

Part A: GLOBAL ENERGY TRENDS**31****1 Understanding the scenarios****33**

Defining the scenarios

34

Non-policy assumptions

36

Economic growth

36

Population

39

Energy prices

40

CO₂ prices

44

Technology

46

2 Energy trends to 2035**49**

Global energy trends by scenario

50

Energy trends in the New Policies Scenario

52

Primary energy demand

52

Energy supply and trade

63

Energy-related CO₂ emissions

68

Economic implications

69

US developments redefining the global energy map

74

Diverging trends in import dependency

75

The impact of unconventional gas

77

The direction of oil trade and supply security

78

3 Oil market outlook**81**

Demand

82

Primary oil demand trends

82

Regional trends

84

Sectoral trends

87

Special topic: heavy freight road transport

91

Supply

97

Reserves and resources

97

Production prospects

101

Trade

119

Investment in oil and gas

120

4 Natural gas market outlook**125**

Demand

126

Gas demand trends

126

Regional trends

127

Sectoral trends

132

Production

133

Reserves and resources

133

Gas production prospects

136

Focus on prospects for unconventional gas

141

Trade

146

Inter-regional trade

146

The pricing of internationally traded gas

150

Investment

154

5 Coal market outlook**155**

Demand

156

Overview of global demand trends

156

Sectoral trends

159

Regional trends

159

Supply

163

Reserves and resources

163

Overview of global supply trends

164

Regional trends

166

Coal markets and industry trends

174

Developments in international pricing

174

Cost and investment developments

176

6 Power sector outlook**179**

Electricity demand

180

Electricity supply

182

Capacity retirements and additions

183

Fossil-fuelled generation

188

Nuclear power

190

Renewables

191

Transmission and distribution

192

Investment

193

CO₂ emissions

196

Regional trends

197

Focus on electricity prices

202

7 Renewable energy outlook**211**

Recent developments

212

Outlook for renewable energy by scenario

214

Outlook by type in the New Policies Scenario

219

Focus on bioenergy

219

Hydropower

225

Wind power

226

Solar photovoltaics

227

Other renewables for electricity and heat

229

Costs of renewables	230
Investment	230
Production costs	231
Subsidies to renewables	233
Integration of variable renewables into the electricity system	236
Benefits of renewables	238
8 Climate change mitigation and the 450 Scenario	241
Introduction	242
Recent developments	242
The world of the 450 Scenario	245
Comparison to other scenarios	245
Primary energy demand and electricity generation in the 450 Scenario	249
Energy-related emissions and abatement	252
Benefits of the 450 Scenario	257
Carbon in energy reserves and energy infrastructure	259
Potential CO ₂ emissions in fossil-fuel reserves	259
Emissions lock-in	261

Part B: FOCUS ON ENERGY EFFICIENCY 267

9 Energy efficiency: the current state of play	269
Introduction	270
The current status of energy efficiency	271
Existing policies	274
Barriers to energy efficiency deployment	280
The outlook for energy efficiency	282
Trends by region	284
Trends by sector	287
Role in reducing CO ₂ emissions	289
Untapped economically viable potential in the New Policies Scenario	290
Investment in energy efficiency	292
10 A blueprint for an energy-efficient world	297
The Efficient World Scenario	298
Introduction	298
Methodology and assumptions	298
Energy markets in the Efficient World Scenario	302
Trends by fuel	303
Energy intensity	307

Energy prices	307
Energy trade	308
Investment and fuel savings	312
Implications for the global economy	313
Environmental implications	317
Energy-related CO ₂ emissions	317
Local pollution	319
The role of energy efficiency in increasing energy access	321
Building the Efficient World Scenario: a blueprint for savings	322

11 Unlocking energy efficiency at the sectoral level	327
The balance of sectoral opportunities	328
Buildings	330
Techno-economic potential and policy framework	330
Outlook	331
Trends by sub-sector	334
Industry	338
Techno-economic potential and policy framework	338
Outlook	340
Trends by sub-sector	342
Transport	344
Techno-economic potential and policy framework	344
Outlook	346
Trends by sub-sector	349
Power generation and electricity demand	351
Techno-economic potential and policy framework	351
Outlook	352

12 Pathways to energy efficiency	357
What is included in the profiles?	357
How to read the profiles	357
World	360
United States	364
European Union	368
Japan	372
China	376
India	380

Part C: IRAQ ENERGY OUTLOOK**385**

13	Iraq today: energy and the economy	387
	Iraq's energy sector	388
	Overview of energy supply	390
	Overview of energy demand	397
	The context for Iraq's energy development	403
	The economy	403
	Legal and institutional framework	405
	Security	411
	Environment and water	412
	Projecting future developments	413
14	Iraq oil and gas resources and supply potential	419
	Oil	420
	Reserves and resources	420
	Production	425
	Crude oil conversion and bringing oil to market	433
	Water requirements	436
	Natural gas	439
	Reserves and resources	439
	Production	440
	Oil and gas investment	445
15	Iraq: fuelling future reconstruction and growth	449
	Overview of energy demand trends	450
	Outlook for the power sector in the Central Scenario	454
	Electricity demand	454
	Electricity generation	456
	Transmission and distribution	462
	Investment in the power sector	463
	Measuring the value of changes in the power sector	464
	Outlook for end-use sectors	466
	Transport	466
	Industry	468
	Buildings and other sectors	470
	Environment	471
	Energy-related emissions	471
	Water use	472
	High Case	473
	Delayed Case	474

16	Implications of Iraq's energy development	477
	Energy in Iraq's economic and social development	478
	The Central Scenario	478
	Economic development in the High and the Delayed Cases	484
	Iraq's impact on international oil markets	485
	The Central Scenario	486
	Iraq's oil market impact in the High and Delayed Cases	489
	Iraq's impact on international gas markets	492

Part D: SPECIAL TOPICS**499**

17	Water for energy	501
	Introduction	502
	Facing a more water-constrained future	502
	Water for energy linkages	505
	Primary energy production	506
	Electricity generation	508
	The vulnerability of energy to water constraints	512
	Outlook for water requirements for energy production	514
	Regional stress points	518
	China	518
	India	521
	United States	523
	Canada	525
	How serious is the water constraint?	527
18	Measuring progress towards energy for all	529
	Introduction	530
	Global status of modern energy access	532
	Outlook for energy access in the New Policies Scenario	535
	Access to electricity	535
	Access to clean cooking facilities	537
	Energy for All Case	538
	Energy Development Index	541
	Energy development framework	541
	Results from the Energy Development Index	544
	ANNEXES	549
	Annex A. Tables for Scenario Projections	551
	Annex B. Policies and measures by scenario	629
	Annex C. Definitions	641
	Annex D. References	655