partnerships (PPPs) 269, 326–7
Quito 425
rainforests 153
‘Review of Road Safety in Urban Areas’ (Downing et al.) 393
Rio de Janeiro
Earth Summit 551, 557
informal public transport 509–15
suburban rail 511
travel affordability 250
Urban transport in the developing world

Riyadh
- motor car use 95
- motorcycles 95
- private transport use 95
- public transport service level 91
- public transport use 93
- taxis 91, 95
- transport costs 102
- transport energy and externalities 98
- transport infrastructure 81, 82, 84, 89
- transport speeds 86
- travel modes split 96
- urban form 79
- road availability 81, 82, 107
- road crashes 150–51, 216–17, 386–7
- casualties 389–90
- costs and consequences 391–2
- equity 164–5, 345
- global figures 226
- non-motorized transport 216–19
- and poverty 392–3
- road user modes 390–91
- victim blaming 395, 415
- vulnerable road user mobility
  - Africa 414
  - Asia 410–12
  - Latin America 412–14
- road deaths 98, 100, 386, 396, 414–15
- contributing factors 108, 151
- European Union 403–404
- by region 388–9, 390
- vulnerable road users (VRUs) 165, 217, 218–19
- road pricing 225, 374–5, 525–6
- see also congestion pricing
- road safety 267, 285–6, 299, 371, 389
- high-income countries 403–404, 409–10
- Netherlands 405
- Sweden 404–405
- UK 405, 407–409
- international aid programmes 393–5
- Asian Development Bank 399, 401
- Disease Control Priorities Project 397
- FIA Foundation for the Automobile and Society 401–402
- Global Road Safety Facility 397–9
- Global Road Safety Partnership 396, 398–9, 400–401
- Global Transport Knowledge Partnership 402–403
- UK Department for International Development 402–403
- World Bank 393, 397–9
- World Health Organization 395–7
- road user hierarchy 225, 407
- rubber production 144
- rural-urban migration 17, 214
- Russia
  - energy consumption 26
  - neo-liberalism 183
- safety see road safety
- San Francisco Bay Area Rapid Transit (BART) system 47–8
- Santiago 521, 522–3
- air pollution 525
- congestion 536
- congestion pricing 523, 525–6, 538, 540, 541, 542
- informal public transport 498
- metro 53, 458
- sprawl 47, 148
- traffic bans 524–6, 534–5, 542
- Santo Domingo, public transport 422
- São Paulo 78, 521, 522–3
- air pollution 528
- bus rapid transit (BRT) 437, 453
- bus travel 350, 351
- congestion 529, 536
- congestion pricing 523, 530, 538, 540, 542
- economic project appraisal 380
- energy use 348
- equity evaluation 352–6
- metro system 439
- motor car use 95
- motorcycles 95
- pollution 346
- private transport use 95
- public transport service level 91
- public transport use 93
- road crashes 345
- taxis 95
- traffic bans 528–30, 534–5, 541, 542
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel affordability 250, 341–2, 343–4
travel modes split 96
urban form 79
vehicle ownership 528
Saudi Arabia see Riyadh
seat belts 395, 396
Seoul 78
bus rapid transit (BRT) 425
bus travel 350, 351
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
sustainable transport policies 226
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 87
travel modes split 96
urban form 79
shale oil 121, 124, 125, 128
Shanghai 31, 78, 217
metro 437
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 101, 102
transport energy and externalities 98
transport infrastructure 81, 82, 84, 89
transport speeds 86
travel modes split 96, 213
urban form 79
vulnerable road user discrimination 411
Singapore
electronic road pricing (ERP) system 225
metro system 462–3
sustainable transport development 99
SITRASS 243–4
slums 187–8, 192, 226
smog 98, 99–100
social capital 236, 244–5
social interaction, impact of
motorization 151, 349, 351–2
social networks 244–5
South Africa
see also Cape Town; Johannesburg
informal public transport 493
Road to Safety Strategy 414
SPARTACUS project 567–8, 569
speeding 395, 396, 399, 414
control 404, 408, 409
speeds of public and private transport 85–8
sprawl 43–6, 143, 147–8, 158, 162–3,
166, 167–8
Stockholm, road pricing 375
storm water management 327
Storm Water Management Model (SWMM) 319
Strategic Environmental Assessment (SEA) 321
structural adjustment 182
Sub-Saharan African Transport Programme (SSATP) 393
suburban rail 84–5, 86–7, 88, 208, 282, 511
suburbanization 115
sulphur dioxide 99, 149
sustainability 6, 29, 167, 548, 550–52
sustainable development 27–9, 34, 166,
167, 551, 552–3
measurement of 553–5
metro development 468–9
Sustainable Indicator Prism 553, 554, 569
Sustainable Transport: Priorities for Policy Reform (World Bank) 557, 558, 563

