Global Energy Interconnection
Development and Cooperation Organization
全球能源互联网发展合作组织

Biodiversity and Revolution of Energy and Electric Power

Global Energy Interconnection
Development and Cooperation Organization

中国电力出版社
CHINA ELECTRIC POWER PRESS

Foreword

Biodiversity provides an important foundation for the survival and development of the human race. It not only affects the well-being of humanity and future generations, but also has a key bearing on the sustainability of global development, and potentially even the rise and fall of civilization. Since the dawn of industrial civilization, mankind has created massive material wealth. But this has come at the cost of intensified exploitation of natural resources, which has disrupted the balance of the earth's ecosystems, giving rise to ecological crises manifesting in terms of biodiversity loss and environmental damage. Now, on the brink of the sixth mass extinction, with the global rate of species extinction accelerating, severe ecosystem degradation and loss of biodiversity pose major threats to human survival and development.

Rising to these challenges, the United Nations has called upon the international community to increase biodiversity awareness, asking countries worldwide to make positive efforts to implement biodiversity protection measures. After the *Convention on Biological Diversity* was signed in 1992, the *Strategic Plan for Biodiversity 2011-2020,* adopted in 2010, added further impetus for the establishment of a global biodiversity governance mechanism.

Despite widespread consensus regarding securing biodiversity and ensuring the sustainable use of biological resources, countries' actions on the ground have been far from sufficient, and the progress of the *Strategic Plan for Biodiversity* has been sluggish. As the world approaches a crossroads in addressing the biodiversity crisis, in order to arrive at a systematic solution for protecting biodiversity and realizing the goal of "harmonious coexistence between humanity and nature", both a holistic approach and a grand vision are sorely needed. On September 30, 2020, Chinese President Xi Jinping, speaking at the United Nations Summit on Biodiversity, noted that "Ecological Civilization: Building a Shared Future for All Life on Earth, which is the theme of next year's Biodiversity Conference in Kunming, embodies humanity's hope for a better future." China has prioritized biodiversity protection in the joint efforts to develop an ecological civilization and to create a shared future for life on Earth, contributing Chinese wisdom to global biodiversity protection.

Globally, biodiversity loss can be attributed to five main causes — habitat loss and degradation, overexploitation, climate change, environmental pollution, and invasive alien species. A key underlying driver exacerbating these problems has been the unsustainable pattern of energy development. Since the Industrial Revolution, long-term, large-scale development and utilization of fossil fuels has produced large volumes of greenhouse gases and other harmful

substances, leading to temperature increases, environmental degradation, and resource shortages, and posing a serious threat to global biodiversity. At this rate, there is a real possibility — especially with the climate crisis looming — of the emergence of a global ecological crisis, disastrous for all life on Earth, sometime in the coming decades. To address this intensifying challenge, energy, the linchpin of the problem, must be addressed, and major efforts made to expedite the energy and electric power revolution, to mitigate and reverse the damage inflicted by fossil fuel use on biodiversity, and to promote coordinated energy and power development and biodiversity governance.

Global Energy Interconnection (GEI) is a new energy system steering a path towards clean energy production, broadened energy allocation, and the electrification of energy consumption, as well as an important platform for the large-scale development, transmission and utilization of clean energy resources worldwide. GEI is essential enabler of the worldwide energy and electric power revolution. Relative to the current development path, upon which economies and societies rely on fossil fuels, GEI represents a complete game-changer: a catalyst for a new energy development model characterized by "zero pollution, zero carbon emissions, and high efficiency" and a radical solution for the crucial problem of fossil fuel usage, which has long harmed and hindered biodiversity. GEI can promote the coordinated and sustainable development of energy and the environment, offer effective measures for the protection of biodiversity, and inject new momentum into the development of ecological civilization, and the creation of a shared future for life on Earth.

GEI has been widely acknowledged by the international community as a systematic solution for driving world energy transition and facilitating sustainable development. To date, it has been included in the frameworks for advancing the UN's *2030 Agenda*, for the implementation of the *Paris Agreement*, for the promotion of environmental governance, for solving electricity access, poverty and health issues, and for other issues, and has been included in the UN High-level Political Forum Policy Briefs for four years in a row. UN Secretary-General Antonio Guterres has described GEI as core to human sustainable development, key to inclusive global growth, and crucial to the implementation of the UN's *2030 Agenda* and the *Paris Agreement*.

