4. Carbon Sequestration

Background

Carbon sequestration plays an important role in the global carbon cycle. Green plants remove (sequester) carbon from the atmosphere through photosynthesis, extracting carbon dioxide from the air, separating the carbon atom from the oxygen atoms, returning oxygen to the atmosphere, and using the carbon to make biomass in the form of roots, stems, and foliage.

Globally, a very large amount of carbon dioxide—on the order of 120 billion metric tons of carbon—is sequestered in biomass.[44] At the same time, carbon is released to the atmosphere from vegetative respiration, combustion of wood as fuel, degradation of manufactured wood products, consumption of biomass for food by animals, and the natural decay of expired vegetation. The net numerical difference, or flux, between carbon sequestration and release can be viewed as a measure of the relative contribution of biomass to the carbon cycle. World flux associated with Earth's living matter is difficult to measure, but biomass is thought to provide a net "sink" equivalent to about 5.1 billion metric tons carbon dioxide per year.[45]

Forests can play an important role in offsetting human-produced carbon dioxide emissions. On average, trees are approximately 50 percent carbon by weight (oven-dry basis, excluding water).[46] The amount of carbon a plant can sequester depends on a number of variables, including species, health of vegetation, and age, but can be quite large. For example, one large sugar maple tree is capable of removing more than 450 pounds of carbon dioxide from the atmosphere in a year. At that rate, preserving approximately 31 trees per operating automobile in the United States would offset all U.S. automobile-related carbon dioxide emissions.[47]

Carbon sequestration on a national scale is substantial. The U.S. Environmental Protection Agency, relying heavily on the work of the U.S. Department of Agriculture's U.S. Forest Service, estimates annual U.S. carbon sequestration (generally defined according to the guidelines of the Intergovernmental Panel on Climate Change) at 691 million metric tons carbon equivalent,[48] which offsets approximately 10 percent of annual U.S. anthropogenic emissions of greenhouse gases.[49]

Projects Reported

For the 2003 reporting year, 51 entities reported projects on Form EIA-1605 that involved forestry or natural resources that sequestered carbon or reduced emissions (Table 14). The reporters included 48 electric companies, a private service organization providing reforestation services to corporate clients, a petroleum company, and a cement company. A total of 446 carbon sequestration projects were reported for 2003, an increase of 8 percent from 2002. Carbon sequestration projects were the third most numerous type reported on the long form, representing 23 percent of the projects reported for 2003. Methane reduction (470) and electricity generation (464) projects outnumbered carbon sequestration projects. The reported carbon sequestration projects were dispersed over a wide geographic area, including 33 States and 8 foreign countries. A total of 377 domestic and 69 international forestry projects were reported; 33 of the foreign projects represent individual equity shares in a single forest preservation project, the Rio Bravo Carbon Sequestration Pilot Project, in Belize.

[44]Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (Cambridge, UK: Cambridge University Press, 2001), p. 188.

[45]Intergovernmental Panel on Climate Change, *Climate Change 2001: The Scientific Basis* (Cambridge, UK: Cambridge University Press, 2001), p. 39.

[46]R.A. Birdsey, *Carbon Storage and Accumulation in United States Forest Ecosystems* (Washington, DC: USDA Forest Service, 1992), p. 12.

[47]Average mileage and fuel consumption for passenger cars from Energy Information Administration, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, DC, September 2004), p. 57, web site www.eia.doe.gov/aer. Carbon dioxide emissions per mile driven and gallon of motor fuel from U.S. Department of Energy, *Sector-Specific Issues and Reporting Methodologies Supporting the General Guidelines for the Voluntary Reporting of Greenhouse Gases Under Section 1605(b) of the Energy Policy Act of 1992*, DOE/PO-0028 (Washington, DC, October 1994), Vol. 2, p. 4.19.

[48]U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2002*, EPA-430-R-04-003 (Washington, DC, April 2004), p. 206, web site http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2004.html.

[49]U.S. anthropogenic greenhouse gases emissions were 6,936 million metric tons carbon dioxide equivalent in 2003. Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2003*, DOE/EIA-0573(2003) (Washington, DC, December 2004), p. ix, web site www.eia.doe.gov/oiaf/1605/ggrpt.

