

# ASA

Architectural Solar Association

## Unlocking the Power of Zero Energy with BIPV

November 16, 2017



# Overview



**ASA**  
Architectural Solar Association

Browning Rockwell, Executive Director ASA

Chris Klinga, Technical Director ASA

*Introduction*



 PILKINGTON

Anna Cooley, Pilkington / NSG Group

*Expanding the Vision*



 ISSOL  
Performance  
& Energy



 BOUYGUES  
Bouygues  
Bouygues

Laurent Quittre, Issol & Paul Cartuyvels, Bouygues

*Active Facades & Envelopes*



 Net-Zero  
ENERGY COALITION

Ann Edminster, Green Building Consultant

*Zero Energy + Architectural Solar*

# The ASA Mission

The Architectural Solar Association (ASA) is an industry advocate for standards development, education, legislative regulations, building & energy codes and solar architecture design specifications as they relate to integrating solar into the architectural envelope.

We represent a growing industry with a common goal of transforming building facades and other architectural surfaces into generating assets.



# ASA Goals

## Standard Development

Within the US, UL 1703 is a major barrier to integrating solar architecturally. By collaborating with the more mature European market we look to drive changes in standards that benefit the global architectural solar market.

## Demand Creation

ASA's market research looks to bring awareness to various financing mechanisms that could benefit the architectural solar market. Through advocacy, education, and outreach, we look to unlock the uncertainties that impede demand creation.

## Building Industry Adoption

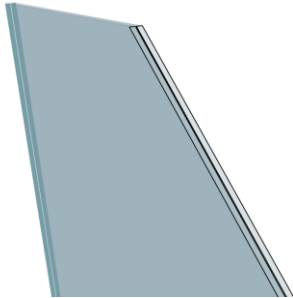
The global building industry and the solar industry have yet to fully integrate. Solar needs to be a ubiquitous resource to all building professionals. ASA looks to make that possible.

# Multi-Functional Benefits

Applications	Multi-Functional Advantage		
Canopies	Weather Barrier	Shading	
Architectural Structures	Messaging		
Window Awnings	Shading		
Rainscreens		Bird -Safe	Glare Control
Balustrades	Safety		
Sloped Glazing			Shading
Vertical Spandrel Glazing	Weather Barrier	Sound Barrier	
Vertical Vision Glazing			Shading

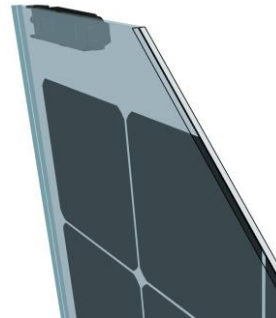
# Incremental Cost

## Laminate/Safety Glazing



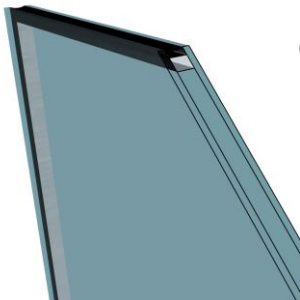
Monolithic Lite  
Encapsulant  
Monolithic Lite

## PV Laminate



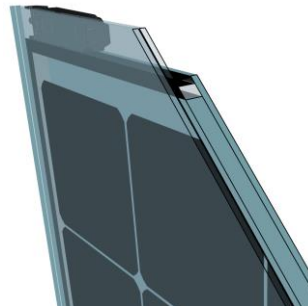
Glass Lite  
Encapsulant  
PV Cells &  
Interconnects  
Encapsulant  
Glass Lite  
Junction Box

