

MACRO-ENGINEERING

A Challenge for the Future

Edited by

Viorel Badescu

Polytechnic University of Bucharest, Romania

Richard B. Cathcart

Geographos, Burbank, California, U.S.A.

and

Roelof D. Schuiling

Utrecht University, The Netherlands

TABLE OF CONTENTS

Contributing Authors	ix
Preface	xi
Foreword	1
Acknowledgements	3
1. Geo-Engineering and Energy Production in the 21st Century RICHARD BROOK CATHCART AND VIOREL BADESCU	5
2. Mineral Sequestration of CO ₂ and Recovery of the Heat of Reaction ROELOF DIRK SCHUILING	21
3. Large-Scale Concentrating Solar Power (CSP) Technology: Solar Electricity for the Whole World EVERT H. DU MARCHIE VAN VOORTHUYSEN	31
4. Wind Parks, Mariculture, Nutrients from Organic Waste Streams, CO ₂ Sequestration: A Fruitful Combination? ROELOF DIRK SCHUILING AND GERRIT OUDAKKER	45
5. A Macro-Project to Reduce Hurricane Intensity and Slow Global Sea Level Rise RICHARD LAROSA	53
6. Mitigation of Anthropogenic Climate Change Via a Macro-Engineering Scheme: Climate Modeling Results GOVINDASAMY BALA AND KEN CALDEIRA	65

7. A Dual Use for Space Solar Power: The Global Weather Control Option	87
ROSS N. HOFFMAN, JOHN M. HENDERSON, GEORGE D. MODICA, S. MARK LEIDNER, CHRISTOPHER GRASSOTTI AND THOMAS NEHRKORN	
8. Space Towers	121
ALEXANDER A. BOLONKIN	
9. Extreme Climate Control Membrane Structures: Nth Degree Macro-Engineering	151
RICHARD BROOK CATHCART AND MILAN M. ĆIRKOVIĆ	
10. Cable Anti-Gravitator, Electrostatic Levitation and Artificial Gravity	175
ALEXANDER A. BOLONKIN	
11. Planetary Macro-Engineering Using Orbiting Solar Reflectors	215
COLIN R. MCINNES	
12. Stellar Engines and the Controlled Movement of the Sun	251
VIOREL BADESCU AND RICHARD BROOK CATHCART	
13. Macro-Engineering in the Galactic Context: A New Agenda for Astrobiology	281
MILAN M. ĆIRKOVIĆ	
Index	301
Color Plate Section	307