

Contents

LIST OF FIGURES	xi
KEY TO UNITS OF MEASURE	xiii
INTRODUCTION	1
Lost Opportunities	2
Persistent Myths	6
Challenging the Myths	11
 PART I: LESSONS FROM THE PAST	 15
1. THE FUTURE BELONGS TO ELECTRIC CARS	18
Electric- versus Gasoline-Powered Cars	19
Recent History of Electric Cars	20
Recent Electric Models	21
Electric Cars and the Supply of Electricity	23
More Efficient Gasoline Engines	28
2. NUCLEAR ELECTRICITY WILL BE TOO CHEAP TO METER	31
Peaceful Uses of Nuclear Fission	32
Retreat from Nuclear Power	35
Hope for Fast Breeder Reactors	38
New Case for Nuclear Energy	40
Successful Failure	42
3. SOFT-ENERGY ILLUSIONS	44
Advantages of Soft Energy	45
Soft Energy Today	47
The Hypercar	48
Other Soft-Energy Dreams	48

Soft Energy in China	49
The “Perfect” Solution	52
The Future of Soft and Small Approaches	54

PART II: MYTHS IN THE HEADLINES **55**

4. RUNNING OUT: PEAK OIL AND ITS MEANING **60**

Predictions of Peak Oil Production	62
Untapped Resources	67
Nonconventional Oil Reserves	69
Production, Demand, and Prices	72
Countering the Claims of Peak-Oilers	76

5. SEQUESTRATION OF CARBON DIOXIDE **79**

Organic Approaches	80
Technical Fixes	86
The Energy Penalty on Sequestration	93

6. LIQUID FUELS FROM PLANTS **98**

Liquid Fuels for Transportation	100
Corn-Based Ethanol	101
Sugar Cane–Based Ethanol	104
Impacts of Ethanol Production	106
Cellulosic Ethanol, “A Huge New Source of Energy”	107
Biofuels, An Inappropriate Solution	113

7. ELECTRICITY FROM WIND **116**

Evolution of Wind Power	118
Estimated Potential of Wind Power	119
Key Constraints on Wind Power	121
Realizing the Potential of Wind Power	130

8. THE PACE OF ENERGY TRANSITIONS **133**

Present Realities	134
Past Transitions	136
Why Energy Transitions Are Gradual	140
The Repowering Challenge	141
False Analogy	143

CONCLUSION: LESSONS AND POLICY IMPLICATIONS	150
Electric Vehicles	150
Nuclear Power	152
Soft-Energy Conversions	155
Peak Oil	156
Carbon Sequestration	157
Crop-Based Ethanol	158
Wind-Powered Electricity Generation	159
Energy Transitions	160
A Quick Summation	162
NOTES	165
REFERENCES	177
INDEX	197
ABOUT THE AUTHOR	213