In recent years, the Global Energy Interconnection Development and Cooperation Organization (GEIDCO) has advanced its research into GEI as an enabler for sustainable development, releasing action plans concerning the implementation of the UN's *2030 Agenda* and the *Paris Agreement*, the advancement of global environmental governance, and the solution of power access, poverty and health issues. In addition, drawing on practical experience and expertise, GEIDCO has conducted extensive study on the relationships between energy, power and biodiversity, and has completed *Biodiversity and Revolution of Energy and Electric Power*, a work whose aim is, via a systematic evaluation of the significance of biodiversity, to shed light on the progress in and challenges facing global biodiversity protection, and to analyze the main drivers of biodiversity loss. This has revealed the unsustainable, fossil fuel-dominated pattern of energy development as the major underlying issue and contributor to the biodiversity crisis. The book proposes new ideas and approaches, a roadmap for advancing the energy and electric power revolution and securing biodiversity via GEI development, and a package of feasible, practicable, and scalable solutions for promoting the energy and electric power revolution and biodiversity protection on a worldwide basis. It consists of seven chapters:

Chapter 1 explains the notion of biodiversity, and the significance of its role in advancing economic and social development, creating a shared future for life on Earth, achieving worldwide sustainable development, and advancing human civilization.

Chapter 2 takes stock of the current status of the global biodiversity crisis from the perspectives of species, ecosystems and genetics, reviews the progress on this front being made by countries worldwide, and analyzes the daunting challenges facing biodiversity protection. For example, while the pace of the crisis is beginning accelerate, the international community lacks biodiversity protection awareness, action is lagging, solutions are lacking, and protection measures have been ineffective.

Chapter 3 systematically explores the five main drivers of global biodiversity losses, i.e.: habitat loss and degradation, overexploitation of biological resources, climate change, environmental pollution, and invasive alien species, and provides some insights into future trends in biodiversity development and the relationship between biodiversity and energy.

Chapter 4 contains an in-depth analysis into the inherent connection between energy development and utilization and biodiversity, revolving around the five main drivers of the biodiversity crisis. This reveals that unsustainable patterns of energy development have had a significant impact on climate change, environmental pollution, habitat loss, overexploitation of biological resources, and invasive species.

Chapter 5 discusses the profound significance of the energy and electric power revolution to biodiversity protection, and proposes guiding principles, a theoretical framework, and a pathway for advancing that revolution while promoting biodiversity protection through GEI development. It explains how GEI offers a systematic solution for promoting biodiversity, with fundamental and comprehensive effects in terms of addressing climate change, controlling environmental pollution, mitigating habitat loss, promoting the sustainable utilization of biological resources, and advancing ecological restoration.

Chapter 6 outlines the current status of biodiversity protection and of energy and electric power development on different continents, and offers a systematic, packaged plan and roadmap for the promotion of biodiversity through GEI development. Consisting of six plans and 21 measures, this provides a useful guide for the advancement of GEI and biodiversity on different continents.

Chapter 7 highlights overall directions and core elements from five perspectives relating to institutional innovation, i.e.: planning & coordination, policy incentive, finance & investment, international cooperation, and capacity building. The book looks ahead to prospects for promoting biodiversity through GEI, and makes a call for joint action from all stakeholders in promoting global biodiversity and creating a shared future for life on Earth.

GEIDCO has long been committed to energy transition and global sustainable development. We hope that this book can provide valuable reference material, for the United Nations and national governments, relevant to the formulation of policies and plans concerning the advancement of the energy and electric power revolution and biodiversity protection. It also

offers enterprises and institutions food for thought concerning the implementation of relevant actions. Thus it constitutes a modest contribution to the reversal of the trend towards global biodiversity loss and to the creation of a shared future for life on Earth. Due to limitations of time and expertise, its contents are inevitably imperfect, and readers are encouraged to provide constructive criticism. GEIDCO stands ready and willing to cooperate with all sectors of society in order to promote global biodiversity protection, and work towards the creation of a bright future of harmonious coexistence between humanity and nature!

