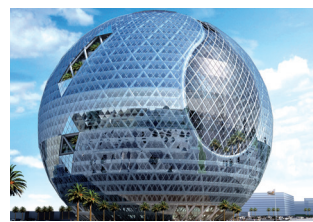


...EF ENERGY FORUM

06 - 07 December 2011, Bressanone, Italy

Solar Building Skins



Solar Building Skins

Conference Proceedings of the 6th ENERGY FORUM
06-07 December 2011, Bressanone, Italy

ISBN 978-3-981205343

English-Italian translations by Alessio Mirabelli

Economic Forum
Elisabethstr. 91
D-80797 Munich, Germany

info@economic-forum.eu

DE129771557

© Copyright: **EF ECONOMIC FORUM**

CONTENT

■ Living, Breathing, Thinking Façades for the 21st Century	7
James Law, James Law Cybertecture International, Hong Kong	
■ Intelligent, energetically autonomous envelope	11
Oana Doina Trusca, Plasma Jet SRL, Bucharest, Romania	
■ Transforming buildings through localized energy production, storage, and distribution	17
Ryan Salvas, School of Architecture, Auburn University, Alabama, USA	
■ Developments of costs of BIPV technologies	23
Johann Koinegg, PV Products GmbH, Austria	
■ Life-cycle cost assessment of photovoltaic façade panels	29
Karoline Fath, Karlsruhe Institute of Technology, Germany	
■ New business models could facilitate the breakthrough for solar façades	37
Andreas Karweger, Managing Director, Economic Forum, Munich	
■ Challenges of integrating photovoltaics into the roof of the central train station in Utrecht, The Netherlands	43
Johan Van Dormael, Sapa Building System, Belgium	
■ Integrating photovoltaics in historical town centers	49
Pierluigi De Berardinis, Faculty of Engineering, University of L'Aquila, Italy	
■ Multitasking façade - How to combine BIPV with passive solar mitigation strategies in a high-rise curtain wall system	55
Juan Betancur, Adrian Smith + Gordon Gill Architecture, Chicago, USA	
■ The potential of spherical solar cells for building components	61
Kenichi Taira and Josuke Nakata, Kyosemi Corporation, Japan	
■ Enhanced lighting and photovoltaics by turquoise luminescent materials	67
Yutaka Tsujiuchi, Akita University, Japan	
■ Thermotropic glazings for overheating protection applications	73
Andreas Weber, Polymer Competence Center Leoben, Austria	
■ Fluidized glass façade elements for an active energy transmission control	79
Daniel Gstöhl, Institute of Architecture, University of Liechtenstein	

CONTENT

- **Designing a flexible net-zero energy house at reduced life-cycle costs..... 85**
James Russell, Appalachian State University, USA
- **Market strategies for solar architecture..... 91**
Tobias Danielmeier, Victoria University, Wellington, New Zealand
- **Building a functioning, marketable, solar-powered house 95**
Edgar Stach, College of Architecture & Design, University of Tennessee, USA
- **Façade’s design solutions for office buildings with natural ventilation..... 101**
Mônica P. Marcondes, University of São Paulo, Brazil
- **Performance of an active dynamic air envelope..... 107**
Zhuang Yu, Huazhong University of Science & Technology, Wuhan, China
- **The impact of photovoltaic thermal mechanical ventilation
heat recovery (PV/T MVHR) on net-zero energy housing 113**
Masa Noguchi, Glasgow School of Art, Mackintosh School of Architecture, UK
- **Interactive optimization in the conceptual design stage of shading devices 119**
Paulo Mendonça, School of Architecture, University of Minho, Portugal
- **The PV-wire free sunshade system..... 125**
Siebe Broersma, Faculty of Architecture, Technical University Delft, Netherlands
- **Development of a coated slat for blinds to be integrated within insulating glass ... 131**
Luca Papaiz, Pellini Spa, Italy
- **Permeable semi-transparent shading devices 137**
Antoine Dugué, Nobatek Institut de Mécanique et d’Ingenierie, France
- **Geometrical optimization of building’s façades for BIPV..... 143**
Virgínia Vannini, Federal University of Rio Grande do Sul, Brazil
- **Architectural design for energy-efficient and cost-effective buildings..... 149**
Jörg Rügemer, School of Architecture, University of Utah, USA
- **Simulating energetic retrofits of school buildings 155**
Andrea Boeri, Faculty of Architecture, University of Bologna, Italy
- **Energy performance criteria for solar optimized high-rise building skin..... 161**
Mohannad Bayoumi, Technische Universität Munich, Germany

