



## 25x'25 Carbon Work Group Q & A

### About This Project

- **What is 25x'25?**

25x'25 is a renewable energy initiative through which nearly 800 partner organizations are working to accomplish the 25x'25 vision: By 2025, America's farms, forests, ranches and other renewable energy sources, will provide 25 percent of the total energy consumed in the United States, while continuing to produce safe, abundant, and affordable food, feed and fiber.
- **What is 25x'25's mission?**

25x'25's mission is to document, affirm and promote to policy makers, energy stakeholders and information multipliers the fact that America's working lands can provide 25 percent of the nation's energy needs from renewable sources while simultaneously:

  - producing abundant and affordable food, feed and fiber;
  - sustaining and enhancing soil, water and air quality and wildlife habitat;
  - sequestering carbon and reducing greenhouse gas emissions;
  - strengthening national security;
  - keeping the cost of energy affordable;
  - reducing dependence on imported fossil fuel; and
  - boosting the economy and creating millions of new jobs.
- **What is the 25x'25 Carbon Work Group?**

The 25x'25 Carbon Work Group is a team of over 50 agricultural, forestry, conservation, academic and business leaders who have been tasked by the 25x'25 National Steering Committee to analyze agriculture and forestry's role in a reduced carbon economy and develop recommendations for how each sector can capitalize on efforts to reduce and capture carbon and greenhouse gas emissions.
- **What is agriculture and forestry's role in a reduced-carbon economy?**

In producing clean, renewable forms of energy, the agricultural and forestry sectors displace fossil fuels and reduce greenhouse gas emissions. In addition, production practices associated with renewable energy production sequester carbon and other greenhouse gases that otherwise might escape into the atmosphere.

### Technical Background Questions

- **What are greenhouse gases?**

Many chemical compounds found in the Earth's atmosphere act as greenhouse gases (GHGs). These gases allow sunlight to enter the atmosphere freely. When sunlight strikes the Earth's surface, some of it is re-radiated back towards space as infrared radiation (heat). Greenhouse gases absorb this infrared radiation and trap the heat in

the atmosphere. Many gases exhibit these “greenhouse” properties.<sup>1</sup> There are six primary greenhouse gases: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and fluorinated gases (hydrofluorocarbons-HFCs, perfluorocarbons-PFCs, and sulphur hexafluoride-SF<sub>6</sub>). CO<sub>2</sub>, the most important GHG, has been increasing rapidly in the atmosphere primarily due to the burning of fossil fuels and deforestation.

- **What is carbon sequestration?**

Carbon sequestration is the act of removing carbon from the atmosphere and storing it. Terrestrial sequestration occurs when plants remove CO<sub>2</sub> through photosynthesis and store it in their biomass and the soil. The oceans also absorb CO<sub>2</sub>, though this increases ocean acidity. CO<sub>2</sub> can be artificially sequestered in geologic reservoirs when captured at a power plant and stored in underground aquifers. (The latter has yet to be proven on a large scale.)

- **What is carbon cycling?**

Carbon cycling is the process by which carbon moves through the environment. There are four major reservoirs for carbon: the atmosphere, biosphere (plants, soil), oceans, and geosphere (including fossil fuels). Carbon is exchanged between these reservoirs through different processes—erosion, photosynthesis, respiration (biomass decaying), and ocean circulation, among others.

- **What is the difference between them?**

Carbon cycling is an exchange of carbon between the reservoirs mentioned above and usually kept in balance. Carbon sequestration is one part of the carbon cycle. However, as humans increase the amount of carbon being released to the atmosphere, we will need to consider additional ways to increase sequestration to help restore balance to the carbon cycle. Where it may take the natural carbon cycle thousands or possibly millions of years to restore balance, we can enhance sequestration by strategically using farm, forest and ranch land and potentially by capturing CO<sub>2</sub> at power plants and other sources of emissions.

- **What is a carbon source?**

A carbon source releases carbon into the environment. Decaying biomass releases carbon as CO<sub>2</sub> during respiration. Burning fossil fuels is a major carbon source.

- **What is a carbon sink?**

A carbon sink is a storage site for carbon. Plants, trees, and soils can be carbon sinks. Oceans can also be carbon sinks. However, different processes may turn sinks into sources. For example, if a forest burns in a wildfire, it can become a carbon source.

- a. **Does a forest, managed sustainably for forest products, qualify as a sink for sequestered carbon?**

Several carbon-accounting programs consider sustainably managed forests as valid carbon sinks, since they effectively remove carbon from the atmosphere for long periods, often longer than undisturbed trees in natural settings do.

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<sup>1</sup> Energy Information Administration, DOE, “Greenhouse Gases, Climate Change, & Energy” May 2008. Available at <http://www.eia.doe.gov/bookshelf/brochures/greenhouse/Chapter1.htm>

Thus, a forest landowner may justifiably claim a credit if he or she can demonstrate that harvested products are likely to prevent their carbon content from re-entering the atmosphere for a long period.

