

## The future of BIPV and AIPV solar

Semitransparent photovoltaic windows constitute Lucintech's core technology strength. This power-generating PV window technology will provide major benefits in two distinct but complementary market spaces:

- **PV windows, skylights and atriums for buildings, and**
- **PV sunroofs for vehicles.**

Each of these markets has an upside potential of \$3 to



\$4 billion.



### BIPV windows, atriums and canopies--

Large expanses of glass in commercial buildings lead to solar heat gain that adds to the already heavy grid power demand coming from these buildings. Lucintech has developed an efficient and affordable building-integrated PV (BIPV) window that reduces the solar heat load and simultaneously converts the windows into an important electrical power source for the building. The Lucintech technology can provide major support for achieving advanced green-building certifications and in reducing energy costs over the life of the building. The Lucintech value-added PV coating can yield a very attractive return on investment. Our analysis shows that the cost of our value-added PV coating on the windows can provide a full return on investment in under four years for a typical building in New York City.

### Sunroofs in automobiles and trucks—

Automotive-integrated PV (AIPV) also offers major opportunities for incorporating Lucintech technology. The PV sunroof creates a high-value, high visibility product for a rapidly growing market in supplementary charging for electric and hybrid vehicles. The PV tinting reduces glare and heat load during driving to increase driver and passenger comfort while still providing the visual advantages of a sunroof. For both conventional internal combustion engine vehicles and EVs the PV



sunroof can power cabin ventilation while parked that improves comfort and greatly reduces air conditioning load during initial driving. This improves efficiency and helps meet new fuel economy standards. Studies show that active cabin ventilation can allow significant down-sizing of auto air conditioners that will provide continuing benefits throughout the driving cycle. Our analysis, based on studies done by the National Renewable Energy Lab, shows that the cost of Lucintech's value-added PV coating can be recovered in as little as two years from the fuel savings that result from reduced air conditioning demand.

Electric buses with PV windows and lightweight rooftop PV--

For a typical electric bus with Lucintech PV windows on the sides and rear and lightweight Lucintech PV on the top, the electric generation will extend the range between charges. For example, for the solar conditions of NYC, and typical driving cycles, the on-board solar can provide power for about 4700 km. (Estimates are based on a 2014 Canadian study of the efficiency of an electric bus operating on a standard route.)