## Insulated Glass Unit (IGU)



Glass Lite  
Spacer / Air Gap  
Glass Lite

## PV-IGU



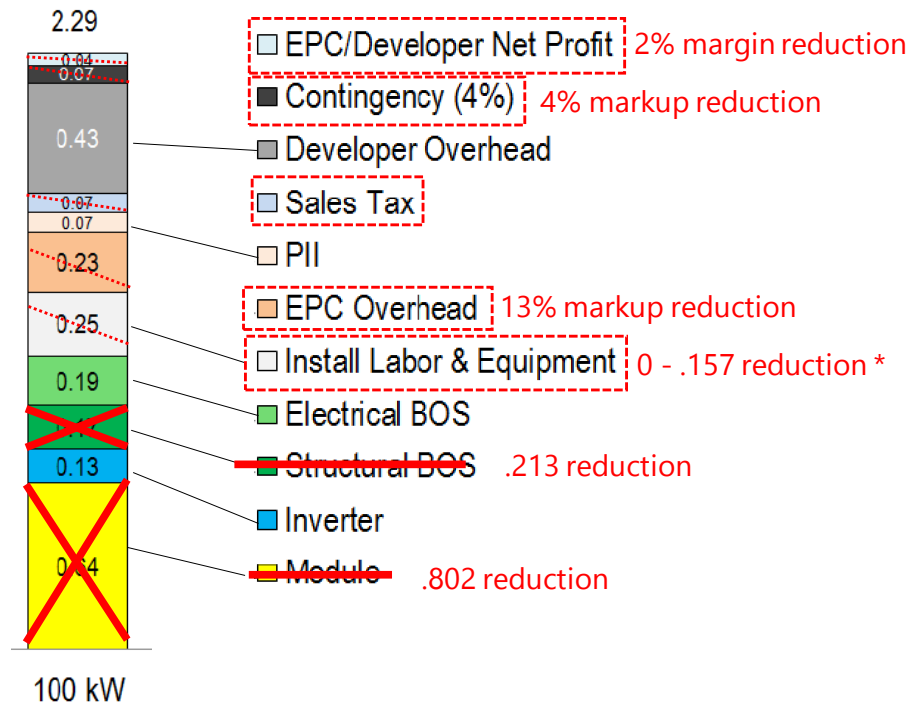
Glass Lite  
Encapsulant  
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Encapsulant  
Glass Lite  
Junction Box  
Spacer / Air Gap  
Glass Lite

# BIPV Baseline Installation Cost

No Modules, No Racking, Labor Varies

## Commercial (>100 kW)

\$2.29 → \$1.12 - \$1.28/Watt



\*Labor costs can be higher in some BIPV applications assuming it is not offset by costs intrinsic to the structure, i.e. glass installation.

# Incremental Cost

**\$0.62 to \$3.50/watt Incremental BIPV Module Cost \***  
**+\$1.17 / Watt - Baseline Installation Cost \*\***  
**- Quantifiable Multi-Functional Value (i.e. Frit)**

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**\$1.79 - \$4.67/Watt : Total Incremental Cost**  
**(\$27-\$70/sqft @15.6% Effic.)**

**Traditional Solar Installation Cost (Fu et al. 2016)**

5 MW Utility PV = \$1.82 100 kW Commercial PV = \$2.29/W Residential PV = \$2.93/W

\* Cell, encapsulant and additional glass costs.

\*\* Includes typical PV labor & BOS without module & racking install (~\$0.05/watt or 70% of install labor)



# Questions ?

# Upcoming Events

- ASA is partnering with Dubai Solar Show - DEWA  
October 23-25 2017
- ASA is partnering with The Big 5 Solar November  
26-29 and Anoop Babu the ASA MENA  
Regional Manager will be presenting on the  
topic *"Where Solar and Construction Meet:  
Building Integrated PV (BIPV) and Energy  
Efficient Building Design"*
- Chris Klinga our Technical Director will be  
speaking at the ASHRAE 2018 Winter  
Conference in Chicago, IL. January 20-24th  
2018. The title of the presentation will be *"How  
to Accelerate Architectural Solar in the US  
Market: From BIPV to Building Component"*



# Thank you!

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Images: Courtesy of Energy Glass & Lumos Solar