Harry T. Dimitriou and Ralph Gakenheimer - 9781849808392
Downloaded from Elgar Online at 03/04/2019 06:05:49AM
via free access
sustainable urban transport 166, 559–61
guidelines for planners and engineers 225–9
measurement
indicators, role of 561–3
indicators and indices 563–70
non-motorized transport, benefits of 222–3
policy framework 223–5
Sweden, Vision Zero 404–405

Taiwan 164
Take Action Active Travel 409
Tanzania, road safety 414
Tata 22
Tata Nano 115, 131
taxi 80–82, 94, 95, 185–6

Tehran
emissions 100
metro 481
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 102
transport energy and externalities 98
transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96
urban form 79

Thailand
see also Bangkok
motorization 20
road deaths 218
sustainable transport 412

*Tiempo, El* 531
Tokyo 74
tolls 365
trade 13–14, 15, 25
traffic bans 519, 521, 523, 526–7, 541, 542, 595
traffic culture 216, 220, 221
traffic deaths see road deaths
‘traffic disaster cities’ 75, 76
traffic management 162, 215–16
people-focused 220–22, 228–9
traffic police 220, 221

trams 52, 84, 85, 86–7
transit-oriented development 441, 443–4, 453
transport analysis 308–15
transport deaths see road deaths
transport energy 144–5
demand and supply, balancing 129–30
demand for 114–19
energy intensity increase 116–19
passenger-kilometres travelled 114–16
urban population growth 114
different modes usage 117, 155
equity of use 347–8
and externalities 97–100
supply of 119–22
use, reduction of 130–31
motor car travel reduction 131–2
technological leapfrogging 132–3
vehicle fuel efficiency 130–131
transport fuels, life-cycle
characteristics 123, 124
transport infrastructure 80–83, 84–5, 88–90, 107
transport management authorities 256–7
transport modal shifts 415–16
transport planning and land use 131–2, 267, 283
guidance 49–54
sprawl, position against 42, 43–6
sprawl constraint, position against 46–9
urban transport planning framework 54–5
budget and finance possibilities 58–9
land development plans 59–61
national urban transport policy 55–8
prior project commitments review 61–2
strategic objectives, design of 62–5
transport planning, use of indicators 562
transport policy-making and planning see also under China; India; Indonesia
institutional capacity-building 292–3
governance and accountability 296–7
knowledge transfer 296
political leaders’ training 294
political–professional dialogue 295
private sector, working with 295–6
professional staff training 293–4
road safety 299
sustainable development 297
sustainable finance 298
urbanization 298–9
institutional responsibilities
  local government 265, 266, 277–9
  national government 263–5, 273–7
  non-transport institutions 266–9
  political support 269–70
transport speeds 85–8
see also speeding
TRANUS 316–17
travel affordability 245–50
travel analysis 312–15
travel demand management 540–44, 595
Bogotá 530–32, 534–5
congestion management, policy options 536–7
congestion pricing 374–5, 519–20, 523, 544
  implementation, challenges to 537–9
  London 225, 520–21, 539
pre-conditions for 540–42
transport experts’ survey findings 533, 536–7
Mexico City 526–7, 533, 534–5
Santiago 524–6, 532–3, 534–5
São Paulo 528–30, 532, 534–5
traffic bans 519, 521, 523, 526–7, 541, 542, 595
Tunis
  light rail transit (LRT) 437
  motor car use 95
  motorcycles 95
  private transport use 95
  public transport service level 91
  public transport use 93
  taxis 91, 95
  transport costs 102
  transport energy and externalities 98
  transport infrastructure 81, 84, 89
transport speeds 86
travel modes split 96
urban form 79
two-wheelers 20, 54

