

Alfred State College Greenhouse Gas Inventory Management Plan 2011

Version 1: August 1, 2011

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Alfred State College Background

Alfred State College (ASC) is a signatory to the American College & University Presidents' Climate Commitment (ACUPCC) program. Part of that commitment is to prepare an annual inventory of greenhouse gas (GHG) emissions. The following procedures were used to quantify ASC's GHG emissions in the 2009-2010 fiscal year and serve as a guide to prepare future inventories. Data sources, coefficients used, and assumptions made are contained in this document. These procedures are consistent with the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) Greenhouse Gas Protocol (GHG Protocol).

College Information

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Greenhouse Gas Inventory Managers

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Organizational Boundary Definition

ASC defines its organizational boundaries using the Operational Control Approach. All facilities and vehicles controlled by the College are included in the GHG inventory. This includes all facilities and equipment the College owns and occupies and all vehicles that the College owns and operates. In addition, the ACUPCC inventory scope includes emissions from air travel paid by or through the institution and emissions associated with daily commuting by faculty, staff, and students.

The temporal range for the annual emissions reports is the fiscal year from July 1 of two years previous through June 30 of the year prior to the report year. The 2011 GHG Inventory Report is for the period from July 1, 2009, through June 30, 2010. Future GHG inventories will be based on fiscal year.

Facilities List

ASC consists of the main campus in Alfred, NY, the College of Applied Technology in Wellsville, NY, the College Farm in Alfred, NY, and the Anderson Horticultural Complex in Alfred, NY. Future plans include a Farm Laboratory in Groveland, NY. A listing of facilities is in Appendix A.

Greenhouse Gas List

The inventory includes CO₂, CH₄, and N₂O emissions from electricity and fuel consumption, CO₂ and CH₄ emissions from farm animals, gases not sequestered that result from the production and use of paper, and refrigerants that escape into the atmosphere. This inventory also includes the refrigerants used in air conditioning and for refrigeration. Offsets include carbon dioxide sequestered by trees owned by the College and in soil organic matter on the College's farmland.

Emission Source Identification Procedure

The GHG Inventory Manager will compile a list of sources that contribute to direct and indirect emissions, and the GHG Inventory Manager will identify all active electricity sources for which data will be collected. The model used to estimate ASC GHG emissions is the Clean Air-Cool Planet® Campus Carbon Calculator™ (CA-CP CCC) (Version 6.6) spreadsheet (Clean Air-Cool Planet, 2011).

Scope 1: Direct Emissions Sources

Stationary Sources

The main source of Scope 1 emissions is the natural gas burned by the ASC Central Heating Plant; the ASC Central Heating Plant has four boilers that produce high-temperature and high-pressure heat circulated throughout the main campus.

Mobile Combustion

The ASC fleet includes gasoline and diesel vehicles. In fiscal year 2009-2010, there were 89 vehicles in the College fleet. Information for gasoline and diesel purchased to fill on-campus tanks can be obtained from the Business Affairs Office. Unreimbursed gasoline purchased off-site is not currently recorded. Mobile combustion releases result from the circulation of campus-owned vehicles, including the campus bus service, various vehicles operated by Facilities Services, farm equipment, and academic vehicles.

Process Emissions

ASC has some process emissions on the Alfred, NY, and the Wellsville, NY, campuses which result from welding, chemistry labs, and other process-related program activities. They were not estimated during the initial inventory.

Fugitive Emissions

ASC has an operating farm with livestock. Fugitive emissions are mainly from the farm animals. Current animal numbers are obtained from the College Farm Manager and verified with the Agriculture and Veterinary Technology Program and the Dean of Arts and Sciences.

HFC refrigerants are used in air conditioning systems for buildings and in refrigeration equipment such as walk-in coolers and ice-makers. ASC currently uses the following refrigerants: H134A, H404, and R22. Purchases of refrigerants for building air conditioning and refrigeration systems at the main campus are maintained at the Central Heating Plant. Annual refrigerant leakage is assumed to equal annual purchases.

Scope 2: Indirect Emissions Sources

The inventory includes only GHG emissions associated with consumption of electricity. The emission factors used for electricity consumption are the emission rates from CA-CP CCC and the Northeast Power Coordinating Council (NPCC) Upstate New York (NYUP) subregions. ASC does not purchase heating, hot water, chilled water, or steam from a third-party vendor.

