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Nota di contenuto	I PART: Design and Research of Lightweight Energy skins -- 1. Towards the Smart Filter Alessandra Zanelli, Carlotta Mazzola -- 2. Life Cycle Design for Lightweight Skins Carol Monticelli -- 3. Lightweight Environmental Architecture Nebojsa Jakica, Maria Giovanna Di Bitonto -- 4. Flexible Photovoltaic Solar Design Zhengyu Fan, Alessandra Zanelli, Carol Monticelli, Qingxiang Li -- II PART: Applied research projects and experimental developments -- 5. Case study: the SOFT-PV Skin Alessandra Zanelli, Carol Monticelli, Zhengyu Fan -- 6. Case study: the TIFAIN Facade Nebojsa Jakica, Carol Monticelli, Alessandra Zanelli -- 7. Case study: Fog and Dew Net Maria Giovanna Di Bitonto -- 8. Case study: TemporActive Carlotta Mazzola.

Sommario/riassunto

This book explores membrane materials as a means of translating natural and renewable resources into a more flexible, dynamic, and reactive architectural skin. It represents the first time that energy-saving design has been addressed systematically in relation to lightweight building systems and tensile membranes. Understanding of the energetic behavior of membranes and foils used as a building envelope is a fundamental theme, as it is the integration of flexible photovoltaics in membranes, as well as the exploitation of water and wind resources. A theoretical, methodological framework for consciously designing the membrane life cycle is presented. The authors cross-cut and combine exploration of climate-based design methodology and life cycle thinking strategies. Both active and passive systems are investigated, referring to alternative productive resources like sun, wind, and water. Case studies are brought forward in the book’s second half, highlighting energy lightness for anincreasingly dematerialized architecture and addressing inherent issues. Four main research and development paths are presented, the first two focusing on advancements in façade materials and Photovoltaic systems applicable to membrane architecture, the third referring to fog and dew harvesting and the fourth dealing with the future frontier of flexible transparency and designs for well-being through a passive solar system.