Contents

Foreword

1 The Significance of Biodiversity 001

1.1 The Meaning of Biodiversity 002
1.2 Biodiversity as an Essential Basis for Economic and Social Development 004
1.3 Biodiversity as a Solid Basis for Building a Shared Future for All Life on Earth 010
1.3.1 Biodiversity Provides a Favorable Environment for the Harmonious Coexistence of Organisms 010
1.3.2 Biodiversity Provides Necessary Conditions for the Reproduction and Evolution of Species 013
1.3.3 Biodiversity Provides a Fundamental Guarantee for the Stability of Ecosystems 014
1.4 Biodiversity as a Major Pillar for Sustainable World Development 016
1.5 Biodiversity as a Key Factor Affecting the Rise and Fall of Human Civilization 020

2 Biodiversity: Current Status and Challenges 023

2.1 Current Status of Biodiversity 024
2.1.1 Loss of Species Diversity 024
2.1.2 Deterioration of Ecosystem Diversity 029
2.1.3 Loss of Genetic Diversity 033
2.2 United Nations Convention on Biological Diversity 035
2.2.1 Evolution of Biodiversity Conservation 035
2.2.2 Implementation of Convention on Biological Diversity 036
2.3 Main Challenges 038

3 Major Drivers of the Biodiversity Crisis 043

3.1 Habitat Loss 045
3.1.1 Forest Destruction 046

3.1.2 Grasslands Destruction ····· 048
3.1.3 Destruction of Freshwater Habitats ····· 050
3.1.4 Destruction of Marine Habitats ····· 051
3.2 Excessive Consumption of Biological Resources ····· 052
3.2.1 Excessive Consumption for Energy Use ····· 052
3.2.2 Excessive Consumption for Food ····· 054
3.2.3 Excessive Consumption for Medicinal Use ····· 054
3.2.4 Excessive Consumption for Clothes Making ····· 055
3.2.5 Excessive Consumption for Handicraft Use ····· 056
3.3 Climate Change ····· 056
3.3.1 Temperature Increases ····· 057
3.3.2 Ocean Acidification ····· 058
3.3.3 Glacier Melting ····· 058
3.3.4 Extremely Severe Disasters ····· 059
3.4 Environmental Pollution ····· 060
3.4.1 Air Pollution ····· 061
3.4.2 Freshwater Pollution ····· 061
3.4.3 Soil Pollution ····· 062
3.4.4 Marine Pollution ····· 062
3.5 Invasive Alien Species ····· 063
3.5.1 Unintentional Human Introduction of Alien Species ····· 064
3.5.2 Deliberate Human Introduction of Alien Species ····· 065
3.5.3 Invasion of Alien Species Indirectly Triggered by Climate Change ····· 066
3.5.4 Invasion of Genetically Modified Organisms ····· 067
3.6 Climate Change Is Increasingly Becoming the Overall Driver of the Biodiversity Crisis ····· 067

4 Unsustainable Energy Development: an Important Cause of the Biodiversity Crisis ····· 069

4.1 Exacerbation of Climate Change ····· 071
4.1.1 Significant Amounts of CO_2 Produced by Fossil Fuel Combustion ····· 071
4.1.2 Large Amounts of Methane Are Produced during Fossil Fuel Production and Utilization ····· 073
4.2 Environmental Pollution ····· 073
4.2.1 Fresh Water and Soil Pollution due to Fossil Fuel Production ····· 073
4.2.2 Oil and Thermal Pollution Threatens Marine Ecological Security ····· 076
4.2.3 Air Pollution Caused by Fossil Fuel Combustion ····· 078

4.3 Habitat Loss ····· 081
4.3.1 Exploitation of Fossil Energy Intensifies Water and Soil Erosion in Mining Areas ····· 081
4.3.2 Exploitation of Fossil Energy Leads to Habitat Fragmentation ····· 083
4.3.3 Fossil Energy Exploitation and Use Consumes Significant Water Resources ····· 084
4.4 Excessive Biological Resource Consumption ····· 085
4.4.1 Biomass Energy Development and Usage Causes Excessive Forest Resource Consumption ····· 085
4.4.2 Limited Electricity Access Leads to Tremendous Food Waste ····· 086
4.5 Increasing Risk of Biological Invasion ····· 086
4.6 Prioritizing Fossil Energy Development Seriously Threatens Biodiversity ····· 088

5 Promoting Biodiversity Protection through the Energy and Electric Power Revolution ····· 089

5.1 Accelerated Energy and Electric Power Revolution Necessary to Achieve Biodiversity Goals ····· 090
5.1.1 Biodiversity Protection Creates an Urgent Need for Green, Low-Carbon Energy Development ····· 090
5.1.2 Directions of Energy and Electric Power Transition ····· 091
5.1.3 Energy and Electric Power Transition Tasks ····· 093
5.2 GEI Construction Is Core to the Energy and Electric Power Revolution ····· 096
5.2.1 The Essence of GEI ····· 096
5.2.2 GEI Promotes the Energy and Electric Power Revolution ····· 101
5.2.3 Development Roadmap for GEI ····· 105
5.3 Building GEI Offers a Systematic Solution for Biodiversity Protection ····· 111
5.3.1 Radically Addressing Climate Change ····· 112
5.3.2 Fully Controlling Environmental Pollution ····· 115
5.3.3 Dramatically Reducing Habitat Loss ····· 120
5.3.4 Effectively Promoting the Sustainable Use of Biological Resources ····· 127
5.3.5 Vigorously Promoting Ecological Restoration ····· 130