Carbon sequestration reported on Form EIA-1605 remained about the same in 2003 as it was in 2002, at 7.7 million metric tons carbon dioxide equivalent (Table 14). Of the 446 sequestration projects reported for 2003, most (354 or 79 percent) involved some kind of tree planting, which included afforestation, reforestation, urban forestry, and woody biomass production or agroforestry (Table 15).[50] These projects accounted for 15 percent of the sequestration (and related direct emission reductions) reported for 2003. Although only 39 forest preservation projects were reported, they accounted for 88 percent of the sequestration reported for 2003 (Table 16). Of the total sequestration for 2003, 89 percent was reported on behalf of foreign projects, including some very large forest preservation initiatives.

Urban forestry projects, involving the planting of trees in urban and suburban areas, accounted for 8 percent (34 projects) of the sequestration projects reported for 2003. Urban forestry projects are typically much smaller than forestry projects undertaken in rural or wilderness areas. The average carbon dioxide sequestration

Table 14. Number of Projects, Carbon Sequestered, and Net Reductions Reported on Form EIA-1605 for Sequestration Projects, Data Years 1994-2003

Data Year	Number of Reporters	Number of Projects	Sequestration (Metric Tons Carbon Dioxide Equivalent)	Net Emission Reductions (Metric Tons Carbon Dioxide Equivalent)	
				Direct	Indirect
1994	23	58	746,545	189	23,127
1995	44	175	1,190,754	378	48,730
1996	51	175	8,676,591	1,291	32,215
1997	56	279	9,849,807	6,160	—
1998	57	321	12,490,927	716	—
1999	53	401	9,623,599	3,406	—
2000	53	468	9,011,117	1,041	—
2001	51	369	7,956,823	1,114	—
2002 (R)	51	413	7,296,516	1,875	—
2003	51	446	7,730,969	1,860	—

(R) Revised data.
Source: Energy Information Administration, Form EIA-1605.

Table 15. Number of Sequestration Projects Reported on Form EIA-1605 by Project Type, Data Years 1994-2003

Data Year	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Tree Planting										
Afforestation and Reforestation	36	113	111	175	205	288	344	251	289	320
Urban Forestry	8	17	21	23	28	28	31	33	33	34
Woody Biomass Production and Other Agroforestry	8	14	2	3	3	3	3	3	3	2
Unspecified	—	2	1	—	1	—	—	—	—	—
Subtotal	44	131	133	199	235	318	376	285	323	354
Forest Preservation	2	22	29	38	43	38	42	37	38	39
Modified Forest Management	12	20	10	33	41	42	44	41	47	48
Conservation Tillage	1	1	1	2	2	2	2	2	1	1
Other Projects	3	4	5	10	4	5	5	5	5	5
Total	**58**	**175**	**175**	**279**	**321**	**401**	**468**	**369**	**413**	**446**

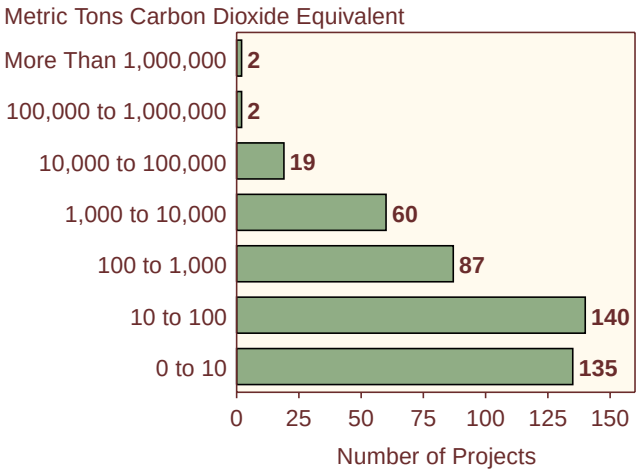
(R) Revised data.
Notes: Project totals do not equal sum of components, because some projects are counted in more than one category. In last year's report, "Unspecified" tree planting projects were included in the "Other Projects" category.
Source: Energy Information Administration, Form EIA-1605.