Scope 3: Indirect Emissions Sources

Scope 3 emissions included in the inventory are those associated with air travel and automobile reimbursements by ASC and the daily commuting by faculty, staff, and students during the academic year. Travel home by residential students is excluded from the inventory. Travel that is reimbursed by the College is included; in particular, air and automobile travel are calculated here.

Commuting

ASC is a residential campus with a five-year average percentage of commuters that is slightly over 25%. The average commuting distance for students is just over 20 miles each way, and it is assumed that the average commuter came to campus 3.5 days per week for 15 weeks each semester. Faculty members are assumed to commute an average of 34 weeks a year for four days a week. Staff members are assumed to commute an average of 46 weeks of the year for five days a week. About 2% of the faculty and staff were assumed to carpool. The average commute was rounded up from 19.79 to 20 miles one way which is a daily round trip of 40 miles for all employees. Over five years, the average commute has increased about 1.5 miles from 18.25 in 2005. Updates should be based on surveys of faculty and staff that include questions about what they would need in order to carpool or take public transportation like the Hornell Area Transit bus.

Air Travel Emissions

Air travel information is available from travel files in the Business Affairs Office. The flight distance of each leg travelled is estimated. The distance is totaled for each trip and compiled based on mileage reported either on the receipt or, if not available, from the Webflyer Mileage Calculator© (Webflyer, 2011). The total mileage for each reimbursed trip is entered into an Excel spreadsheet and totaled for the campus. That total figure is then entered into the CA-CP CCC spreadsheet; estimates for GHG emissions are based on the coefficients found in Appendix B.

Reimbursed Auto Travel

Every travel reimbursement that involves automobile travel is reviewed for mileage, gas reimbursement, or air travel. Rental cars and personal vehicles are assumed to have a fuel efficiency of 22.10 miles per gallon. Distances are estimated using Google Maps© (Google, 2011). Leasing a fleet of more efficient and hybrid vehicles by the College is expected to decrease fuel consumption for off-campus travel beginning in fiscal year 2010-11. No adjustments were made to the CA-CP CCC coefficients for the length of trips for either automobile (highway vs. city miles) or air travel (many short legs vs. a few long legs).

Solid Waste

Solid waste is handled by ACES. Annual records are kept for tipping fees paid to the Allegany County Landfill. This facility is not actively managed for methane recovery or CO₂ sequestration.

Biogenic Emissions

ASC does not have a stationary biomass generating facility. ASC is in the process of evaluating whether to purchase a stationary electricity generator to reuse waste cooking oil. There is a biodiesel refinery on the Alfred campus, but it was not in operation during the base year.

Data Management/Emissions Quantification

The GHG Inventory Manager will compile the necessary data and input it into the CA-CP CCC spreadsheet. The results will be reported to ACUPCC through their online reporting system.

ASC is served by New York State Electric and Gas (NYSEG). Bills are sent monthly to the Business Affairs Office. Monthly usage is compiled in an Excel spreadsheet for reporting to the SUNY system. Submeters are currently not read either on the Alfred, NY, or the Wellsville, NY, campuses.

GHG emissions are calculated by multiplying fuel or refrigerant use by the appropriate emissions factors. The emissions factors that are used to quantify ASC's GHG inventory are defaults found in the U.S. Environmental Protection Agency (EPA) modules (U.S. EPA, 2010, *Climate*). These factors will be kept up to date by reviewing any revisions to the modules maintained by the EPA. The methodologies and emission factors used are discussed below.

Carbon Sequestration

The College Farm has approximately 225 acres of hay and pasture. Coefficients for carbon sequestration are based on data from the EPA. Approximately one acre is managed in a vegetable/cover crop rotation that sequesters carbon. Forest reserves are estimated to be approximately 400 acres of mixed temperate forest. Coefficients for forest and soil organic matter are taken from EPA estimates (U.S. EPA, 2010, *Carbon*). Further study will be done regarding offsets for ASC forest conservation and reforestation efforts; a forest conservation plan and a sustainable design for the management of ASC's timber resources will need to be considered in future inventories. Carbon sequestration by increased soil organic matter offers another source of offsets. To have offsets that will withstand an independent audit, ASC may want to partner with other institutions to empirically measure soil organic matter over time. Following the ACUPCC guidelines, purchased credits can be considered as a secondary means of achieving offsets (*ACUPCC Voluntary*, 2008).

