

The Green Calculator used by the Webinar Portal estimates the savings related to fuel consumption, salary, carbon emission, and social cost of carbon realized by participants who participated in the webinars presented through the Webinar Portal for Forestry and Natural Resources and the Webinar Portal for Conservation of Natural Resources.

The Green Calculator is based on a modified green savings model originally created by Robert Bardon, Ph.D., Associate Dean of Extension & Engagement with the College of Natural Resources at NC State University and by Eric Taylor, Ph.D., Associate Professor & Extension Specialist – Forestry with Texas A&M AgriLife Extension Service. The Webinar Portal's Green Calculator uses standard formulas for calculating the savings however; to estimate the savings, several assumptions are made since the online Webinars can be attended by anyone anywhere in the world.

### Assumptions

1. Registered participant will travel to attend similar classroom training as the webinar at a University most likely to conduct such training in their state.
2. Only one registered participant will travel per vehicle.
3. The average miles per gallon for a participant vehicle in the United States is set at 20 MPG. This is slightly less than 22.4 MPG, which is being reported for the US. (<http://www.project.org/info.php?recordID=384> )
4. Current fuel prices can be determined online at <http://www.eia.gov/petroleum/gasdiesel/xls/pswrgvwall.xls>
5. The average miles per hour a vehicle travels is 52 MPH.
6. The average pay for a registered participant is \$26.28/hour, which is the pay of a professional forester. Federal Bureau of Labor Statistics, <http://www.bls.gov/oes/current/oes191032.htm> . The professional forester was selected for the labor rate based on the dominant participant in the webinars to date.
7. A gallon of gasoline burned produces 19.4 pounds of CO<sub>2</sub>. EPA standard for calculating emissions. <http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1001YU0.txt>
8. The social cost of CO<sub>2</sub> per metric ton of CO<sub>2</sub> is \$6.00. (Peters-Stanley, M. and K. Hamilton. 2012. Developing Dimension: State of the voluntary carbon markets 2012. Ecosystem Marketplace and Bloomberg New Energy Finance, 2012.)

### Sum of Fuel Cost Savings (\$)

#### Calculation Summary:

This savings figure is calculated based on the participant's round-trip distance from their home zip code to an in-state University most likely to conduct similar training divided by an average MPG estimate multiplied by an estimated cost of fuel. The participant's distance to and from the in-state University is based on the straight line distance between the longitude / latitude coordinates of the participant's zip code and their in-state University's zip code. We have identified the Universities in each state that are most likely to provide similar training and have assigned zip codes and longitude / latitude coordinates to each of those Universities for

purposes of our calculations. Existing published zip code longitude / latitude coordinate tables are used to estimate the coordinates of the participant. Before using the basic formula below to derive the Sum of Fuel Cost savings, the Haversine formula is used to calculate the straight line distance between the two coordinates (participant and University location).

**Formula:** *total distance / average MPG \* estimated cost of fuel per gallon*

### **Sum of Salary Cost Savings (\$)**

#### **Calculation Summary:**

The Sum of Salary Cost Savings is calculated based on the estimated time it would have taken the participant to travel (round trip) from his/her home to the in-state University most likely to conduct similar training. Here we use distance (using the same approach from the Sum of Fuel Cost Savings above) divided by an average 52 miles per hour multiplied by an estimated average hourly salary for a professional forester of \$26.28, as published by the Federal Bureau of Labor Statistics, <http://www.bls.gov/oes/current/oes191032.htm>.

**Formula:** *total distance / average miles per hour \* average hourly pay rate*

### **Sum of CO<sub>2</sub> Savings (lbs)**

#### **Calculation Summary:**

The carbon dioxide (CO<sub>2</sub>) savings is calculated based on the estimated amount of fuel that is saved from not having to travel to the in-state University to attend the training. We used the gallons of fuel saved (as used in the Sum of Fuel Costs Savings calculation above) multiplied by the standard published amount of CO<sub>2</sub> stored in a gallon of fuel which is 19.4 lbs.

**Formula:** *gallons of fuel \* lbs of CO<sub>2</sub> stored in a gallon of fuel*

### **Social Cost CO<sub>2</sub> Savings (\$)**

#### **Calculation Summary:**

The Social Cost of Carbon (SCC) is the estimated price of the damage caused by each ton of CO<sub>2</sub> released in the atmosphere. It is intended to include monetized damages due to changes in net agriculture productivity, human health, property damages from weather changes and the value of ecosystem services. This is calculated based on the pounds of CO<sub>2</sub> saved (as calculated by the Sum of CO<sub>2</sub> Savings above) divided by 2204.62 (the number of pounds in a metric ton) and multiplied by \$6, the social cost of CO<sub>2</sub> per metric ton of CO<sub>2</sub> as published by Peters-Stanley, M. and K. Hamilton. 2012. Developing Dimension: State of the voluntary carbon markets 2012. Ecosystem Marketplace and Bloomberg New Energy Finance, 2012.

**Formula:** *pounds of CO<sub>2</sub> saved / pounds in a metric ton \* social cost of CO<sub>2</sub> per metric ton*

### **Sum of Total Savings (\$)**

The Sum of Total Savings is the total cost savings from the three dollar-savings calculations above (Sum of Fuel Cost Savings, Sum of Salary Cost Savings and Social Cost CO<sub>2</sub> Savings).

This implementation of the Green Calculator as used in the Webinar Portal was implemented by Darryl Outlaw, IT Senior Manager for Southern Regional Extension Forestry, University of Georgia. ( <http://sref.info> )

The Webinars Portal is sponsored by Southern Regional Extension Forestry, University of Georgia and provides links to forestry, natural resource and conservation related education and information in webinar format. Our primary partners include a regional team from North Carolina State University, the USDA Forest Service, the University of Florida, the University of Georgia, Clemson University, Mississippi State University, the University of Kentucky, Texas A&M University, Texas Agrilife, and the USDA Natural Resources Conservation Service.

Website Address

<http://www.forestrywebinars.net>

<http://www.conservationwebinars.net>