

Doubting Thomas (D): PV glazing is too expensive.

Answering Anne (A): You're right if you are comparing the cost of PV glazing to plain old regular glazing and the cost of equivalent power from subsidized local utilities. However, Integrated Framing (IF) provides several advantages from a long term and also broader perspective. We are saying: If you maximize the efficiency and production of EVERY system in the building, and you use the smart grid, you get a highly efficient system that allows PV to work under ideal circumstances. Then, PV can be done at a reasonable initial cost with long term savings.

D: Isn't that comparing apples to oranges?

A: No, it's comparing apples to fruit salad. Why have just one item when you can get your pick of the whole cornucopia. The savings for each aspect of the system are also available a la carte.

D: Batteries are not well developed to store the energy from the PV.

A: You're right; that's why we advocate using the relatively low voltage, DC power for Solid State (SSL and LED) lighting so we minimize transmission loss, and look at storing power in electric vehicles, heat sinks or fuel cells. We recommend making the most of the power during the daylight when it's being produced, or limiting the distribution to the immediate area to keep the efficiency as high as possible. Most of the load for commercial offices is during the day or early evening.

D: Why the grid on the outside? Isn't there a danger of exposure to weather?

A: It is true that most early PV glazing installations used the outside cap on the curtainwall framing which was not weathertight. But most other installations have been fully exposed on the roof, so there is plenty of proven wiring technology for adverse conditions. In Integrated Framing, the wiring is on the interior channel of the solid aluminum framing where it is protected by two gaskets under a pressure plate. IF uses the protected internal channel which has over 12 square inches of capacity in each vertical framing member, usually spaced every five feet. The channel protects wires from puncture so no conduit is required. The main risers and connections have been pre-engineered and pre-fabricated in the factory. Further, to meet recent international regulations, the quick-connections are encased in rigid plastic or resin so that moderately-trained workers can safely install or even hot-fix some parts of the system.

D: If most installations are custom why do a pre-engineered system?

A: Most architects are still wary of BIPV, and many are simply scared of electricity. (We're trained to be!) Most have to hire a consultant to plan and develop PV systems, which often gets taken out of their fees. But the reason we have not seen more of these installations is because the manufacturers are making and selling roof panels and expecting the architects to be engineers for the rest of the systems. With a pre-engineered product and good documentation, we should be taking the fear factor away and replacing it with an easy-to-use system for saving energy.

D: How do you deal with the very traditional construction industry?

A: Integrated Framing was designed to address and appeal to each of the stakeholders on a job. Especially in this difficult commercial office market, Owners are looking for ways to differentiate themselves, and if the premium for BIPV is reasonable AND they get ongoing benefits, they will consider it. Architects thrive on fresh ideas that they can bring to the client. Engineers want kit-of-parts systems that are easy to specify and incorporate with the other systems. GCs will deal with new products if they are modular and reduce time and labor costs and Pain in the A** factors. Framing companies are dealing with global competition and need new product lines to compete.

D: If most current installations are custom installed by licensed electricians, aren't they going to resist this technology?

A: They will if they think it is taking work away, but their scope will actually be greater. While they may do less rough-in, the scope for electricians will include final connections for the PV and the line voltage systems, low-voltage lighting, sensors and controls, and telecommunications which has often been done separately.

D: The market for renovations is much bigger than for new construction. How would the system work for a renovation?

A: IF is ideal for gut to structure rehabs. In a single scope, you get the building enclosure, which you need anyway, you get highly efficient windows which greatly impact comfort, and you get all the grid systems, electrical, lighting, HVAC sensors and controls, etc. Plus, for the same weight as roof panels you can get a green planted roof to filter rainwater for a Net Zero Energy building. Plus, there is limited core drilling and other modifications. If we could do this on our glut of older suburban office buildings, we could make a sizable dent in our energy needs and our carbon output.

D: If it's such a great idea, why isn't anyone doing this already?

A: A glass supplier in China confirmed our suspicions. He said it was either such a simple concept that it would get copied easily, or it was absolutely impossible given the number of subcontractors involved. But we are fine doing the coordination to get the system produced. The telling thing is we have been taking this idea to manufacturers for over ten years and got little interest until this year, when the response has been fantastic. The contributing technologies have just become feasible, though the transparency characteristics of the glazing are just now being explored. The massive support for new technologies and efficiencies from the new administration has certainly helped.

D: I thought the DOE said PV glazing was ten years out as a feasible technology?

A: Yes, but they are also expecting an R-10 insulation factor in the glazing. Plenty of buildings are being built with much less and still meeting high-efficiency standards. There are actually several R-values to consider: during the day when heat gain is the issue (the PV reduces the gain); at night when heat loss is the issue (the tenants are usually gone); at the frame (the Smart Grid makes heated frames easy); and in the middle of the glazing (the new films are far more efficient). With the added value of the smart grid that Integrated Framing provides, and the latest available insulated glazing, we believe the technology will have acceptable characteristics much sooner.

D: The PV glazing I have seen is um, ugly.

A: The first PV glazing merely took standard silicon chips and spaced them out to allow visibility between the chips. The next generation of thin film technology was made with five to 10% visibility through fine lines cut into the film, which was suitable mostly for skylights. There are new thin film PV technologies in development that allow much more visibility through the thin film, and there are organic thin film plasmas, polymers and clear circuitries under development now. The system is designed to allow the latest technology to be simply plugged into a robust, coordinated architectural framework.

D: Is this product available now?

A: Not yet, but coming. We received a Clean Tech grant for modeling software and are completing a rapid virtual prototyping of the system vs. a traditional office building. Next, we are preparing to do a full-scale installation at an energy research lab for UL and other testing. If you have a project just starting design, we could have the code compliance and manufacturing addressed in time for start of construction within 12 months. This could, of course, be expedited with an influx of financial support.