For immediate release: September 28, 2012

Contacts:
Kathleen Ross, Department of Architecture, MIT
(for interviews with Prof. Reinhart)
617.253.1876, kross@mit.edu

Meghan Shaw, Cambridge Energy Alliance
(for logistical questions about the event)
617.349.5323, mshaw@cambridgema.gov

New Interactive Map Assesses Solar Power Potential of Cambridge

Official Public Launch October 3 at 6PM, Cambridge Main Library

(CAMBRIDGE, MA) -- MIT researchers have developed a new interactive map to show Cambridge property owners how much electricity can be produced on their rooftops from solar photovoltaic (PV) systems, how the financial investment will pay off and how much pollution will be reduced.

The new tool shows that if photovoltaic panels were installed on all good and excellent locations, Cambridge could generate about a third of its electricity needs via PV for about $2.8 billion. The technology has been found to predict electricity yield to within 4 – 10% of actual measured results.

The Solar Map was developed by the Sustainable Design Lab at MIT – a part of the Building Technology Program in the Department of Architecture directed by Professor Christoph Reinhart – and Modern Development Studio LLC (MoDe Studio) — a consulting, design, and development workshop based in Boston and led by Eduardo Berlin — in collaboration with the City of Cambridge Community Development Department.

For its part in the collaboration, MIT created the annual electricity yield map from PV for virtually all Cambridge rooftops by calculating the amount of electricity that could be generated over the course of a typical year on almost 17,000 roofs; each roof is then color-coded to show which parts have excellent, good, poor and no solar potential.

MoDe Studio designed and developed the online viewer and a financial analysis module that considers federal and state incentives for PV installations. The City of Cambridge provided the underlying data and images and will make the solar map available to the public on its website at www.cambridgema.gov/solar. The solar map will be an invaluable tool in the City's efforts to promote solar energy as a strategy to fight global climate change.

The main goal of the project was to communicate, in a simple and intuitive online tool, the technical, financial and environmental implications of installing solar, based on MIT's reliable and advanced calculation techniques.

Created as a proof of concept for more expansive efforts to predict yield from any photovoltaic array anywhere on the planet, the tool considers detailed surrounding geometry such as trees and buildings, hourly direct and diffuse solar data, and solar cell efficiencies due to varying roof temperatures. Required simulation inputs are standard local weather station data and LiDAR data. (LiDAR – Light Detection And Ranging – is a remote sensing technique.)

The assumptions and calculation methods underlying the map are significantly more accurate than those of comparable older solar maps used in other cities. Some solar maps, for instance, assume all rooftops are flat, an assumption that leads to errors in the case of a pitched roof which may have sloping and shady areas constraining the size of a PV system.

Another discrepancy between maps results from how radiation is calculated. The MIT approach measures hourly solar radiation and temperature data for a site for a typical year, then translates that data into an actual sky condition for each hour of the year. The amount of radiation on any given surface can then be calculated, including the effects of shading from trees and reflectance from neighboring buildings.

And because solar cells become less effective as they heat up – reducing yield in the summer when solar radiation is most plentiful – the calculations also consider the *momentary temperature* of the surface.

The researchers caution that the tool is not a substitute for an on-site assessment by a solar installer because some specific building features (such as rooftop equipment), site conditions, and financial factors might not be accounted for. But to maximize accuracy, the City of Cambridge intends to update the tool on a regular basis to reflect changing market conditions and financial incentives.

Support for the project was provided by the city's Information Technology Department and the National Science Foundation.

For more information, visit the MIT site for the project at http://mit.edu/SustainableDesignLab/projects/CambridgeSolarMap/index.html

More technical details can be found here: http://mit.edu/SustainableDesignLab/publications/SimBuild2012_jakubiec,reinhart_towards-validated-urban-solar-radiation-maps.pdf