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Don M. Flourney

Solar Power Satellites



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Preface

Don't be intimidated by this topic. Although collecting energy from space might appear to be a distant and overly complex answer to our energy problems on Earth, a careful look reveals surprising advantages. This small book is intended to be a "quick study" overview of space solar power, its current status and prospects for implementation, a topic that could matter to you and me personally.

You may find that solar power from space is not so far off. As one who has edited a journal on space communication and was a board member of the Society of Satellite Professionals International for a decade, it is increasingly clear to me that our next generation of space satellites will be of the power satellite–Sunsat–variety. Solar power satellites will be launched for the principal purpose of capturing the Sun's energy in space and delivering it to Earth as a non-polluting form of electrical power. These new Sunsats, I predict, will not only serve as the basis for the revitalization of the space industry, they will be a key to the future economic strength and environmental health of all nations.

Solar Power Satellites makes the case that space solar power is poised to become the planet's most significant source of alternative (clean and renewable) energy. True, space satellites will not soon replace the infrastructure and business models for terrestrial energy production and distribution, but the Sunsats systems promise to be a complementary source of global "base load power," i.e., electrical power that can be accessed and delivered whenever and wherever it might be needed.

We know that energy demand is growing. We also know that all current sources of energy will sooner or later prove to be insufficient, either due to declining production, as with oil and gas, or environmental concerns, as with coal or nuclear, or the insufficiencies of terrestrial wind and solar. How will our future needs be met? In this book, I make the case that to bring "power to all the people everywhere," only a space-based global power grid will do the job. To make such a vision a reality, individual governments will certainly have to play a supportive role – to assure that their economies continue to grow and their citizens have a reasonable quality of life – but to develop an energy market of such size and scope commercial involvement is required.

In brief, the task will require: 1) larger and more sophisticated space platforms, arrays and power transmission systems; 2) more robust and reliable transportation systems for delivering materials to space; 3) specialized large-scale receivers, converters, storage and distribution systems on Earth; 4) in-orbit position allocations and assignment of radio frequency spectrum for energy transmission; and 5) effective operational arrangements and management systems to insure that all components work together efficiently and safely.

Accomplishing these goals will obviously require financial, intellectual and diplomatic resources in considerable portions. But being successful will ultimately mean a lot to Planet Earth, including economic renewal of our moribund communities, the creation of new businesses and jobs, cleaner air and water, more stable weather and climate and possible avoidance of energy-related conflicts.

Solar Power Satellites is unique for its coverage of three emerging situations: 1) the social and economic pressures everywhere that require new energy solutions; 2) the growing recognition that space-based solar power is an unlimited, non-polluting source of new energy; and 3) the financial and business opportunities that will attract the aerospace, communication satellite and related industries to this new market.

The book is written for the non-technical professional and interested student. Illustrative examples are drawn from the space industry, from energy sectors, and from basic science. Explanations are straightforward; the language is easy to follow and understand. I believe that scientists, engineers, economists, and regulatory authorities will also find the overview and evidence presented to be timely and informational.

Athens, OH, USA

Don M. Flournoy, Ph.D.

Contents

1	What Is a Solar Power Satellite?	1
	What Is a Sunsat?	1
	Power Plants in Space	2
	The Space Segment	3
	The Launch Segment	4
	The Ground Segment	5
	Challenges That Sunsat Face	6
	A Perfect Storm	7
	Concluding Thoughts	8
	References	8
2	What Are the Principal Sunsat Services and Markets?	9
	The Energy Picture	9
	Climate Change	10
	Satellite Power Markets	11
	Power-to-Power Utilities	12
	Power-to-Agriculture	12
	Power-to-Terrestrial Solar	13
	Power-to-Fresh Water	14
	Power-to-Cities	14
	Power-to-Disaster Sites	16
	Concluding Thoughts	17
	References	17
3	What Will Sunsat Look Like?	19
	Technical Feasibility	19
	Commercial Viability	20
	New Architectures	21
	Newer Research	23
	Other Technical Challenges	24

- Corporate Research 25
- Concluding Thoughts 26
- References 26
- 4 How Will Sunats Be Delivered to Space? 29**
 - Launching Sunats 29
 - An Historical Perspective 30
 - Launch Strategies 31
 - Reducing Costs 33
 - Reusable Rockets 35
 - Alternative Approaches 36
 - Concluding Thoughts 37
 - References 38
- 5 How Will Sunsat Power Be Captured on Earth? 39**
 - Future Prospects 39
 - Historical Perspective 41
 - Public Policy Concerns 42
 - Environment and Health 42
 - Upper Atmosphere Effects 43
 - Land Use 44
 - Space Communications 45
 - Concluding Thoughts 45
 - References 46
- 6 What Is the Economic Basis for Solar Power Satellites? 47**
 - The Case for Sunats 47
 - Bilateral Project Development 48
 - Indo-U.S. Collaboration 50
 - The Commercial Sector 51
 - Intermediate Steps 52
 - Concluding Thoughts 53
 - References 54
- 7 What Are the Legal Issues? 55**
 - International Development Goals 55
 - Space Law 57
 - The Outer Space Treaty 57
 - The Liability Convention 58
 - The Registration Convention 59
 - Space Debris 60
 - Microwave Radiation 62
 - Other Regulatory Issues 62
 - GEO Slot Rights 62
 - Power Beaming 63
 - Renewable Energy Targets 64
 - The Role of Government 65
 - Concluding Thoughts 65
 - References 66

8	How Is Sunsat Development Faring Internationally?	67
	SPS over China	67
	China’s Long-Term Vision.....	69
	China’s Energy Future	69
	Sustainable Development.....	70
	A Skilled Workforce	70
	Heading Off and Mitigating Disasters	71
	SPS Implementation.....	71
	SPS over India.....	72
	India’s Energy Policies.....	73
	India’s Strategic Goals	73
	Power Capacity Constraints	74
	SPS over Japan.....	75
	The Japanese National Space Plan.....	76
	International Cooperation and Collaboration.....	77
	Concluding Thoughts.....	77
	References.....	78
9	What Is Worrisome About Solar Power Satellites?	79
	Launch to Space.....	79
	Assembly in Space.....	80
	Wireless Transfer of Energy	80
	Land Use	81
	Satellite Collisions	82
	Space Debris	83
	Solar Storms and Flares	83
	Signal Interference	84
	Concluding Thoughts.....	84
	References.....	85
10	Top Ten Things to Know About Space Solar Power	87
	References.....	99
	Glossary	101
	About the Author	103
	Index	105