①



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Case no. 2020-00174 "Net metering"
Before the public service commission

I am a disabled-retired coal mine electrician of 20 + years. I am deeply concerned about what effect Roof top solar will have on Kypco customers. If enough Kypco customers buys Roof top solar systems can the retail customers left be able to afford to keep up Kypco grid who will never own Roof top solar systems.

Most solar companies that sells Roof top solar systems want to make the PSC think that Roof top solar customers in the electrical generating business, which they are not. Most solar companies wants Kypco to let Roof top solar customers stay hooked on Kypco grid for free putting all the expense for maintaince and up Keep on Kypco grid on the retail customers, which is not fain. Solar companies also want Kypco to pay Roof top solar customers tremendous high prices for the for the extra out put. With out Knowing if this out put is useable or worth-while

for the Kypco grid and retail customers. all solar companies want to do is to make buying a Roof top solar system more worth-while to sell more solar systems destroying Kypco grid for all other Kypco retail customers. making electrical rate unaffordable. PSC must protect Kypco customers from these people. So we will have safe & dependable electricity.

If Roof TOP solar customers want to use solar panels, let them disconnect from Kypco grid and go it on their own. Kypco Cannot give them free electricity just because they bought a Roof top solar system. Roof top Solar customer cannot disconnect from the Kypco grid because:

① Roof TOP Solar systems only works during day light hours - part time electricity.
② does not work at night
③ works very little on cloudy days. (Example) since thanksgiving 2020 there have been very few uncloudy days up to Feb 20, 2021. During the winters months there is a lot of days you don't see the sun because of winter clouds
④ Solar panels cannot generate when they are covered with snow.
⑤ Solar panels cannot work when they are broke down or torn up.

⑥ People who rely on part time electricity such as Roof top solar panels would be endangering their families lifes if their homes were hot hooked to Kypco grid.

⑦ Even if Rooftop solar owners had a back up battery pack, they would still need to be hooked up to Kypco grid because long wintens when you do not see the sun for days, because of clouds and othen cloudy day when the batteries will not get charged to give them electricity during the day & night.

So Roof top solar customer must be hook on Kypco grid. Roof top solar Customers must pay their share of taxes, tariffs, and up-keep on the Kypco grid. This is fair to Kypco retail customens and failure to do so would put a huge burden on fixed income and poor people.

The house meter does not give a true reading of the Roof top solar extra output because there is electricity lost after it passes through the house meter before it reaches Kypco grid. This power lost is caused from resistance in the utility-pole step down transformer windings when you back feed

electricity from the Roof Top solar system, the function of the utility pole step-down transformer suppling the home from Kypco grid is then revensed to function as a step-up transformer. when this happens the primary windings of the utility pole step-down transformer which is enengized all the time from Kypco grid causes a lot of resistance to the back feed electricity from the Roof top solar system. This loss of electricity happens in the windings of the utility pole ; step-down transformer. Back feeding electricity shortens the life of a step-down transformer due to heat and coppen loss. a lot of electricity is lost from surplus generation of a Roof top solar system onced it reaches Kypco grid if there is no demand or any one to use this output. This loss of electricity must must be deducted from Roof top solar systems. Please read Ehibit 1 and 2.

Kypco is under contract with PJM to provide enough electricity for every Kypco Customer plus 15% more. For example Kypco-Lousia power plant generates electricity, when this generated power is put on the Kypco grid to be sold, if the demand at the moment this electricity is generated is

weak and no other utility company will purchase this generation for a peroid of time, then Kypco has lost generated powen and money. Kypco cannot store up electricity. Electricity must be used the moment it is generated or it is lost unuseable electricity. Generation from Roof top solan systems work on the same principals as Lousia power plant - in othen words electricity must be used at the moment it is generated or it is lost unuseable electricity. If there is no demand for this extra Roof top solan system generation when it is generated and Kypco cannot store it, why should Kypco customens pay for this lost and unuseable electricity.

I want to remind the PSC about what happened in Texas during the winten of 2020-2021. a lot of lives were lost in texas because of powen outages because of these part time electrical systems - solar and wind. I ask the PSC to protect Kentuc Ky citizens against the greed of these solan companies and stop them from destroying Kypco grid. Solar companies does not care about how much expense they put on poor

Kentuckians by making power bills unaffordable Most Kentuckians does not keep up with what goes on in Frankfort so I ask the PSC to protect these people.

Respectifully

Juddie Coleman

Exhibit 1

HAMMOND
POWER SOLUTIONS INC.

# Back Feeding Transformers

Back-feeding involves wiring a standard step-down transformer in reverse and using it as a step-up transformer. The best solution when a step-up transformer is needed is to have it designed for the application. While a standard transformer can be back-fed, several problems can occur.

