

## List of Tables

Table 2.1	Assumed FCEV Stock	9
Table 2.2	Fuel Economy of a Passenger Vehicle	10
Table 2.3	Fuel Economy of ICE Heavy-Duty Vehicles	10
Table 2.4	Annual Average Driving Distance	11
Table 2.5	Estimated Hydrogen Demand for Transport	11
Table 2.6	Estimated Hydrogen Demand for Fuel Cell	12
Table 2.7	Estimated Hydrogen Demand for CCGT	14
Table 2.8	Total Hydrogen Demand	15
Table 2.9	Avoided CO <sub>2</sub> Emission	15
Table 2.10	Technologies to Produce Hydrogen	16
Table 2.11	Estimated Hydrogen Production Potential from Coal	19
Table 2.12	Potential of CCS in China	19
Table 2.13	Available Capacity and Life of CCS in China	20
Table 2.14	Estimated Hydrogen Production Potential from Natural Gas	21
Table 2.15	Remaining Potential of Major Renewable Energy Sources to Produce Hydrogen	22
Table 2.16	Estimated Hydrogen Production Potential from Renewable Energy	23
Table 2.17	Summary of Estimated Results	24
Table 3.1	Cost of Hydrogen Production	29
Table 3.2	Cost of Liquid Hydrogen Transportation	30
Table 3.3	Cost Items for Hydrogen-Dedicated Pipeline Transportation	31
Table 3.4	Cumulative Solar Power and Wind Abandonment Volume (100 million kWh) and Wind Abandonment Rate in All Regions of China	36
Table 3.5	200 MW Hydrogen Production Capacity, Output, and Power Consumption	38
Table 3.6	200 MW Hydrogen Production Cost	39
Table 3.7	200 MW Hydrogen Production Cost	40
Table 3.8	Summary of Hydrogen Production Cost	40

Table 3.9	Hydrogen Liquefaction Costs	42
Table 3.10	Auxiliary Data of Hydrogen Storage and Transportation	42
Table 3.11	Liquid Hydrogen Transport Cost	43
Table 3.12	Summary of Liquid Hydrogen Storage and Transport Costs	43
Table 3.13	Exclusive Pipeline Storage and Transportation Auxiliary Data	44
Table 3.14	Exclusive Pipeline Storage and Transportation Costs	45
Table 3.15	Storage and Transportation Costs of Hydrogen-Mixed Pipeline	46
Table 3.16	Results of the Four Cases, Summary	47
Table 4.1	Equipment Costs of the System	65
Table 4.2	Equipment Parameters of the System	65
Table 4.3	Main Parameters in the Optimisation Calculation	71
Table 4.4	Natural Gas and Electricity Prices in Dalian Area	71
Table 4.5	Optimal Configuration of the System for Different Hydrogen Production	73
Table 5.1	Parameters of Unit Electrolysis Hydrogen Production Equipment	103
Table 5.2	Comparison of Electricity and Gas Prices with and without Offshore Wind Power Subsidies	111
Table 6.1	Renewable Energy Capacity in China, 2000–2019 (MW)	117
Table 6.2	Financing Costs of Hydrogen Projects (%)	125
Table 6.3	Input–Output Table for the NPVs Based on Different Funding Scenarios, %	128
Table 6.4	Classification of Different Long-Run Investment Rating by Moody’s	128
Table 8.1	Main Content of China’s Laws, Regulations, and Standards System for Hydrogen Production	156
Table 8.2	Safety Requirement for Hydrogen Production Station	160
Table 8.3	Main Content of China’s Laws, Regulations and Standards System for Hydrogen Energy Storage and Transportation	163
Table 8.4	Main Content of China’s Laws, Regulations and Standards System for Hydrogen Energy Filling	168
Table 8.5	Relevant Requirement for Hydrogen Filling Station	170

Table 8.6	Main Content of China’s Laws, Regulations and Standards System for FCEVs	171
Table 8.7	US Hydrogen Safety Standard Systems (Excerpts of Key Points)	180
Table 8.8	Main Content of EU Hydrogen Safety Laws and Regulations	184
Table 8.9	Laws, Regulations, and Standards Related to Hydrogen Safety in Japan	185
Table 8.10	Comparison of Major Safety Distances	189
Table 8.11	Status on Establishment of Hydrogen-Energy-Related Testing Centers	195
Table 8.12	Documents on the Management of Hydrogen Refueling Stations in China and the Key Points Concerning Safety	198
Table 9.1	Green Hydrogen Characterisation Initiatives Worldwide	214
Table 10.1	Estimates of Hydrogen Production Costs in the European Union	228
Table 10.2	Cost Estimates of Hydrogen Production by Electrolysis Load Factors	232
Table 10.3	Hydrogen Produced from Curtailed Electricity in ASEAN	232
Table 10.4	Emissions Reduction by Scenarios in 2050 in ASEAN (unit: million tonnes)	233
Table 10.5	Hydrogen Produced from Curtailed Electricity in EAS (unit: million tonnes)	234
Table 10.6	Emissions Reduction by Scenarios in 2050 in EAS (unit: million tonnes)	234
Table 10.7	Carbon Prices (unit: US\$/tonne-CO2)	235
Table 10.8	Possible Amounts of CO2 Abated per H2 Production in 2050 (unit: million tonnes)	235
Table 10.9	Possible Benefits of Hydrogen Produced from Curtailed Electricity (unit: US\$/kgH2)	236
Table 10.10	Possible Amounts of CO2 Abated per H2 Production in 2050 (unit: million tonnes)	236

Table 10.11	Possible Benefits of Hydrogen Produced from Curtailed Electricity (unit: US\$/kgH <sub>2</sub> )	237
Table 10.12	Cost-Benefit Ratios under the Electrolyser Load Factor (1,500 hours) in ASEAN	237
Table 10.13	Cost-Benefit Ratios under the Electrolyser Load Factor (1,000 hours) in ASEAN	238
Table 10.14	Cost-Benefit Ratios under the Electrolyser Load Factor (1,500 hours) in EAS	238
Table 10.15	Cost-Benefit Ratio under the Electrolyser Load Factor (1,000 hours) in EAS	238
Table 11.1	Central Government Policies Relevant to Hydrogen Energy	245
Table 11.2	Summary of Local Government Policies on Hydrogen Energy	247
Table 11.3	Subsidies Provided to FCEV in China at both Central and Local Government Levels before 2020	249
Table 11.4	Subsidies Provided to FCEVs in China at Central Government Level after September 2020	249
Table 11.5	Adequacy of the Current Policy Support Provided at Various Levels of the Chinese Government on Hydrogen and Fuel Cell Industries and Applications	257
Table 11.6	Main Purposes of Developing Hydrogen Energy in China	258
Table 11.7	The Ideal Share of Green Hydrogen in the Energy Consumption of China by 2050	259
Table 11.8	Projections on the Timeline of Developing Hydrogen Energy Applications in China	263
Table 11.9	Projections on the Timeline of Developing the Relevant Hydrogen Energy Infrastructure in China	263
Table 11.10	A Strategic Roadmap of Chinese Green Hydrogen	267