[50] Afforestation is the planting of new forests on lands that have not been recently forested. Reforestion is the replanting of forests on lands that have recently been harvested or otherwise cleared of trees. Urban forestry is the planting of trees individually or in small groups in urban or suburban settings. Agroforestry is the cultivation of trees in plantations for fuel or fiber.

reported per urban forestry project for 2003 was just 517 metric tons. In contrast, tree planting projects in rural or wilderness areas generally are much larger, accounting for 16 of the 19 projects that sequestered more than 10,000 metric tons carbon dioxide each in 2003 (Figure 12). For the 445 projects for which data were reported, average sequestration in 2003 was 16,456 metric tons carbon dioxide per project.

Almost all (414 or 93 percent) of the reported sequestration projects were undertaken in part to fulfill commitments made under the U.S. Department of Energy's Climate Challenge program.[51] Twenty-eight (28) of the investors in the UtiliTree Carbon Company[52] each submitted reports on the 10 projects that were operational in 2003. All the investors reporting were also participants in Climate Challenge. In addition, 36 sequestration projects reported on Form EIA-1605 for 2003 were undertaken as part of the U.S. Initiative on Joint Implementation (USIJI). Established under the Climate Change Action Plan (CCAP),[53] the USIJI is a pilot program that seeks to encourage foreign-based emission reduction and carbon sequestration projects conducted by U.S. and non-U.S. partners. The USIJI program has been inactive since 2000. The projects reported represent individual partner shares in two USIJI-approved forestry projects: the Rio Bravo Carbon Sequestration Pilot Project (Belize) and the Noel Kempff Mercado Climate Change Action Project (Bolivia).

Figure 12. Carbon Sequestration Projects Reported on Form EIA-1605 by Amount of Carbon Sequestered, Data Year 2003



Source: Energy Information Administration, Form EIA-1605.

Table 16. Carbon Sequestration Reported on Form EIA-1605 by Project Type, Data Years 1994-2003
(Thousand Metric Tons Carbon Dioxide Equivalent)

Data Year	1994	1995	1996	1997	1998	1999	2000	2001	2002(R)	2003
Tree Planting										
Afforestation and Reforestation	726.8	620.4	237.3	322.4	449.0	590.6	628.0	637.9	676.1	711.7
Urban Forestry	0.2	1.1	1.3	1.9	5.3	5.8	10.5	11.2	14.4	17.6
Woody Biomass Production and Other Agroforestry	356.6	213.9	1,964.6	1,962.3	1,962.3	503.2	392.5	425.7	428.0	425.4
Unspecified	—	7.0	*	—	0.1	—	—	—	—	—
Subtotal	727.0	627.7	2,188.1	2,263.6	2,393.6	1,077.3	1,006.4	1,056.4	1,097.6	1,135.7
Forest Preservation	73.0	615.8	6,546.5	7,545.5	10,073.4	8,523.4	7,879.6	6,804.3	6,055.9	6,469.6
Modified Forest Management	363.9	366.2	93.6	148.3	167.9	164.6	74.0	51.9	98.9	81.5
Conservation Tillage	4.3	4.3	3.3	8.5	8.5	8.5	11.9	4.4	4.4	4.4
Other Projects	2.8	3.1	4.1	44.9	58.9	59.1	59.1	59.8	59.7	59.8
Total	**746.5**	**1,190.8**	**8,676.6**	**9,849.8**	**12,490.9**	**9,623.6**	**9,011.1**	**7,956.8**	**7,296.5**	**7,730.9**

(R) Revised data.
*Less than 50 metric tons.
Notes: Project totals do not equal sum of components, because some projects are counted in more than one category. In last year's report, "Unspecified" tree planting projects were included in the "Other Projects" category.
Source: Energy Information Administration, Form EIA-1605.

[51]The Climate Challenge program, established in 1994, focused on commitments by electricity generators to reduce, avoid, or sequester greenhouse gases by the year 2000. Because its focus was on the year 2000, the Climate Challenge program is no longer active. It has been replaced by Power Partners[SM], which is the electric power industry's vehicle for participating in President Bush's Climate VISION initiative.

[52]The UtiliTree Carbon Company, a consortium of 41 North American electric utility companies investing in forestry projects that sequester carbon, was established under the Climate Challenge Program. It is administered by the Edison Electric Institute's (EEI's) Forest Carbon Management Program, which has identified and sponsored 10 ongoing domestic and international forestry projects. EEI has established a new program, PowerTree, to coordinate electric power industry sponsorship of forestry projects through Power Partners[SM] for Climate VISION.