Prior to fall 2010, only landscaping material was composted; it is estimated that about 5 tons were produced during fiscal year 2009-2010. Beginning in the fall of 2010, ASC began to compost dining hall scraps, leaves, grass clippings, and spoiled hay on a small scale. Estimated compost production is based on the estimated delivery of dining hall scraps and a 2:1 ratio of dining hall scraps to leaves. Greater carbon sequestration can be achieved by

increasing the amount of carbon in the compost. Compost feedstocks are delivered by volume with estimates used to convert weights.

Contextual Data

Building Space

Building Space is compiled based on the reported usable square foot. During the 2010-2011 academic year, remodeling began on the Allied Health Building (56,164 sq. ft.) and this remodel will continue through the 2011-2012 academic year.

Population

Student counts are taken from registration data in the Banner database and verified by the data collected by Residential Life. Commuter data is collected from Banner and the University Police.

Endowment Size

The Endowment Size is based on what is held in the endowment at the beginning of the fiscal year on July 1.

Climate

Heating and Cooling Degree Days are taken from the Binghamton, NY, station of the National Weather Service. Binghamton, NY, was chosen over Rochester, NY, and Buffalo, NY, because it is on the Southern Tier, and it is removed from the moderating effects of the Great Lakes that Buffalo, NY, and Rochester, NY, experience.

Data Collection Process

Quality Assurance

Operations will be verified annually and updated if necessary to ensure that all natural gas and electricity meters are included in the inventory. Data missing from the initial inventory will be added to subsequent inventories as methodologies are developed for data collection or retrieval.

Billing by vendors and data entry are two possible sources of errors. Accuracy checks will be performed prior to data usage. Furthermore, monthly consumption data will be checked to ensure that it conforms to expected seasonal patterns and that there are not larger-than-expected discrepancies from month to month. The total consumption and total dollars spent will also be checked to ensure that they are within expected ranges.

System Security

ASC will maintain the files on a secure campus server which is backed up daily.

Frequency

Electricity and natural gas data are available from monthly statements. Annual totals for each meter-account are used for the inventory. Other data, such as gasoline, diesel, and fuel oil usage are available at a varying frequency depending on purchase dates. The annual totals from these sources will be input into the CA-CP CCC tool.

Adjusting Base Year Emissions

ASC’s base year for its GHG inventory is fiscal year 2009-2010. ASC will follow the guidelines in the GHG Protocol for adjusting the base year GHG inventory. Inventories for the base year and all subsequent years will be adjusted in response to structural or methodology changes if the resulting adjustment is more than 0.5% of base year emissions. Adjustments less than this threshold are considered insignificant and will be decided case by case. Structural changes include mergers, acquisitions, or divestitures. Methodology changes include changes to accepted emissions calculation methodologies or emission factors, errors in data or calculations, or omitted emission sources.

To adjust for structural changes:

- In the case of an acquisition of another school or campus, the emissions from the facilities of the acquired/merged entity will be added to the base year inventory. Base year emissions for acquired facilities will ideally be calculated using actual consumption data for the base year. If this is unavailable, the earliest year of data will be used and kept constant back to the base year.
- Emissions from facilities that are divested from Alfred State will be removed from the base year inventory.
- The base year will not be adjusted for organic growth or decline such as increases or decreases in business activity or opening or closing facilities when not part of a structural change. For organic decline, the base year data up to the closing of the facility will remain in the inventory.

When developing each biennial inventory, ASC will evaluate whether any structural or methodological changes have occurred. If an adjustment is necessary, a description of the change, the person performing the change, and the person authorizing the change will be kept in a log in the inventory calculation spreadsheets.

Roles and Responsibilities

The following table documents the current participants in this project. These individuals are subject to change, but the area of representation should remain constant.

Area of Representation	Individual Responsible
Executive Director, Institute for Sustainability	Brian Baker
Internal Controls Coordinator	Peter McClain
Director of Facilities Operations	Glenn Brubaker
Faculty Contact	Calista McBride
Residential Life Contact	Neil Benedict
President’s Office	Hollie Hall
Student Contact	Jacob Willson
Vice President for Administration and Enrollment	Valerie Nixon

Training

The GHG Inventory Manager provides any needed training to other personnel involved in data collection.