1. All transformers have winding resistance that causes a voltage drop. A standard transformer has about a 3-5% voltage drop caused by winding resistance at full load. Transformer designers compensate the windings ratios to account for the voltage drop. When a transformer is back-fed, the compensated winding ratio will work against the user. Not only does the 3-5% voltage drop occur, the compensated windings ratio also adds a 3-5% voltage drop. As a result, back-fed transformers can have a 6-10% voltage drop at full load. While this can be somewhat adjusted by using the taps if available, the total effect may still be a lower voltage.
2. All transformers have inrush current when energized lasting for a few cycles until the electrical fields establishes itself. Manufactures design transformers to limit inrush but this will work against the user when it is back-fed. As a result, back-fed transformers can have large inrushes. The inrush can cause many problems including nuisance tripping of circuit breakers and fuses and voltage drops. The inrush problem can increase if the transformer is k-rated, low temperature rise or high efficiency. This high inrush can also stress the insulation system since it is encountering high currents.
3. A neutral can not be derived from a back-fed transformer since standard transformers typically do not have a four wire primary. Back-fed transformers may also develop large fault currents in the event of a catastrophic fault. The larger the transformer, the larger the potential fault current. When back-feeding a delta-wye transformer, the ground strap normally provided between the XO terminal and the case ground must be removed, only the case can be grounded.
4. 5 kV class transformers are never recommended to be back-fed.
5. Back-fed transformers may void the standard warranty and Hammond does not recommend back-feeding a transformer. Due to the higher fault current that could occur during a fault with a back-fed transformer, the mechanical stresses that could occur during a fault may cause mechanical damage. Back-fed transformers may not meet local and national electrical codes.

A step-up transformer, while not readily available as a standard transformer, can be designed to limit the problems that would occur back-feeding a standard transformer. The user needs to weigh the risk and liability when back-feeding a transformer.

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Exhibit 2

March 10, 2021



# The Net Loss of Net Metering

*Because of the way the electric grid works, net metering is wr*

By Kermit Frosch | April 15, 2016



*For every complex problem there is an answer that is clear, simple, and wrong.*

*H. L. Mencken*

Let's assume for purposes of discussion that rooftop solar power generation is such a Good Thing that it should be encouraged with subsidies. Solar subsidies can be overdone as the Germans found when businesses started opening factories and creating jobs in other countries because they couldn't afford German electricity prices. It's important to get subsidy programs right.

Rooftop solar systems receive two subsidies in the United States. The federal government offers tax credits when solar systems are installed, and many states force electric companies to buy surplus electricity from homeowners and other solar sources at full retail price. This is called "net metering."

If a homeowner pays, say, 10 cents per kilowatt-hour, and his solar cells push a kilowatt-hour of power back through the meter into the grid, why shouldn't the power company pay what they'd charge the homeowner for it?

This is clear and simple. Because of the way the electric grid works, however, net metering is wrong.

**Electric Grid Made Simple**

A few formulas will show why net metering is wrong. The formula for electric power is $\mathbf{P = V \cdot I}$ where **P** is the electric power in watts (**W**), **V** is the voltage in volts (**V**), and **I** is the current in amps (**A**).

Your laptop power brick, rated 5 volts at 5 amps, supplies 25 watts, 5 volts times 5 amps. Your electric meter tells the electric company how many watts you've used and for how long. If you run a one kilowatt load for one hour, you've used one kilowatt-hour of power and pay accordingly.

The electric company worries a lot about power because that's what you pay for, but they worry nearly as much about power *loss* in their wires. They can't bill for lost electricity, which is distasteful. Power loss through a transmission cable is ($\mathbf{I^2R}$) where **I** is current in amps and **R** is electrical resistance in ohms. Loss is the current *squared* times the resistance of the wire.

If you cut resistance in half by using a better conductor, you cut power loss in half. Most electric wires are made of copper because copper offers the least resistance of any wire power companies can afford. Gold and silver wires have less resistance, but they're a bit pricey when bought by the mile.

Electric companies work *hard* to find just the right alloy to minimize resistance while being strong enough not to break, but the real payback comes from cutting current. Power loss is proportional to the *square* of current. If you cut current in half, you reduce loss by 75%.

That's why power companies transmit power at much higher voltages than you find in your house. Suppose your subdivision needs a certain amount of power **P**. The formula is $\mathbf{P = V \cdot I}$. If you need 100 watts of power and you transmit it at 10 volts, you'll need to send 10 amps; 10 volts times 10 amps is 100 watts. That will lose power at 100 (10 squared) times the resistance of your wire.

If you transmit at 100 volts, you'll need only one amp to transmit 100 watts; 100 volts times 1 amp is 100 watts. Loss will be 1 (1 amp squared) times the resistance. Raising the voltage cut your losses by a factor of 100, and you can use a thinner wire because there's less current flowing. All you need is better insulation to protect people against the higher voltage.



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Long distance transmission lines run at millions of volts. Once power gets near a neighborhood, it's stepped down to 20,000 volts. The company puts transformers on poles to step 20,000 volts down to the 110 volts your house needs. One transformer serves 3-5 houses depending on their load.