6 Plan and Roadmap for Promoting Biodiversity Conservation Based on GEI ····· 135

6.1 Plan for Promoting GEI-based Climate Governance ····· 136
6.1.1 Accelerate Reduction of Emissions during Energy Production ····· 137
6.1.2 Accelerate Emissions Reduction during Energy Consumption ····· 151
6.1.3 Actively Implement Negative Emissions Measures ····· 156

6.2 Plans for Promotion of Environmental Governance Based on GEI ····· 157
6.2.1 Accelerating the Phasing out of Fossil Fuels ····· 158
6.2.2 Advocate Green Energy Use ····· 163
6.2.3 Promote Clean Treatment of Pollutants ····· 167
6.3 Plans for Habitat Protection Based on GEI ····· 168
6.3.1 Accelerate the Development of High-Efficiency Ecological Agriculture ····· 168
6.3.2 Accelerate Energy, Transportation and Information Networks (ETI) Integration ····· 169
6.3.3 Accelerate Micro-Grid on Islands ····· 174
6.4 Plans for Promoting Sustainable Use of Biological Resources Based on GEI ····· 175
6.4.1 Replace Firewood with Electricity to Reduce Deforestation ····· 175
6.4.2 Reduce Food Waste via Electric Refrigeration ····· 176
6.4.3 Reduce Consumption of Biological Resources via Electrosynthesis of Raw Materials ····· 177
6.4.4 Promote Ecological Poverty Alleviation via Upgrading the Industrial Chain ····· 177
6.5 Plans for Promoting Ecological Restoration and Emergency Protection Based on GEI ····· 178
6.5.1 Accelerate the Application of "Electricity-Water-Land-Forest" ····· 178
6.5.2 Promote Dynamic Biodiversity Monitoring Systems ····· 179
6.5.3 Improve Wildlife Emergency Protection Capabilities ····· 180
6.6 Innovation Plan for Key Biodiversity Promotion Technology Based on GEI ····· 183
6.6.1 Accelerate Technological Innovation in Clean Power Generation ····· 183
6.6.2 Accelerate Innovation in Clean Power Distribution ····· 185
6.6.3 Speed up Technological Innovation in Electricity Replacement ····· 186
6.6.4 Accelerate Technological Innovation in Electrosynthesis of Fuels and Raw Materials ····· 188
6.6.5 Accelerate innovation in CCUS technology ····· 189
6.7 GEI Provides an Excellent Tool for Promotion of Biodiversity Protection ····· 191

7 Supporting Mechanisms and Outlook ····· 193

7.1 Key Mechanisms for Biodiversity Conservation via GEI ····· 194
7.1.1 Planning and Coordination Mechanism ····· 195
7.1.2 Policy Support Mechanism ····· 195
7.1.3 Financial Investment Mechanism ····· 196
7.1.4 International Cooperation Mechanism ····· 196
7.1.5 Capacity Building Mechanism ····· 197
7.2 Future Outlook and Proposals ····· 198

Figure Contents

Figure 1.1 Statistics About Global Biodiversity ····003
Figure 1.2 The Speciation of the Arctic Fox and the Gray Fox ····004
Figure 1.3 Biodiversity: A Source for a Great Variety of Food ····005
Figure 1.4 A Diagram of the Circulation of Substances on Earth ····010
Figure 1.5 The Transpiration of Plants Maintains a Balance in Water Circulation ····013
Figure 1.6 Pollination by Insects ····014
Figure 1.7 A Schematic Diagram of a Biological Chain ····015
Figure 1.8 A Schematic Diagram of Carbon Sequestration in Forest and Marine Ecosystems ····016
Figure 1.9 Biodiversity Helps Ensure Food Security ····018
Figure 1.10 Biodiversity and Human Health and Wellbeing ····019
Figure 1.11 The Remains of Babylon Civilization ····021
Figure 1.12 The Stages of Human Civilization ····021
Figure 2.1 Recently Extinct Species ····025
Figure 2.2 Species Extinction Risk Overview ····025
Figure 2.3 Overview of Species Extinction ····027
Figure 2.4 The Earth's Five Mass Extinction Events ····028
Figure 2.5 Ecosystem Living Planet Index ····029
Figure 2.6 Decreases in Forest Area ····030
Figure 2.7 Wetland Area Reductions ····031
Figure 2.8 Coral Reef Bleaching ····032
Figure 2.9 Livestock and Poultry Species' Extinction Risk ····034
Figure 2.10 United Nations Biodiversity Framework ····036
Figure 2.11 Strategic Plan for Biodiversity 2011-2020 ····037
Figure 2.12 Implementation of Aichi Biodiversity Targets ····038
Figure 2.13 Spreading Impact of Biodiversity Loss ····039
Figure 2.14 Changes in Nature's Contributions to People ····039
Figure 2.15 Development of National Biodiversity Strategies and Action Plans ····041
Figure 3.1 How human activities cause biodiversity loss ····045
Figure 3.2 Regional causes of deforestation 2000-2010 ····047

