To encourage the adoption of renewable energy resources nationwide, the U.S. government has reauthorized (though 2019) the substantial (30%) tax credit to those homeowners installing solar energy systems. In addition to that federal incentive, Columbia’s Water & Light Department (CW&L) offers a generous 50 cent per Watt rebate on solar installations. CW&L is the only electric utility in Missouri that offers such a rebate.

Considering these dual financial benefits, what might it cost a homeowner to install a typical 5,000 Watt (5 kW) residential solar system in Columbia Water and Light’s service area?

**Columbia Solar Energy System Costs**

Currently, at $3.50 per Watt installed, the ‘up-front’ materials and labor costs for a 5 kW residential solar system will be $17,500. Deducting from this, first, a $2,500 CW&L cash rebate, and, thereafter, recovering a $4,500 federal tax credit, the homeowner’s final system cost would total $10,500. (For comparative nationwide data, see: ‘How Much Does an Average Solar-Panel System Cost?’, Mother Earth News, July 29, 2016).

Not only can a solar energy-generating installation be expected to pay for itself in reduced electrical energy charges for decades, but a comprehensive national study has shown that a 5 kW solar installation adds over $15,000 in value to a solar-equipped home (‘New Solar Home Premiums: Calculating the Value Rooftop PV Adds to a Multi-State Sample of New U.S. Homes’, U.S. Department of Energy, Lawrence Berkeley National Laboratory).

**Energy Benefits, Power Output, and System Life**

In mid-Missouri, a 5 kW system produces about 6,500 kWh/y whereas, on average, a Columbia household consumes about 10,000 kWh/y. Therefore, it will be necessary to practice some conservation if one hopes to be fully ‘net zero’ with respect to electrical energy use.

Annually, over a typical 25-year warranty period, 5 kW of solar panels can be expected to provide a Columbia homeowner with a savings of approximately $0.12/kWh times 6,500 kWh/y or $780. This would amount to a 7.4% annual return on investment. This yield will increase if municipal utility electric rates continue to increase in the future (presently, by 4% per year). Accordingly, a residential solar system can be expected to repay its installation cost several times over during its service lifetime.

Obviously, a residential solar system will produce its energy during daylight hours (a time when most families are up and about) and on those long, sunny, summer days when the demand for electrical energy...
is highest for most electric utilities. Criticized as being intermittent, the ability of solar systems to help meet peak electrical demands is actually one of their most attractive - and valuable - features.

A caveat: Solar panels gradually lose generation capacity with time. Although solar panels have been shown to last far longer than their 25 year warranties, they are guaranteed to provide, at least, 80% of their initial rated output at that age. (So, hold onto your warranty card, just in case.)

**Net Metering: Connecting to the Grid - and Paying for the Privilege**

Columbia’s municipally-owned electric utility will also credit their customer’s currently applicable electric rate (perhaps, 12 cents per kWh) for any surplus solar electricity delivered to their customer’s newly installed meter which now records both ‘energy delivered’ and ‘energy consumed.’

Other Missouri electric utilities, viewing residential solar installations as nuisances and competitors, will only credit solar inputs at the lowest rate for their alternative energy purchases (often, 3 cents per kWh). This, despite the likelihood that the solar energy delivered into their system was likely sold at their premium rate.

It should also be noted that, if the residential solar system is metered and connected to the electrical grid through grid-tie inverters, as most such systems are, a general power outage will also turn off the residential solar system. (In other words, your lights, as well as those of your neighbors, will be off - and the meat in your freezer will be thawing.)

**Don't have the Bread? Third-Party Solar Financing!**

Solar energy is such a good investment that today many third party entrepreneurs install panels on homes at no cost to the owner; retain ownership of the installation; and sell the power generated to the homeowner at a lower rate than the local utility charges (power purchase agreement). Alternately, they may lease the installation to the homeowner. The fact that solar energy is cheaper than local utility rates and virtually no system operation or maintenance is required makes such arrangements feasible and profitable.

**Electric Utility Push Back on Residential Solar Energy Customers**

Electric utilities see solar installations a both an opportunity (when they own and control the outputs of their own large arrays of panels) and a threat (when solar panels are independently owned and connected to the grid). To discourage the latter, utilities have taken to increasing the ‘base rate’ or ‘fixed’ fees (essentially, the monthly connection charge before any electrical energy is purchased) for their customers while, for public relations purposes, nominally reducing the per kWh use charges.
This inflated fixed charge strategy, in effect, increases the electrical unit costs to those consumers who use the least amount of energy, including both low-income customers and apartment dwellers as well as solar conservationists. (*Caught in a Fix: The Problem with Fixed Charges for Electricity*, prepared for Consumers Union, February 9, 2016).

With City Council approval, CW&L has enacted such a rate restructuring, thereby reducing incentives for energy efficiency and distributed generation. If City administration is sincere about pursuing a goal of achieving ‘social equity’, it might start by revisiting our electrical utility rate structure.