POSTER

- **Integrating Solar Thermal Technologies into the Building Envelope 169**
Maria Cristina Munari Probst and Christian Roecker,
Solar Energy and Building Physics Laboratory, EPFL, Switzerland

- **Residential-scale solar thermal hot air system integrated
with a central heating and dehumidification system 170**
Mark E. Walter, Ohio State University, USA

- **Solar air-cooling and heating for curtain-walls of large buildings 171**
Iris Mack, SwissINSO SA, Switzerland

- **From solar passive to plus energy houses 172**
Matt Barnes, Solarate Ltd., Dublin, Ireland

- **Solar energy strategies for residential and commercial buildings 173**
Fabiano Homobono Paes de Andrade, Institute of Technology,
Faculty of Architecture and Urbanism, Federal University of Pará, Brazil

- **The integrations of PV in agricultural greenhouses..... 174**
Francesco Emanuele Contaldo, Studio Contaldo, Salerno, Italy

- **Photovoltaic charging stations for electric bicycles in the tropics 175**
Andrea Fajardo, SESlab, Costa Rica Institute of Technology

- **Lleida outdoor test center for BIPV systems..... 176**
Chiara Lodi, University of Lleida, Spain

- **Modular multifunctional prefabricated building skins..... 177**
Horst Stiegel, Department of Energy Systems,
Fraunhofer Institute for Building Physics, Kassel, Germany

- **Integrating a solar thermal collector into a façade system..... 178**
Alessia Giovanardi, Institute for Renewable Energy, EURAC Research, Bolzano, Italy

- **BIPV applications in historical town centers 179**
Rossana Paparella, Department of Architecture, University of Padova, Italy

- **An energy-plus-house strategy applied to a Solar Decathlon house 180**
Stephanie Armand Decker, Nobatek, France

- **Integrating Building Information Models (BIM) and passive house planning 181**
Jason Andersen, CASE Design Inc., New York

POSTER

- **Sustainable architecture at low cost 182**
Rodrigo Carazo, Universidad del Diseño, San Jose, Costa Rica

- **Heat and moisture transfer characteristics
of wet surfaces exposed to solar radiation 183**
Tetsu Aoki, Department of Architecture,
Gifu National College of Technology, Japan

- **Thermal evaluation of envelopes of non air-conditioned buildings 184**
Guadalupe Huelsz, Energy Research Center,
Independent National University of Mexico

- **Habitable skins for comfort improvement in architecture 185**
Daniel Estevez, Architectural Research Laboratory,
Ecole Nationale Supérieure d'Architecture, Toulouse, France

- **Mitigating effects of transparent solar heat absorption glass on cooling loads 186**
Zhe Cui, Nagoya Institute of Technology, Japan

- **Revaluation of technologically improved blinds as luminance,
visual, acoustic and climatic control system 187**
Nuría Martí, School of Architecture La Salle,
University of Ramon Llull, Barcelona, Spain

- **Daylighting geometry in architecture 188**
Paulo Brito da Silva, Faculty of Architecture, University of Lisbon, Portugal

- **Assessment tools for daylight control performance of expanded metal..... 189**
Josemi Martínez Rico, School of Architecture,
University of the Basque Country, Donostia-San Sebastián, Spain