Figure 4.1 Unsustainable Energy Development Affects Biodiversity ····· 070
Figure 4.2 Breakdown of Global Greenhouse Gas and CO_2 Emissions, 2019 ····· 071
Figure 4.3 Global CO_2 Emissions, Total & Breakdown, 1850-2019 ····· 072
Figure 4.4 Sectoral Global CO_2 Emissions, 2019 ····· 072
Figure 4.5 Global Fossil Energy Consumption and CO_2 Emissions, 2015 ····· 072
Figure 4.6 Emissions and Sources of the World's Three Major Pollutants, 2015 ····· 079
Figure 4.7 Emission Factors and Source Shares for Three Major Air Pollutants, 2015 ····· 079
Figure 4.8 Global Water Consumption by Energy Industry, 2016 ····· 084
Figure 4.9 Food Waste by World Region ····· 087
Figure 5.1 Increases in Global Installed Solar and Wind Power Generation Capacity ····· 092
Figure 5.2 Technological Revolutions' Contributions to Energy Utilization Efficiency ····· 093
Figure 5.3 Current Proportions of Renewable Energy Consumption and Generation Installed Capacity, Worldwide ····· 094
Figure 5.4 Electricity Share in Global End-Use Energy ····· 095
Figure 5.5 GEI's Structure ····· 097
Figure 5.6 Diagram of the Smart Grid System ····· 098
Figure 5.7 Comparison of UHV and EHV AC/DC Transmission Technologies ····· 098
Figure 5.8 Global Clean Energy Resource Distribution and Reserves ····· 099
Figure 5.9 Five Core Features of GEI ····· 099
Figure 5.10 Two Replacements, One Increase, One Restore and One Conversion ····· 101
Figure 5.11 The Development of Global Primary Energy Consumption ····· 106
Figure 5.12 The Development of the Global Mix of Installed Power Generation Capacity ····· 106
Figure 5.13 The Development of Global Energy Consumption ····· 107
Figure 5.14 Forecast of the Proportion of Global Electricity Demand in Final Energy Consumption ····· 108
Figure 5.15 GEI Backbone Grid Network ····· 109
Figure 5.16 A Correlation Model of GEI and Biodiversity Protection ····· 112
Figure 5.17 The GEI Path for Emissions Reduction ····· 113
Figure 5.18 An Investment Comparison of GEI and Other Schemes ····· 114
Figure 5.19 The Benefits of GEI-Based Emissions Reduction ····· 114
Figure 5.20 GEI Reduces Coal and Oil Demand ····· 119
Figure 5.21 SO_2 and NO_x Emissions by 2050 ····· 122
Figure 5.22 GEI Alleviates Habitat Loss ····· 125
Figure 5.23 GEI Promotes Desert Land Governance ····· 130
Figure 5.24 GEI Creates a New Model of Desert Governance ····· 132
Figure 5.25 GEI Reduces Biological Invasion ····· 134
Figure 6.1 Six Action Plans for GEI-based Biodiversity Promotion ····· 136