[53]President William J. Clinton and Vice President Albert Gore, Jr., *The Climate Change Action Plan* (Washington, DC, October 1993), Appendix II, web site www.gcrio.org/USCCAP/toc.html.

Afforestation and Reforestation

Of the sequestration projects reported for 2003, 320 (72 percent) involved either afforestation or reforestation. The carbon sequestration and emission reductions reported for these projects totaled 0.7 million metric tons carbon dioxide, representing 10 percent of the total sequestration reported for 2003. All the afforestation and reforestation projects reported for 2003 were domestic.

American Electric Power, Inc. (AEP), a large investor-owned utility, accounted for the largest number of afforestation and reforestation projects, submitting 60 (19 percent) of the projects in this category for 2003. The AEP projects, all of which were afforestation projects, sequestered a reported 102,810 metric tons carbon dioxide in 2003. AEP reported 4 new domestic afforestation projects initiated in 2003, which sequestered a reported 2,121 metric tons carbon dioxide during the year.

Members of UtiliTree Carbon Company, a nonprofit consortium of 41 North American electric utilities, reported on 8 afforestation projects, including the Western Oregon Carbon Sequestration Project and 7 bottomland hardwood restoration initiatives in Louisiana, Arkansas, and Mississippi that are intended to convert marginal agricultural land to forest: the Mississippi River Valley Bottomland Hardwood Restoration, Upper Ouachita River Valley Bottomland Hardwood Restoration, Overflow Bottomland Hardwood Forest Restoration Project, St. Catherine-NFWF, Bayou Cocodrie Bottomland Hardwood Forest Restoration, St. Catherine-ESI, and St. Francis River Carbon Offset. The following afforestation and reforestation projects were reported for the first time for 2003.

The St. Francis River Carbon Offset Project, shares of which were reported by 28 UtiliTree Carbon Company partners, involves the restoration of 405 acres of bottomland hardwood forest using native tree species. The project site is on privately owned, marginal agricultural farmland in Lee County, Arkansas. Sequestration totaling 279 metric tons carbon dioxide equivalent was reported for 2003.

American Electric Power, Inc., reported on projects AEP-AGSPOIL-2003 and AEP-Private Lands-2003. AEP-AGSPOIL-2003 is an afforestation project on 1,089 acres of reclaimed mined grassland. AEP planted a total of 885,360 seedlings in 2003, including green ash; white ash; sycamore; pitlolly pine; loblolly pine; white oak; red oak; bur oak; sawtooth oak; black locust; and black alder. AEP-Private Lands-2003 involves financial assistance provided by AEP to private landowners who want to plant trees on their property in return for any associated greenhouse gas reduction benefits. These agreements are in 45- or 70-year durations, depending on the species planted and the nature of the site. The 2003 plantings involved afforestation of marginal agriculture cropland previously used for grain, hay, or cattle production. The species planted include white pine, white ash, green ash, sycamore, bur oak, white oak, and red oak. Together, these projects sequestered a reported 2,088 metric tons carbon dioxide equivalent in 2003.

ESI Florida Longleaf Pine Restoration, reported by Environmental Synergy, Inc., is located in the Withlacoochee State Forest managed by the Florida Division of Forestry. Native longleaf pine trees were planted in this 70-year project, which, beyond sequestering carbon, was designed to help create large forested blocks, rejoin fragmented forests, and create wildlife corridors for the benefit of neotropical migratory birds, waterfowl, and other animals such as deer and turkey. Carbon sequestration values were not estimated for this project.

DTE Energy/Detroit Edison reported on projects called "Six Lakes–2002" and "Miscellaneous Tree Plantings–2003." For Six Lakes–2002, DTE Energy/Detroit Edison planted trees on the site of the Six Lakes-Taggert Compressor Station, which is owned by Michigan Consolidated Gas Company (a subsidiary of DTE Energy). The planting in 2002 consisted of 80,000 red pine seedlings planted on 90 acres and 20,000 white spruce seedlings planted on 30 acres. These plantings reportedly sequestered 489 metric tons carbon dioxide equivalent in 2003.