**b. Are forest products, themselves, carbon sinks?**

To the extent harvested forest products, such as building products or paper products, prevent a portion of woody cellulose from breaking down into carbon and re-entering the atmosphere, they are carbon sinks. The quality of the carbon sink—the extent to which its carbon-retention may be assured to persist over time—will influence how various carbon-accounting programs discount it in the offsets market. Since it is unreasonable for a particular, individual forest product's life to be traced, the discount would be determined by historical and predicted future rates of decomposition for products in its class.

**c. Are agricultural products with relatively long lives, such as cotton, wool, or leather, carbon sinks?**

To our knowledge, setting up an accounting system for agricultural products has only been proposed for forest products, but the same logic could be applied to other classes of long-lived agricultural products, provided that their sequestration of carbon is long-lived and predictable in the aggregate.

## Policy Questions

### General

- **What are the currently discussed policy options for controlling greenhouse gas emissions?**

There are three main options for controlling greenhouse gas emissions. A carbon tax can be applied to increase the cost of carbon-rich materials, such as fossil fuels, and discourage their use. A cap and trade system can limit the allowable amount of greenhouse gases released to the atmosphere. The Clean Air Act could also be applied to regulate greenhouse gases as pollution. All three options will be described in more detail below. Additional complementary policies, like increasing vehicle fuel economy or implementing a low carbon fuel standard, may also be used to control greenhouse gas emissions.

- **How would collected revenues be allocated?**

The prevailing sentiment is that revenues collected from a carbon tax, auctioning allowances for a cap and trade system, or fines, would be used to promote additional climate change solutions, such as investing in clean energy technology research and development (R&D), modernizing the electric power grid, or helping offset higher energy costs for consumers. How revenues will be allocated will be set by legislation that has yet to be passed.

- **What is the timetable for Congressional action on GHG legislation?**

Many observers believe that Congress will take up economic and energy legislation before tackling climate legislation, but they may be combined. In either case, economic and energy legislation will create incentives for low-carbon technologies and promote energy efficiency, both important for meeting the climate challenge. The international community is working to forge a successor agreement to the Kyoto Protocol by

December 2009, so there is significant pressure for the U.S. to pass domestic legislation in anticipation of international negotiations. President Obama has vowed to make climate legislation a top priority, and Speaker Pelosi is expected to work closely with Rep. Waxman, Chairman of the House Energy and Commerce Committee, to take early action.

### Carbon Tax

- **What is a carbon tax?**

A carbon tax sets a price per ton of GHG emissions. Sweden imposed a carbon tax in 1991, and has gradually been increasing the tax rate over that last few decades.

- a. **Under a carbon tax system, how would the taxed entities be defined?**

Similar to a cap and trade system, taxed entities would be defined by legislation, but would likely be upstream sources, such as petroleum refineries and large power plants.

- **What are the advantages of a carbon tax?**

A carbon tax is often touted as simpler to administer than a cap and trade system and fixes the cost of emissions in a more stable fashion. Revenues that are collected could be used to fund clean energy R&D, offset distortionary taxes (like the income tax), or aid consumers or industries that are facing higher energy costs.

- **The disadvantages?**

A carbon tax is a much less flexible mechanism because it does not set up a trading system where entities that can reduce emissions more cheaply can trade carbon credits with those that cannot. Under a carbon tax, it is also unlikely that a large-scale offset market (offsets are explained below) will emerge, though a voluntary market may remain. A carbon tax also does not establish emission limits, which may impose costs without the guarantee of reaching a meaningful goal. A carbon tax is not seen as politically feasible to pass.

A carbon tax will also have a different impact on agriculture and forestry sectors than a cap and trade program. Under a carbon tax, the agricultural and forestry sectors may be subject to a tax like all other sectors. However, a hybrid system is possible where an offset program could be wed to a carbon tax system, allowing sectors such as agriculture and forestry to contribute low-cost offsets according to their abilities.

- **How could a goal be set and enforced with a carbon tax?**

By placing a price on carbon emissions, the cost of pollution is internalized into business decisions. This, in turn, stimulates investment in new technologies that will result in reduced emissions. Setting the right price on carbon will be key to attaining the goal.

### Clean Air Act

- **Can the Clean Air Act be used to regulate GHGs?**

In April 2007, the Supreme Court ruled in *Massachusetts v. EPA* that all six greenhouse gases qualified as air pollutants and therefore could be regulated by the EPA under the Clean Air Act (CAA). This ruling did not mandate regulation, however, but rather directed the EPA to assess the danger that new motor vehicle emissions posed to public

health. If greenhouse gasses meet the endangerment test, then the EPA will be obligated to set standards for new motor vehicles. The EPA has also been petitioned to set standards for non-road vehicles, including construction, shipping, and farming equipment, and legal challenges have been brought to try to control emissions from coal power plants. Even though the Supreme Court case ruled on motor vehicles, it is likely that stationary sources would also be addressed.

### Cap and Trade

- **What is Cap and Trade and how does it work?**

A cap and trade system sets a national cap, or limit, on how many greenhouse gas emissions are allowed. The government then creates allowances (legal permits to emit) for that amount of emissions. Entities that reduce their emissions to a level below their owned allowances generate 'surplus' allowances that can then be traded among capped entities.