Figure 6.2 End-use Energy Demand and Electricity Share, Asia ····· 152
Figure 6.3 End-use Energy Demand and Electricity Share, Europe ····· 153
Figure 6.4 End-use Energy Demand and Electricity Share, Africa ····· 153
Figure 6.5 End-use Energy Demand and Electricity Share, North America ····· 154
Figure 6.6 End-use Energy Demand and Electricity Share, Central and South America ····· 155
Figure 6.7 End-use Energy Demand and Electricity Share, Oceania ····· 156
Figure 6.8 Primary Energy Projections by Type, plus Demand, Asia ····· 158
Figure 6.9 Primary Energy Projections, by Type, plus Demand, Europe ····· 159
Figure 6.10 Primary Energy Projections by Type, plus Demand, Africa ····· 160
Figure 6.11 Primary Energy Projections by Type, plus Demand, North America ····· 160
Figure 6.12 Primary Energy Projections by Type, plus Demand, Central and South America ····· 161
Figure 6.13 Primary Energy Projections by Type, plus Demand, Oceania ····· 161
Figure 6.14 Key Technology for Promoting Biodiversity Based on GEI ····· 183
Figure 6.15 Electric Vehicles' "Three Power Technologies" ····· 187
Figure 6.16 CCUS Technical Processes and Classifications ····· 190
Figure 7.1 GEI's Key Biodiversity Conservation Mechanisms ····· 194

Table Contents

Table 5.1 Food Freshness Lifetime at Varied Temperatures 128
Table 6.1 Information on Large-scale PV Power Plants in Asia 137
Table 6.2 Information on Large-scale Wind Power Plants in Asia 139
Table 6.3 Information on Large-scale Wind Power Plants in Europe 141
Table 6.4 Information on Large-scale PV Plants in Africa 143
Table 6.5 Information on Large-scale Wind Power plants in Africa 144
Table 6.6 Information on Large-scale PV Power Plants in North America 146
Table 6.7 Information on Large-scale Wind Power plants in North America 146
Table 6.8 Information on Large-scale PV plants in Central and South America 148
Table 6.9 Information on Large-scale Wind Power plants in Central and South America 149
Table 6.10 Information on Large-scale PV Plants in Oceania 150
Table 6.11 Information on Large-scale Wind Power plants in Oceania 150