**Net Metering's Achilles Heel**

Suppose your solar panels feed one kilowatt-hour back through your meter and the other houses which are fed by your transformer have no solar power. Your power flows through the wires to their houses but *there are losses along the way* so the power company loses money on the deal. Although they charge your neighbor retail prices for the delivered part of kilowatt-hour they bought from you, they have to make up the losses in the power line to sell an entire kilowatt-hour to your neighbor.

It's worse if your neighbors also have solar cells. Suppose you and they together have a 10 kilowatt-hour surplus. The power company can't sell it to other users on your transformer, so the power must go backward through their transformer onto the 20,000 volt line.

Utility pole transformers have been lovingly redesigned over the last century or so to step 20,000 volts down to 110 as efficiently as possible. The Energy Information Administration estimates that about 5% of all American electric power is lost in transmission, so pole transformers are pretty efficient when stepping down.

When stepping *up*, however, they aren't nearly as efficient because they weren't designed to do that. The power company takes a much worse hit due to power loss when you and your green neighbors run their transformer backward to step up your 110 volt power for the 20,000 volt line.

What's worse, power loss translates into heat. The power losses the company suffers when you run their transformers backward make the transformers hotter than expected.

When does this happen the most? At the height of summer, when your solar system is cranking and the transformers are being warmed by sun shining on them. Like any electrical appliance, if it fries, it dies.

Power companies are correct in saying that net metering requires that people who are rich enough to afford solar cells get a free ride at the expense of everybody else. Utilities are happy to buy the power, but argue that they should pay no more than the wholesale price they pay other generating companies.

**Battle of the Billionaires**

Solar City was started by Elon Musk to install rooftop solar energy systems. It's grown to about $350 million in annual revenue. Between the federal tax credit and selling surplus power at retail prices based on net metering, Solar City can install systems without charging homeowners anything. Solar gets the tax credits and customers buy less electricity.

This was working so well that the Nevada power company, which is owned by Warren Buffett, fought back. After much lobbying, the power company won price changes that made it uneconomical to install new solar systems and made existing installations liable for as much as $11,000 in additional payments over the next two decades. Solar City stock took a big hit.

Greens and Elon Musk are outraged, the power company is happy, and the bulk of customers who haven't gone solar and didn't understand what was going to happen to their electric rates as more rooftop solar went in don't much care. Both Warren Buffet and Elon Musk have much wampum; the lawyers are licking their chops in anticipation of long-running lawsuits.

**Rides for the Rich**

Like net metering, all green subsidies are designed to transfer wealth from low-income taxpayers to high income political donors. Consider Mr. Musk's Tesla, an all-electric automobile that sells for north of $100,000. Rich people who drive Teslas bask in feeling good about saving the planet while collecting tax rebates, discount parking, HOV use, and free battery charging, but the British have shown that this is an illusion. Although the car itself doesn't pollute, the electricity comes from somewhere, and most electrical generators pollute.

> *In China, because their coal power plants are so dirty, electric cars make local air much worse: in Shanghai, pollution from more electric-powered cars would be nearly three-*

*times as deadly as more petrol-powered ones.*

It gets worse when you take manufacturing into account.

> *Over a 150,000 km lifetime, the top-line Tesla S [in Britain] will emit about 13 tonnes of $CO_2$. But the production of its batteries alone will emit 14 tonnes, along with seven more from the rest of its production and eventual decommissioning.*
>
> *Compare this with the diesel-powered, but similarly performing, Audi A7 Spor* *which uses about seven litres per 100km, so about 10,500 litres over its lifetime* *makes 26 tonnes of $CO_2$. The Audi will also emit slightly more than 7 tons in produc* *and end-of-life. In total, the Tesla will emit 34 tonnes and the Audi 35. So over a dec* *the Tesla will save the world 1.2 tonnes of $CO_2$.*
>
> *Reducing 1.2 tonnes of $CO_2$ on the EU emissions trading system costs £5; but instea* *the UK Government subsidises each car with £4,500.*



Sure enough: green regulations are nothing more than schemes for transferring money from middle-class taxpayers to rich greens who want to feel good about themselves regardless of the facts. Mr. Musk isn't saving the planet with either Tesla or Solar City, he's exploiting an artificial market which was created solely by government fiat. His business is just another boondoggle, it's not a moral imperative.

At least his exploits haven't cost citizens anything besides money. We're fortunate that we haven't been forced to install complex home heating systems which leave people freezing in the dark as happened in England.

*Kermit Frosch is a guest writer for Scragged.com. Read other Scragged.com* ***articles by Kermit Frosch*** *or other* ***articles on Environment****.*

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# Reader Comments

**Bassboat said:**

So what if it is a push? Lose 1.2 tonnes of CO2 is no big deal over the life of the car. The real crux of the matter is the cash subsidies by the government. This is the big problem. The CO2 thing is a bunch of hogwash, more jobs have been thrown on the trash heap of history because of the greenies than you can count. They are the ones that owe an apology, not the folks who buy the cars. Ditto the solar panels. They will become practical one day, you can't force it.

April 15, 2016 10:40 PM