Entergy Services, Inc., reported on projects called "Little Gypsy Plant Reforestation" and "Willow Glen Plant–Reforestation," which involved tree plantings at Entergy power plant sites. The former involved the planting of 20,000 nuttall oak, cypress, willow oak, green ash and pecan saplings and seedlings on 44 acres. The latter included the planting of 70,577 bottomland hardwoods on 234 acres, including the following species: water oak, nuttall oak, cottonwood, cherrybark oak, pecan, sweetgum, shumard oak, cow oak, sugarberry, green ash, and sycamore. These efforts sequestered a reported 462 metric tons carbon dioxide equivalent in 2003.

Urban Forestry

A total of 24 reporters, all of which were electric utilities, reported 34 urban forestry projects for 2003. For the 34 projects, total sequestration of 17,565 metric tons carbon dioxide was reported for 2003 (Table 16). Urban forestry projects are unique, in that under some circumstances they can reduce energy consumption as well as sequester carbon. Shade trees planted near buildings reduce summer air conditioning requirements; in addition, trees can act as windbreaks, reducing heating needs in the winter. Although the emission reductions associated with energy effects of urban forestry can be several times the sequestration benefits on a carbon dioxide equivalent basis, they are difficult to estimate. As a result, no energy-related emission reductions were submitted for 2003.

One new urban forestry project was reported for 2003. DTE Energy/Detroit Edison reported the planting of 3,082 trees, which were mostly white spruce, fir, pine, beech, oak, maple and birch. This project sequestered 5 metric tons carbon dioxide equivalent in 2003.

Forest Preservation

Forest preservation projects sequester carbon by avoiding the harvesting of timber or clearing of land and, thus, preventing the release of stored carbon. For 2003, 39 forest preservation projects were reported by 31 reporters; however, the vast majority (33) of these projects were reported separately by participating electricity generators as shares in the Rio Bravo Carbon Sequestration Pilot Project in Belize, held independently or through the UtiliTree Carbon Company. Also, 3 reporters provided information on their shares in the Noel Kempff Mercado Climate Action Project in Bolivia. No new forest preservation projects were reported for 2003.

The two largest forest preservation projects were reported by AES Hawaii and AES Shady Point, subsidiaries of the AES Corporation. AES Hawaii reported on the Mbaracayu Conservation project in Paraguay, and AES Shady Point reported on the OXFAM America Amazon project in Bolivia. Together, the two projects sequestered a reported 6.15 million metric tons carbon dioxide in 2003, representing 95 percent of the total sequestration reported for forest preservation projects (6.5 million metric tons carbon dioxide equivalent).

The Mbaracayu Conservation project is designed to offset carbon dioxide emissions from the AES Hawaii plant, a 180-megawatt circulating fluidized-bed coal-fired cogeneration plant on the island of Oahu. Sequestration of carbon is accomplished through the planting of fruit trees and cash-producing indigenous trees in the 143,000-acre Mbaracayu forest tract, which, according to AES, would have been sold to a timber company in the absence of the project.

AES Shady Point describes the OXFAM America Amazon Project as an innovative project to protect the tropical forest in the Amazon regions of Peru, Ecuador, and Bolivia. The project, which is being conducted in cooperation with national indigenous groups, OXFAM America, and the World Resources Institute (WRI), is intended to offset carbon dioxide emissions from the AES Shady Point plant in Oklahoma. The project will support efforts by indigenous groups to gain control over their lands and to develop sustainable resource extraction plans for the forest, thus avoiding tropical deforestation. WRI estimates that over 10 years the project would prevent the deforestation of 1.2 million hectares and avoid emissions of at least 233 million metric tons carbon dioxide equivalent.

American Electric Power, BP America, and PacifiCorp reported on the Noel Kempff Mercado Climate Action Project in Bolivia, which was accepted by the USIJI in November 1996. The project, which involves the preservation of 634,286 hectares of land on the southern and western boundary of the Noel Kempff Mercado National Park by incorporating it into the park, includes the following components: (1) carbon dioxide emission reductions through the cessation of logging activities and the protection of forest land from conversion to agricultural use; (2) protection, regeneration, and preservation; and (3) leakage prevention.[54] The sequestration reported for this project for 2003 totaled 243,660 metric tons carbon dioxide.