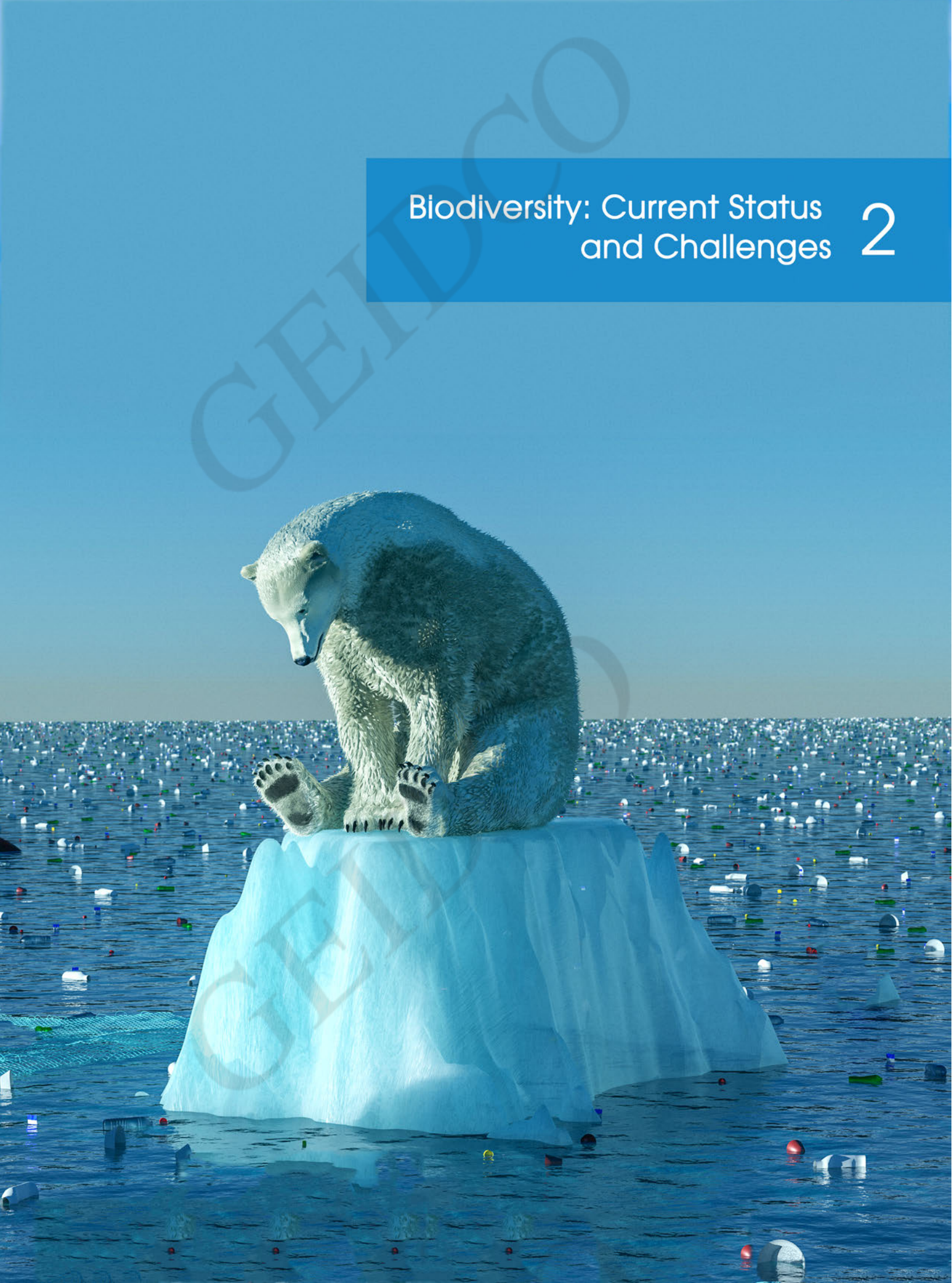
Column Contents

Column 1-1 Biopharmaceutics ····006
Column 1-2 Major Industries Using Organisms as Raw Materials ····007
Column 1-3 Bionic Technology ····009
Column 1-4 Ten Trees That Can Purify the Air ····011
Column 1-5 The Human–Nature Relationship Affects Human Health ····019
Column 2-1 Extinction Risk Assessment Methods ····026
Column 2-2 The Great Barrier Reef Ecosystem ····033
Column 3-1 Impact of Deforestation on Biodiversity ····047
Column 3-2 Impact of Grasslands Desertification Control on Biodiversity in Inner Mongolia ····049
Column 3-3 Impact of Establishment of Marine Conservation Areas on Biodiversity ····051
Column 3-4 Power Scarcity and Forest Resource Consumption in Africa ····053
Column 4-1 Environmental Pollution Caused by Coal Mining, South Africa ····074
Column 4-2 Environmental Pollution Due to Exploitation of Marcellus Shale, United States ····074
Column 4-3 Environmental Pollution Caused by Tar Sands Mining, Alberta, Canada ····076
Column 4-4 "Deepwater Horizon" Drilling Rig Oil Spill, Gulf of Mexico, United States ····077
Column 4-5 Nuclear Accident, Fukushima, Japan ····078
Column 4-6 Acid Rain in Europe ····080
Column 4-7 Smog's Effects on Crop Growth ····081
Column 4-8 Water and Soil Erosion, Huainan Mining Area, China ····082
Column 4-9 Oil and Gas Pipeline Network Construction Caused Habitat Fragmentation, Nigeria ····083
Column 4-10 Coal Industry Exacerbates Global Fresh Water Crisis ····085
Column 4-11 Ballast Water Causes Biological Invasion ····087
Column 5-1 China Energy Interconnection Helps to Control Air Pollution ····116
Column 5-2 Biomass Power Generation ····118
Column 5-3 Garbage Transfer Stations ····119
Column 5-4 Waste Heat from Coastal Power Plants Threatens Marine Ecosystems ····121
Column 5-5 Co-development of Electricity-mining-metallurgy-industry-trade Promotes Diversified Industrial Development ····123

