

Delivering a Low-Carbon Electricity System

Technologies, Economics and Policy

Michael Grubb

Tooraj Jamasb

Michael G. Pollitt

CAMBRIDGE
UNIVERSITY PRESS

Contents

<i>List of figures</i>	<i>figures</i>	<i>page</i> viii
<i>List of tables</i>		xii
<i>List of contributors</i>		xv
<i>Foreword</i>		xviii
<i>Acknowledgements</i>		xx
1, A low-carbon electricity sector for the UK: issues and options		1
MICHAEL GRUBB, TOORAJ JAMASB AND MICHAEL G. POLLITT		
Part i: The Fundamentals		29
2 Calculating the social cost of carbon		31
CHRIS HOPE AND DAVID NEWBERY		
3 Technologies for a low-carbon electricity system: an assessment of the UK's issues and options		64
TOORAJ JAMASB, WILLIAM J. NUTTALL, MICHAEL G. POLLITT AND ALEXANDRA MARATOU		
4 The benefits of fuel mix diversity		100
FABIEN A. ROQUES		
5 Variability and renewables		133
GRAHAM SINDEN		
6 Implications of intermittency and transmission constraints for renewables deployment		157
KARSTEN NEUHOFF, JIM CUST AND KIM KEATS-MARTINEZ		

Part n: Incentives and the Demand Side: Demand-Side Management and System Requirements	181
7 Electricity network investment and regulation for a low-carbon future •	183
MICHAEL G. POLLITT AND JANUSZ BIALEK	
8 Domestic electricity consumption and demand-side participation: opportunities and challenges for the UK power system	207
MARK BILTON, CHARLOTTE RAMSAY, MATTHEW LEACH, HANNAH DEVINE-WRIGHT, PATRICK DEVINE-WRIGHT AND DANIEL KIRSCHEN	
9 Enhancing the efficient use of electricity in the business and public sectors	229
MICHAEL GRUBB AND JAMES WILDE (WITH CONTRIBUTIONS BY STEVEN SORRELL)	
Part m: Investment, Price and Innovation	257
10 Will the market choose the right technologies?	259
KARSTEN NEUHOFF AND PAUL TWOMEY	
11 Pricing carbon for electricity generation: national and international dimensions	278
MICHAEL GRUBB AND DAVID NEWBERY	
12 Learning curves for energy technologies: a critical assessment	314
TOORAJ JAMASB AND JONATHAN KOHLER	
13 Accelerating innovation and strategic deployment in UK electricity: applications to renewable energy	333
MICHAEL GRUBB, NADINE HAJ-HASAN AND DAVID NEWBERY	
Part iv: Scenarios, Options and Public Attitudes	361
14 Scenarios of the electricity industry in Great Britain in 2020: networks, generation and decarbonisation	363
IAN ELDERS, GRAHAM AULT, GRAEME BURT, RYAN TUMILTY, JIM MCDONALD AND JONATHAN KOHLER	

15	Modelling the economic impact of low-carbon electricity MILTON YAGO, JONATHAN P. ATKINS, KESHAB BHATTARAI, RICHARD GREEN AND STEPHEN TROTTER	394
16	Bridging technologies: can carbon capture and storage offer a bridge to a sustainable energy future in the UK? DAVID M. REINER, JON GIBBINS AND SAM HOLLOWAY	414
17	Reconsidering public acceptance of renewable energy technologies: a critical review PATRICK DEVINE-WRIGHT	443
18	A low-carbon electricity sector for the UK: what can be done and how much will it cost? MICHAEL GRUBB, TOORAJ JAMASB AND MICHAEL G. POLLITT	462
	<i>Index</i>	498