The Rio Bravo Carbon Sequestration Pilot Project, a forest preservation project in Belize, was reported by 28 utilities. Begun in 1995, the project is being undertaken through a partnership between Wisconsin Electric, Detroit Edison, Cinergy, PacifiCorp, and UtiliTree Carbon Company (which provided financial support), as well as The Nature Conservancy and a Belizean nongovernmental organization, Programme for Belize. A 14,400-acre parcel of forest threatened by agricultural conversion was secured, linking two forested Rio Bravo properties. The project implemented a sustainable forestry management program on the entire Rio Bravo Conservation and Management Area that aims to increase carbon sequestration through improved forest and timber management.

The entire Rio Bravo Carbon Sequestration Pilot Project sequestered an estimated 20,412 metric tons carbon dioxide in 2003, of which 19,890 metric tons (97 percent) was reported to the Voluntary Reporting Program.[55] The reported carbon sequestration for this project was estimated by defining a reference case that assumes a profile of carbon releases that would have occurred if the project had not been undertaken and the forest had been converted to agriculture over a 5-year period (1995-1999). The estimated carbon sequestration equals the projected avoided carbon releases. To date, it has been reported that the entire project has sequestered an estimated 4.4 million metric tons carbon dioxide. The UtiliTree Carbon Company estimates that most (91 percent) of that carbon dioxide was sequestered during the 5-year preservation phase of the project. The smaller annual sequestration totals reported for years after 2000 represent the accumulation of carbon in the forest that has occurred since the 1995 to 1999 preservation phase.

[54] "Leakage" refers to the migration of logging and land-clearing activities that would have occurred in the preserve to areas outside the preserve, which would offset the sequestration achievements of the project.

[55] Ten UtiliTree participants did not submit reports to the Voluntary Reporting Program for data year 2003, including one Canadian utility that is ineligible to report.

We Energies reported its independent sponsorship of an expansion to the Rio Bravo Conservation and Management Area, which added 20,630 acres to the preserve. We Energies reported that this preservation initiative sequestered an estimated 54,431 metric tons carbon dioxide equivalent in 2003.

Only one domestic forest preservation project was reported for 2003, by Alliant Energy, which reported sequestering 1,597 metric tons carbon dioxide by maintaining forested buffer lands around its power plants in the Wisconsin River Valley. This project involves the management of more than 10,000 acres along the Wisconsin River valley. Included in the land management plan are access restrictions for the preservation of osprey and eagle habitats in the forest.

Modified Forest Management

Modified forest management involves the modification of the management regimes of existing forests to increase their carbon capture rates. Of the 48 modified forest management projects reported for 2003, 29 were associated with two related reduced-impact logging initiatives in Malaysia. The first initiative was a pilot project reported by NEGT Corporation.[56] Started in 1992, this project implemented new logging techniques with the goal of reducing logging damage by 50 percent. The new techniques include pre-cutting of vines, directional felling, and planned extraction of timber on impact-reducing skid trails. On the second initiative, 28 utilities reported their shares of a full-scale project sponsored by the UtiliTree Carbon Company that introduced reduced-impact logging practices to 2,422 acres of forest beginning in 1997. The reported sequestration for the second initiative was 9,405 metric tons carbon dioxide equivalent in 2003.

American Electric Power reported the only new modified forest management project for 2003. This project was conducted in predominantly upland central hardwood stands ranging from 30 to 50 years in age. The stands were selectively harvested, removing overmature, mature, cull, and diseased trees, as well as other stems as necessary to improve growing relationships and maximize growth rates. The project is a continuation of annual forest management efforts reported separately since 1991. Including the 378 metric tons carbon dioxide equivalent for the 2003 project, these efforts together sequestered a reported 15,128 metric tons carbon dioxide equivalent in 2003.

Sequestration exceeding 10,000 metric tons carbon dioxide equivalent in 2003 was reported for the following three previously reported modified forest management projects:

- Southern California Edison Co. reported sequestration of 23,587 metric tons carbon dioxide equivalent by its Net Growth of Timber at Shaver Lake project.
- Alliant Energy's afforestation project also had a modified forest management component. The entire project sequestered a reported 19,958 metric tons carbon dioxide equivalent in 2003; however, Alliant Energy did not report the sequestration quantity attributable to modified forest management alone.
- American Electric Power's Guaraquecaba Climate Action Project, located in Brazil, sequestered a reported 11, 272 metric tons carbon dioxide equivalent in 2003.