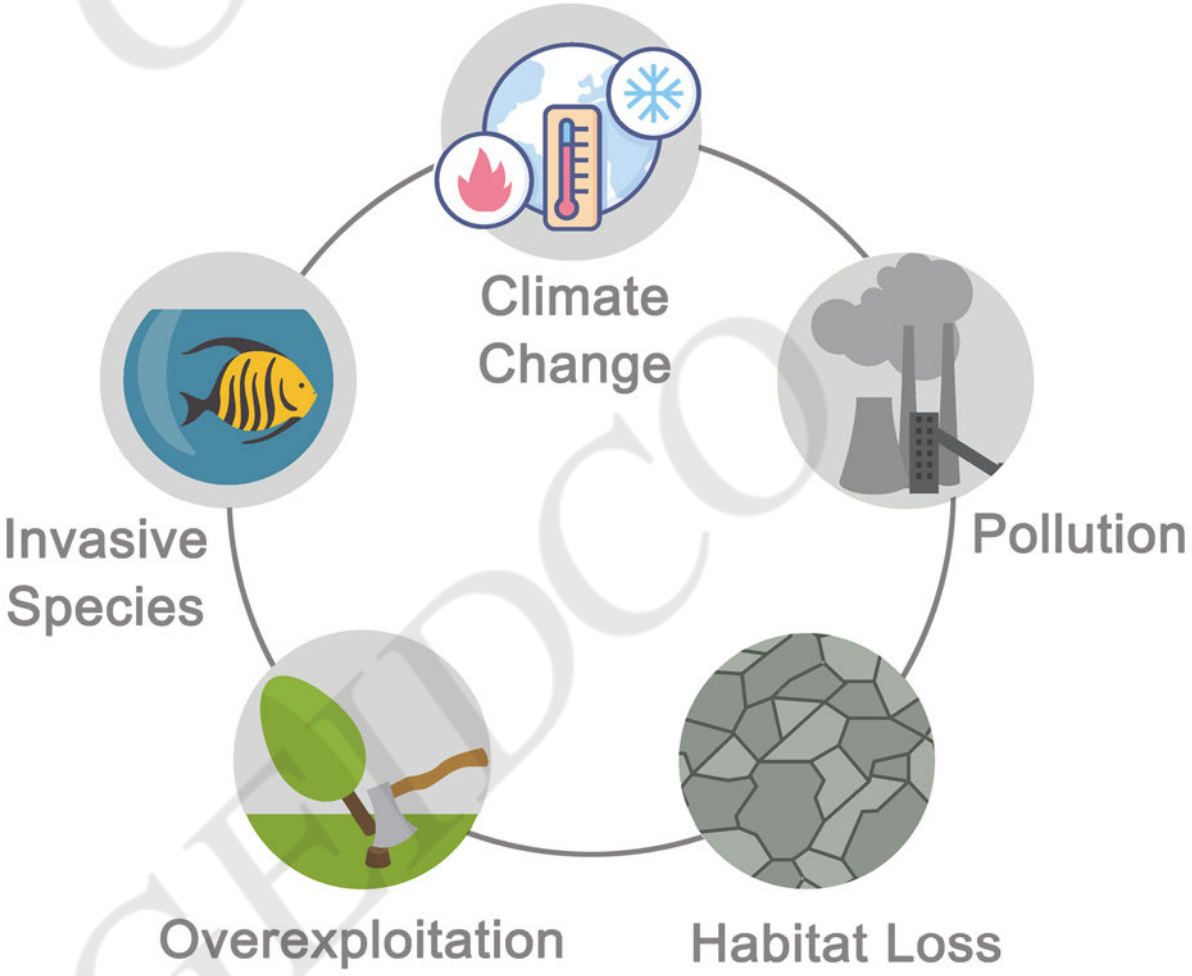
Column 5-6 Environmental Assessment of Belo Monte Hydropower UHV DC Transmission Project Phase II 126
Column 5-7 Electrosynthesis of Methane, Methanol and Protein 129
Column 5-8 PV Desertification Control in Inner Mongolia, China 131
Column 5-9 Electricity-water-land-forest Development Model and Its Application 132
Column 6-1 Prospects for the Development of Carbon Capture, Utilization and Storage 157
Column 6-2 Timetable for Coal Power and Fossil Fuel Vehicle Phase Out 162
Column 6-3 Prospects for Green Hydrogen Energy Development 166
Column 6-4 "Sewage Treatment + PV Power Generation" Project, Zhengzhou, China 167
Column 6-5 New "Clean Energy + Vertical Agriculture" Model 169
Column 6-6 Significance and Value of ETI Integration 170
Column 6-7 ETI Integration Promotes Biological Habitat Protection 172
Column 6-8 Island Micro-grids and Island Habitat Protection 174
Column 6-9 Remarkable Results for "Replacement of Diesel with Electricity" in China's Western Fujian Villages 176
Column 6-10 Development of Global Cold Chain Logistics for Fresh Agricultural Products 176
Column 6-11 China's Remarkable "PV-based Poverty Alleviation" Results 178
Column 6-12 The Electricity-Water-Land-Forest Development Model and Its Application 179
Column 6-13 Ecological Monitoring Assists in Protection of Elephant Herd 179
Column 6-14 Clean Energy Helps Protect Endangered Animals 181
Column 6-15 Clean Energy Helps Ensure Drinking Water Quality for Wildlife 182

The Significance of Biodiversity 1

Biodiversity: Current Status and Challenges 2



Major Drivers of the Biodiversity Crisis 3



4 Unsustainable Energy Development: an Important Cause of the Biodiversity Crisis

Promoting Biodiversity Protection through the Energy and Electric Power Revolution

5

Plan and Roadmap for Promoting Biodiversity Conservation Based on GEI 6

Supporting Mechanisms and Outlook 7

More Detail