

Community Forestry Assistant



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Urban Forests and Carbon Trading

Urban forests have a role to play in reducing levels of carbon dioxide and other greenhouse gases (GHG) in the atmosphere. Urban trees reduce atmospheric carbon dioxide (CO₂) through sequestration and reducing GHG emissions by conserving energy used for space heating and cooling. Carbon sequestration is the process by which CO₂ is transformed into above and below ground biomass and stored as carbon. During photosynthesis, atmospheric CO₂ enters the leaf through stomata, combines with water, and is converted into cellulose, sugars, and other materials in a chemical reaction catalyzed by sunlight. Most of these materials become fixed as wood, although some are respired back as CO₂ or used to make leaves that are eventually shed by the tree.



Once trees die or are cut down, they begin to decompose and return stored carbon to the atmosphere. The rate of decomposition differs greatly based on the use of the wood. Wood that is chipped and applied as mulch decomposes relatively quickly, while wood salvaged for use in wood products can survive 50 years or more before gradually decomposing. The combustion of gasoline and diesel fuels by vehicle fleets and by equipment such as chainsaws, chippers, stump removers, and leaf blowers is a GHG emission source. Typically, CO₂ released due to tree planting, maintenance, and other

program-related activities is about 2 to 5% of annual CO₂ reductions obtained through sequestration and reduced power plant emissions.

Recently, the city of Moscow, Idaho, the Clearwater Resource, Conservation, and Development Council (RC&D), and the Latah Soil and Water Conservation District partnered to implement a pilot project that used the Chicago Climate Exchange's protocol and Moscow's urban tree inventory to calculate the CO₂ stored in the city's urban forest. Moscow's goal is to be able to use this information to one day sell their carbon "credits" to GHG emitters who are seeking ways to reduce their carbon footprint. In effect, the buyer is paying a charge for polluting, while Moscow is being rewarded for having reduced emissions by more than was needed. Trading carbon credits has the potential to produce additional income for landowners and operators, including cities.

Very few GHG tree projects have been undertaken because of uncertainty regarding their performance and permanence. The Urban Forest Project Reporting Protocol was developed to reduce this uncertainty by providing a standard set of guidelines for use throughout the United States. The protocol provides detailed guidance to ensure that tree projects meet eligibility requirements, produce GHG reductions that are additional to a baseline, are sustained for at least 100 years, and do not detract from management of existing trees. The protocol also describes how to calculate and report carbon storage by project trees, as well as emissions associated with their maintenance. Adoption of the urban forest protocol sets the stage for investment in large-scale tree planting and stewardship projects because projects that adhere to the protocol's guidance will generate real, reliable, additional and credible GHG reductions. Registered carbon reductions are "quality offset credits" that pose less risk to investors than unregistered credits. The market for quality offset credits is growing as corporations, utilities, and individuals purchase credits to offset their emissions or become carbon neutral.

The future of the CO₂ and other GHG trading market is currently being decided. H.R.2454, the American Clean Energy and Security Act of 2009, was passed by the House of Representatives in June of 2009 and is now being debated in the Senate. This is the Waxman-Markey comprehensive energy bill, known for short as "ACES," that includes a cap-and-trade global warming reduction plan designed to reduce economy-wide greenhouse gas emissions 17 percent by 2020. Other provisions include new renewable requirements for utilities, studies and incentives regarding new carbon capture and sequestration technologies, energy efficiency incentives for homes and buildings, and grants for green jobs, among other things.

California Example

Some initial research suggests that planting lots of trees in California communities can make a difference when it comes to fighting climate change. The California Global Warming Solutions Act of 2006 (AB32) requires a reduction in GHG emissions to 1990 levels by 2020. This amounts to a reduction of 173 Mt (million metric tons) from the predicted level in 2020. Using aerial photography, researchers found 242 million empty tree planting sites in California cities. If 50 million trees were planted, they would sequester about 4.5 Mt CO₂ (million tons) annually. If they were planted strategically to shade east and west walls of residential buildings, they would reduce air conditioning energy use by 6,408 GWh, equivalent to an average annual CO₂ equivalent emission reduction of 1.8 Mt. The estimated total CO₂ reduction of 6.3 Mt annually is 3.6% of the 173 Mt statewide goal or about the same as would be obtained from retrofitting homes with energy-efficient electric appliances.