On a smaller scale, DTE Energy/Detroit Edison conducted selective harvesting operations in previously unmanaged wood lots in southeastern Michigan and reported increasing sequestration by 1,398 metric tons carbon dioxide equivalent in 2003.

Forest Plantations

Forest plantations include woody biomass production and agroforestry. Woody biomass production is the cultivation of trees in intensively managed plantations to produce fuel or fiber. Agroforestry involves mixing trees with annual crops to provide wind shelter, stabilize soil, sequester carbon, and produce fuel wood and fruit crops.

One of the two woody biomass production projects reported for 2003 was Minnesota Power's Short Rotation Woody Crop Establishment project. Contracts to plant hybrid poplars were established with landowners enrolled in the Conservation Reserve Program. Following pre-planting site preparation, first commenced in 1994, the planting of 2,800 acres was phased in over 1995, 1996, and 1997. The project area was reduced to 2,550 acres in 2003 after consideration of adverse conditions such as seasonal flooding of low spots, insect damage, and poor growth rates. The project sequestered a reported total of 15,430 metric tons carbon dioxide equivalent in 2003.

The other plantation project reported was an AES Thames agroforestry project in Guatemala, which

[56]This project was originally sponsored by the New England Power Company and reported by its parent company, New England Electric System (NEES) Company. In August 1998, USGen New England, Inc. (USGenNE) completed the acquisition of New England Electric System (NEES) Company's hydroelectric and fossil power generation business previously operated by New England Power. As part of the acquisition, the rights to the emission reductions and carbon sequestration achieved by this and other projects were transferred to USGenNE. For 2000 through 2002, the activities previously reported by USGenNE were incorporated into the report submitted by its parent, PG&E Corporation. For 2003, this project was included in a separate report submitted by NEGT (National Energy and Gas Transmission), formerly known as PG&E National Energy Group, a subsidiary of PG&E Corporation.

involves establishing a plantation of fruit, pulp, and fuelwood trees. For 2003, AES Thames reported sequestering 410,000 metric tons carbon dioxide equivalent for this project.

Conservation Tillage and Other Sequestration Projects

Not all the carbon sequestration projects reported for 2003 involved conventional forestry. Other projects reported involved conservation tillage,[57] reuse of utility poles, and restoration of terrestrial, wetland, and marine habitats. Six such projects were reported for 2003.

Exelon (formerly Commonwealth Edison and PECO) reported on its Illinois Prairie Grass Plantings project, in which native prairie grasses are planted on various properties in the utility's State system. In contrast to conventional turf grass, the deep root systems of native Illinois prairie grasses afford environmental benefits that include reducing soil erosion and downstream flooding and eliminating the need for irrigation, fertilizers, pesticides, and herbicides. In addition, the deeper root systems sequester more carbon dioxide. For this project, Exelon claimed responsibility for the sequestration of 718 metric tons carbon dioxide in 2003. In another project, Exelon reused wood utility poles that are structurally sound in order to avoid the harvesting of trees to manufacture new utility poles. The utility pole reuse project was reported to have sequestered 649 metric tons carbon dioxide in 2003.

Alliant Energy reported on a conservation tillage project in south central Wisconsin that involved the conversion of 956 acres of former corn and soybean row cropland to a variety of other uses, including tall grass prairie, wetlands, conservation tillage, and oak savanna. This project reportedly sequestered 4,390 metric tons carbon dioxide in 2003. Alliant Energy also reported on a habitat restoration project in Wisconsin, which sequestered 3,493 metric tons carbon dioxide in 2003.

Other carbon sequestration projects include the reclamation of 5,500 acres of wetlands in Texas and Louisiana by Entergy Services, Inc., and the reclamation of 6 acres of wetlands by Conectiv Atlantic Generation. The two projects sequestered a reported 54,885 and 12 metric tons carbon dioxide in 2003, respectively.

[57] Conservation tillage includes practices (such as reduced till or no till) that, compared to conventional tillage methods, increase carbon storage on cropland.