UK
  Crossrail project 476
  London congestion charge 225, 520–21, 539
  Safer City Project, Gloucester 407–408
  Take Action Active Travel 409
  Urban Safety Management 405, 407
  Vision Zero 408–409
United Nations (UN) 205
United Nations Development Programme (UNDP) 557
United Nations Environment Programme (UNEP) 306, 307
United States see USA
upper-middle-income nations 11
urban footprints 167–8
urban form and urban transport, evolution of 74–7
urban form and wealth 78–80
urban planning practice, paradigm shift 225–6, 227–9
urban population growth 114, 119
urban poverty 17, 22
see also poverty alleviation, transport initiatives 233–5, 252–4
  employment 250–52
  fares 257–8
  infrastructure 255
  non-motorized transport 254–5
  transport management authorities 256–7
  and road crashes 392–3
  social capital 236, 244–5
  travel affordability 245–50
  travel conditions 241–4
  urban sprawl 43–6, 143, 147–8, 158, 162–3, 166, 167–8
  urban transport challenges 33
developments 28–9
economics of 101–104

Harry T. Dimitriou and Ralph Gakenheimer - 9781849808392
Downloaded from Elgar Online at 03/04/2019 06:05:49AM
via free access
employment in 250–52
as a public good 183–5
and urban form, evolution of 74–7
urban transport planning and land use
131–2, 267, 283
guidance 49–54
sprawl, position against 42, 43–6
sprawl constraint, position against
46–9
urban transport planning framework
54–5
budget and finance possibilities 58–9
land development plans 59–61
national urban transport policy 55–8
prior project commitments review
61–2
strategic objectives, design of 62–5
urban transport policy-making and
planning
see also under China; India;
Indonesia
institutional capacity-building 292–3
governance and accountability
296–7
knowledge transfer 296
political leaders’ training 294
political-professional dialogue 295
private sector, working with 295–6
professional staff training 293–4
road safety 299
sustainable development 297
sustainable finance 298
urbanization 298–9
institutional responsibilities
local government 265, 266, 277–9
national government 263–5, 273–7
non-transport institutions 266–9
political support 269–70
urbanization 15, 19, 45–6, 147, 214,
226
USA
agricultural land 48
air pollution 323
bicycle delivery firms 213
bus rapid transit (BRT) 428, 429,
430, 433
Clean Water Act 324
energy consumption 26
energy use and equity 165
informal public transport 493
motor car dependence 162, 163
motor car use 95
motorcycles 95
motorization 105
obesity 151
oil consumption 23
population 26
private transport use 95
public transport service level 91
public transport use 93
sprawl 46–7, 50
taxi 91, 95
transport costs 103
transport energy and externalities
98, 99
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96
urban form
and transport development 368
and wealth 79
vehicle occupancy 117, 118
Vietnam, road safety 396, 398
Vision Zero 404–405, 408–409
vulnerable road users (VRUs) 387
see also bicycles; motorcycles;
pedestrians
discrimination against 411
mobility, promotion of 410
Africa 414
Asia 410–12
Latin America 412–14
road safety 216–19, 394
traffic management 215–16, 220–22,
228
walking 212, 213, 227, 254
see also pedestrians
Washington Consensus 14, 15, 34–5
water quality modelling 319–20
waterways 146–7, 151
wealth and urban form 78–80
Western Europe
motor car use 95
motorcycles 95
private transport use 95
public transport service level 91
public transport use 93
taxi 91, 95
transport costs 103
transport energy and externalities 98
transport infrastructure 81, 85, 89
transport speeds 87
travel modes split 96
urban form and wealth 79
wetlands 163, 323–4
World Bank 28, 182
    economic project appraisal 376–9
    Global Road Safety Facility 397–9
    non-motorized transport investments 205
    road safety 393, 397–8
    transport policy (1996) 557, 558, 563
World Business Council for Sustainable Development (WBCSD) 558–9, 563–6
World Health Assembly (WHA) 395–6
World Health Organization (WHO) 216–17, 276, 395–7
world population 15, 16
World Report on Road Traffic Injury Prevention (WHO) 276–7, 395
Xian 213
Zimbabwe see Harare
Urban transport in the developing world
636  Urban transport in the developing world