

Computations of environmental benefits from Renewable Energy and Carbon Offset purchases from NC GreenPower are derived from the following:

One block of NC GreenPower = 100 kWh

Annual energy output supported by one block subscribed monthly:

100 kWh x 12 months = 1200 kWh

Amount of coal needed to generate one kWh:

10,500 BTU/kWh / 13,000 BTU/lb. coal = .81 lb coal/kWh

Source: <http://www.econsci.com/euar9801.html>

“Clearly, most of the heat rates are concentrated in the range of 9,000 – 12,000 BTU/KWh.” – Average 10,500 BTU/kWh

Source: <http://www.ket.org/trips/coal/agsmm/agsmmtypes.html>

“Bituminous coal has a carbon content ranging from 45 to 86 percent carbon and a heat value of 10,500 to 15,500 BTUs-per-pound.”
Average 13,000 BTU/lb. coal

Amount of indirect CO₂ offset annually by one block of NC GreenPower subscribed monthly (12 blocks over one year):

56.7 lb carbon per 100 kWh x 3.67 lbs. of CO₂ per lb. of carbon x 12 months = 2497 lbs.

Source: Marks Standard Handbook for Mechanical Engineers, 8th Edition, page 7-4. Shows ultimate analysis of bituminous coal to be 60-80% carbon – 70% average

Formula: (56.7 lb C per 100 kWh block): If coal is 70% carbon, then .81 lb coal/kWh x 0.7 = .567 lb C/kWh or 56.7 lb C/100 kWh. If one 100 kWh block is subscribed monthly, the annual savings in carbon is 56.7 lb.

Formula: (3.67 lbs. of CO₂ per lb. of carbon): Atomic weight of CO₂ = 44; atomic weight of C = 12; 44 lbs of CO₂ / 12 lbs of C = 3.67 or 3.67 pounds of CO₂ per pound of carbon.

Amount of NO_x offset annually by one block of NC GreenPower subscribed monthly (12 blocks over one year):

.0026 lbs. NO_x per kWh x 100 kWh per block x 12 months = 3.12 lbs NO_x

Source: EPA Power Profiler – eGRID 2002
Pounds of NO_x per kWh in North Carolina region: .0026

Amount of SO₂ offset annually by one block of NC GreenPower subscribed monthly (12 blocks over one year):

.0065 lbs SO₂ per kWh x 100 kWh per block x 12 months = 7.8 lbs. SO₂

Source: EPA Power Profiler – eGRID 2002
Pounds of SO₂ per kWh in North Carolina region: .0065

Annual reduction of CO₂ emissions per block of NC GreenPower subscribed monthly as environmentally equivalent to trees planted:

2497 lbs / 13 lbs CO₂ = 192 trees planted

Source: 56.7 lb carbon per 100 kWh block x 3.67 lbs. of CO₂ per lb. of carbon x 12 months = 2497 lbs. CO₂ offset annually per block of NC GreenPower subscribed monthly (see above methodology)

Source: http://www.treelink.org/docs/29_reasons.phtml

“One acre of new forest will sequester about 2.5 tons of carbon annually. Trees can absorb CO₂ at the rate of 13 lbs./tree/year.”

Annual reduction of CO₂ emissions per block of NC GreenPower subscribed monthly as environmentally equivalent to days not driven:

3039 miles not driven annually / 15,000 average miles per year driven * 365 days in one year = 73.949 days not driven

Source: 10,500 BTU of coal required to make 1 kWh of electricity x 100 kWh per block of NC GreenPower x 12 months / 4145 BTU per mile driven = 3039 miles not driven annually per block of NC GreenPower subscribed monthly (see above methodology)

Source: <http://www.csaa.com/global/articledetail/0,,1008010000%257c4512,00.html>

\$8431 (estimated annual automobile operating cost per year) / \$0.562 per mile operating cost = 15001.77 miles or 15,000 miles estimated average annual miles driven

Annual reduction of CO₂ emissions per block of NC GreenPower Carbon Offset subscribed monthly directly equivalent to miles not driven:

Source: <http://www.epa.gov/OMS/climate/420f05001.htm>

CO₂ emissions from a gallon of gasoline = 19.4 pounds/gallon

Source: http://www.nhtsa.dot.gov/nhtsa/Cfc_title49/ACTchap321-331.html

The average miles per gallon that car makers are required to meet for fuel efficiency = 27.5 MPG (as of 2008)

15,000 miles (gal/27.5 miles) (.114mmBTU/gal) (154.4lbs/mBTU) (1 block/500 lbs)
19.4 lbs/gal x 27.5mi/gal

<http://www.eia.doe.gov/oiaf/1605/coefficients.html>

Annual reduction of direct CO₂ emissions per block of NC GreenPower Carbon Offset subscribed monthly as environmentally equivalent to trees planted:

6000 lbs / 13 lbs CO₂ = 462 trees planted

Source: http://www.treelink.org/docs/29_reasons.phtml

“One acre of new forest will sequester about 2.5 tons of carbon annually. Trees can absorb CO₂ at the rate of 13 lbs./tree/year.”