CONSIDERING ROOFTOP SOLAR AT CHAPEL HILL FRIENDS

WHY WE MIGHT WANT TO DEPLOY ROOFTOP SOLAR

TO REDUCE GREENHOUSE GAS EMISSIONS

Duke Energy, our provider, emits greenhouse gases by burning both coal and natural gas. Substituting solar power on the two buildings would eliminate emissions from large amounts of natural gas and close to 3 tons of coal[1]. Yes, the manufacture of the equipment will produce emissions, but the net savings in deployment of the solar panels will exceed the energy and emissions cost in manufacture of the equipment[2].

TO IMPROVE HEALTH

Orange County suffers from poor air quality, far worse than Asheville or Wilmingtone[2]. Vehicular emissions and coal are major culprits. The small particles blowing eastward from Duke Energy's coal generation plants lodge in our lungs and adversely affect our health. Not just asthma and lung problems, but cardiac problems result from the small particles. Burning less coal makes for better health.

TO PROVIDE AN EXAMPLE TO OTHERS

Facing the high traffic on Raleigh Road, the rooftop installations on our meetinghouse and schoolhouse will demonstrate our commitment to reducing climate change and for better air quality.

TO SAVE PAYMENTS FOR COAL, GAS, AND NUCLEAR ENERGY

The energy savings for the meetinghouse from not paying Duke Energy for coal, gas, and nuclear energy would be $746 or 43% of last year's $1,734 Duke costs. Projecting a 2% rate increase per year from Duke, we estimate energy savings not paid to Duke over ten years of $8,171 for the meetinghouse and $14,397 for the schoolhouse, $22,568 for both buildings. These energy savings do not refer to the difference between expenditures and income, or net cash flow. With a ten-year lease and no down payment beyond the rebate, we do not initially achieve a positive cash flow. A down payment or purchase would likely benefit us financially. The energy savings accord with our primary purpose of reducing gas emissions and achieving cleaner air.

TO CONSERVE CAPITAL

For non-profit organizations, the NC Legislature in 2017 under House Bill 589 authorized through 2022 rebates from Duke of $0.75 per AC kilowatt installed. By using the rebate of $6,750 for the schoolhouse and $2,850 for the meetinghouse, a total of $9,600, we would make no down payment.

THE OPPORTUNITY

Eagle Solar and Light is one of three entities authorized by the NC Utility Commission to lease rooftop solar. The others are Duke Energy and Secure Futures based in Virginia. We can obtain the same rebate from other companies if we purchase. The Peace and Justice Committee has solicited a proposal from Eagle Power and Light. The proposal (deployed on our website) describes through pictures, text, and data how Eagle could install solar roof panels on the meetinghouse and schoolhouse. Micro inverters installed for each solar panel would adjust for partial shade and optimize performance.

The Table of System Metrics summarizes the data and costs associated with a ten-year lease. The Duke Energy rebate would cover the down payment. At the end of the lease, there would be three options: 1) enter into a

new lease agreement, 2) purchase the equipment at fair market value, or 3) have Eagle remove the equipment at no cost. Financial options include 1) making a down payment in addition to the Duke rebate to reduce lease costs, 2) doing a five-year instead of a ten-year lease, and 3) purchasing the equipment outright instead of leasing. With any of these options, we would receive the same rebate from Duke Energy.

Since Carolina Friends School (CFS) currently pays the utilities for the schoolhouse, we assume that, with concurrence of the Meeting, CFS might decide to install solar and benefit from reduced utility payments. Maintenance will cost less per building if both the meetinghouse and the schoolhouse deploy rooftop solar. If we lease, Eagle Power and Light covers all maintenance. If we purchase, we pay for maintenance separately if not covered by a warranty. An interior monitor in each building will inform us of system performance.

Table of System Metrics from the Eagle Solar and Light Proposal

System Metrics	Schoolhouse	Meeting House
System Size (DC kW)	9.6	4.3
System Size (AC KW)	9.0	3.8
kWh per year generated- base (aurora)	12,523	6,434
Utility Cost per kWh	$0.1050	$0.1160
Utility Annual Increase in Rates	2%	2%
Base Annual Energy Savings-Year 1	$1,315	$746
Energy Savings over Ten Years	$14,397	$8.171
Duke Energy Rebate	$6,750	$2,850
Annual Lease Payment (Using only the Duke Rebate as a down payment. A larger down payment would reduce the lease payment.)	$1,500	$800.00
Additional Down Payment	0.00	0.00
Outright Purchase Price:	$29,280	$13,416
Fixed Purchase Price at lease end	$4,392	$2,012

RECOMMENDATION FROM THE PEACE AND JUSTICE COMMITTEE

The Peace and Justice Committee asks the Meeting to set up a subcommittee to investigate the possibility of leasing or buying solar panels for the Meetinghouse and to coordinate with CFS on the possibility of installing rooftop solar on the schoolhouse. The subcommittee will include members representing CFS, B&G, P&J, the Quaker Earthcare Witness group, Finance, and other interested Meeting members.

REFERENCES:

[1] In the last 12 months, the two buildings used 37,305-kilowatt hours (kWh) of Duke Power energy. 21% or 7,862 kWh hours came from coal. 7,862 kWh/ 2,460 kWh per ton = 3.2 tons of coal.

2 Atse Louwen et al. 2016. "Re-assessment of net energy production and greenhouse gas emissions avoidance after 40 years of photovoltaics development " *Nature Communications*, December 2016. https://www.nature.com/articles/ncomms13728

[3] For the Raleigh, Durham, Chapel Hill metropolitan statistical area, the EPA Air Quality Report for 2018 registered 121 days when the Air Quality Index was worse than "Good" versus only 48 days for the Asheville Metropolitan Area and only 21 days for the Wilmington Metropolitan Area. https://files.nc.gov/ncdeq/Air%20Quality/monitor/data_summaries/AQI/AMP410S_raleigh.pdf