- **What is a carbon credit?**

A carbon credit, also known as an allowance, is the legal right to emit one ton of CO<sub>2</sub>, or the equivalent of one ton of CO<sub>2</sub> (MTCO<sub>2</sub>e) for other GHGs. Carbon credits can be traded amongst entities under a carbon cap.

- **What do we mean by sectors?**

Sectors are groupings of economically similar entities. For example, agriculture is one sector and electricity producers are another. Some sectors will be regulated under a carbon cap, while others will not.

- **What is a capped sector and how will they be defined?**

A capped sector is one that will have to limit its GHG emissions. Capped sectors are determined by how many emissions the sector is responsible for, the number of entities within the sector, and ease of administering a cap for the sector. The carbon cap is likely to apply to "upstream" sectors such as oil refineries, rather than "down stream" entities such as gas stations. There are fewer refineries than gas stations, so this will ease the administrative burden of managing the cap and trade system. Even within a capped sector, not all entities may have to reduce emissions. For example, power plants under a specific size may not be regulated. Climate legislation will determine the guidelines for determining capped sectors.

- **How would allowances be distributed?**

The government may decide to give allowances away for free or raise revenues by auctioning them to capped entities. It is most likely that a hybrid system will be established where the number of allowances given away for free will be reduced over time. Most legislation and the existing Regional Greenhouse Gas Initiative in the Northeast propose auctioning most of the allowances.

- **What are offsets?**

Offsets represent emissions reductions achieved by an uncapped sector. Offsets allow greater flexibility for a cap and trade system and may reduce its overall cost. However, to maintain the integrity of carbon credit prices and to reach environmental goals, the

number of offsets allowed may be limited. For example, the Regional Greenhouse Gas Initiative is limiting the number of offsets, but has cost triggers to allow a larger percentage if carbon credit prices get too high. The rest of the terms in this section refer to offsets.

- **What is additionality?**

Additionality is one of the most important concepts for the offsets market. Because offsets are used to compensate for emission reductions that a capped entity would otherwise have to make itself, the reductions resulting from offset projects must be shown to be “in addition to” reductions that would have occurred without the offset credits. For example, if a water treatment plant was required to install more efficient furnaces, the facility would not qualify for offset credits even if it reduces GHG emissions because the action was already required by law.

- **What is a baseline?**

A baseline represents forecasted emission levels in the absence of the offset project. A GHG emission baseline must be established in order to quantify an offset project’s GHG reductions. The baseline is sometimes referred to as the “business-as-usual” scenario, or the “without-project” case. The difference between the baseline and the actual emissions after the offset project is implemented represents the reductions achieved by the project, and this amount is available to be credited as an offset. Offsets are only as credible as their baselines.

- **What is leakage?**

Leakage means that the planned rate of reductions might not materialize after the project has been completed because they have been increased elsewhere. For example, a farmer that reforests a plot of land may sequester carbon on his land, but new land elsewhere may need to be cultivated to account for lost production. Unintended emissions within a project’s boundary require the project owner to solve the problem. However, leakage is often outside the project boundary and beyond the control of the project owner.

- **What is permanence?**

Permanence refers to the length of time that carbon will remain stored after being sequestered in vegetation or soil. Permanence can be thought of as a type of project risk most often associated with biological and geologic sequestration of emissions. Agriculture and forestry entities understand that biological sequestration projects such as soil carbon, afforestation, or reforestation, possess inherent uncertainty and risk regarding the duration of the sequestration. These projects must account for this uncertainty if offset credits are to be fully fungible, or fully interchangeable with guaranteed emissions reductions.

### **Implications for Bioenergy**

- **Are carbon sequestration and bioenergy rivals, complements, or allies in energy policy?**

The answer is: it depends. In the case of harvested forest products, bioenergy and carbon sequestration appear to be rivals, since a forest product dedicated to bioenergy or biofuel production will sequester carbon in biomass only for the length of time the

tree is growing or the forest is expanding: once a bioenergy product is converted to energy, it releases its carbon to the atmosphere and ceases any function as an offset. However, if that bio-power offsets fossil fuel emissions, that bio-power may qualify for carbon credits or offsets, depending on whether or not the entity creating that power is capped or not. In the case of agricultural lands, carbon may be sequestered in the soil, qualifying for carbon offsets, while the crops may be harvested for bioenergy production.

#### **Additional Information**

- **Who can I contact for further information?**

- For questions about 25x'25, please contact Ernie Shea: [eshea@25x25.org](mailto:eshea@25x25.org)
- For questions about the forestry sector, please contact Neil Ward: [nward@forestresources.org](mailto:nward@forestresources.org)
- For questions regarding the 25x'25 Carbon Primer, please contact Jeffrey Frost: [jfrost@25x25.org](mailto:jfrost@25x25.org)

- **Where can I find more resources?**

You can find more resources, including the 25x'25 Carbon Primer entitled "The Role of Agriculture and Forestry in a Reduced Carbon Economy," at the 25x'25 Web site under the Carbon Initiative tab on the 25x'25 website: [www.25x25.org](http://www.25x25.org)