Contents

	Preface	page vii
	Acknowledgments	ix
	Glossary	x
	Part I	
	Setting the scene	1
Ĺ	Introduction	3
2	The energy conversion chain	10
3	Energy and the environment	18
	3.1 Localized environmental concerns	18
	3.2 Global environmental concerns	21
	3.3 Adaptation and mitigation	34
	Part II	
	The global energy demand and supply balance	37
Į.	World energy demand	39
5	World energy supply	46
	5.1 World energy sources	46
	5.2 Fossil fuel resources	51
	5.3 The global demand-supply balance	58

Index

	Part III	
	New and sustainable energy sources	63
6	Non-conventional fossil fuels	65
	6.1 New sources of oil and gas	65
	6.2 Clean coal processes	70
	6.3 Carbon mitigation	75
7	Renewable energy sources	81
	7.1 Introduction	81
	7.2 Solar energy	83
	7.3 Wind energy	94
	7.4 Biomass energy	100
	7.5 Hydroelectric power	103
	7.6 Ocean energy	105
	7.7 Geothermal energy	110
8	Nuclear power	115
	8.1 Introduction	115
	8.2 Light-water reactors	116
	8.3 Heavy-water reactors	120
	8.4 Other reactor types	122
	8.5 Advanced reactor designs	124
	8.6 Nuclear power and sustainability	128
	8.7 Nuclear power economics and public acceptance	135
	Part IV	
	Towards a sustainable energy balance	139
9	The transportation challenge	141
	9.1 Transportation energy use	141
	9.2 Road vehicles	144
	9.3 Trains, planes, and ships	162
10	Achieving a sustainable energy balance	165
	Appendix: Energy conversion factors	176

177