Document Retention and Control Policy

Utility data collection spreadsheets and GHG calculations are retained indefinitely. Utility data and purchasing data documentation will be retained for at least five years.

Internal Auditing

Prior to submitting an updated inventory, the GHG Inventory Manager will review the inventory calculations and spot check a sample of inventory data.

External Validation and/or Verification

No external verification of the inventory is planned.

Management Review

The Vice President for Administration and Enrollment will biennially review the GHG inventory.

Corrective Action

If anomalies or potential errors in data are discovered, the GHG Inventory Manager will investigate further to resolve the questions. Any errors in the activity data or inventory calculations that are discovered later will be corrected by the GHG Inventory Manager and the corrections will be documented by creating a new version of the data spreadsheet highlighting these corrections.

References

- ACUPCC implementation guide: Version 1.1.* (2009). Retrieved May 1, 2011, from http://www2.presidentsclimatecommitment.org/pdf/ACUPCC_IG_Final.pdf
- ACUPCC voluntary carbon offset protocol.* (2008). Retrieved July 19, 2011, from <http://www.presidentsclimatecommitment.org/resources/guidance-documents/offset-protocol>
- Clean Air-Cool Planet. (2011). Campus Carbon Calculator (Version 6.6). [Computer software]. Retrieved May 1, 2011, from <http://www.cleanair-coolplanet.org/>
- Google Maps. (2011). [Computer software.] Retrieved May 1, 2011, from <http://maps.google.com>
- U.S. Environmental Protection Agency. (2010). *Carbon sequestration in agriculture and forestry: Representative carbon sequestration rates and saturation periods for key agricultural & forestry practices.* <http://www.epa.gov/sequestration/rates.html>
- U.S. Environmental Protection Agency. (2010). *Climate leaders cross-sector guidance: Core modules.* Retrieved May 1, 2011, from <http://www.epa.gov/climateleaders/resources/cross-sector.html>
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Document Revision History

Version	Date	Description of Changes
1	August 1, 2011	Initial Version
2		

Appendix A: Alfred State Facility List

Building Name	Area (GSF)	Occupancy Date
ADMINISTRATION BUILDING	16,200	9/1965
AGR ENGINEERING #1	6,738	7/1955
AGR ENGINEERING #2	11,870	9/1970
AGRICULTURAL SCIENCE BLDG	56,210	2/1972
ALLIED HEALTH BLDG	56,164	8/1967
ALUMNI HOUSE	2,075	12/1969
BEEF SHED	2,583	9/1954
PRESS BOX	294	9/2008
VIP BOX	400	8/2010
BRADDON HALL STAGE V	49,208	7/1964
E J BROWN HALL	46,600	10/1966
BURDICK HALL STAGE VIII	47,372	9/1969
BUS GARAGE	4,875	9/1967
CENTRAL DH STAGE VII	31,789	5/1966
DAIRY BARN	14,223	7/1964
DOCUMENT CENTER	6,800	9/1972
DRY COW HOUSING	4,248	7/1964
FARM MACHINERY REPAIR	3,768	7/1966
FARM MANAGER APT.	5,062	7/1954
ATHLETIC FIELD GATEWAY 1	1,393	5/2010
ATHLETIC FIELD GATEWAY 2	2,077	5/2010
FARM ARENA	9,600	1/1973
FARM TENANTS HOUSE	4,825	9/1970
FUEL STORAGE	290	7/1945
GENERAL STORAGE	10,560	8/1999
GETMAN HALL STAGE II	19,782	7/1957
HAY DRYING BARN	1,360	7/1964
HAY SHED	1,929	7/1963
HAY STORAGE BLDG	1,363	7/1954
HAY STORAGE	3,600	7/1964
HEATING PLANT	8,613	7/1964
HORTICULTURE ANNEX BLD	7,355	7/1958
HORTICULTURE BLDG.	12,206	7/1958
HORTICULTURE STORAGE BLDG	2,462	1/1979
T A PARISH HALL	8,200	7/1970
LIBRARY	32,175	10/1965
MATERNITY BARN	2,955	7/1954
MCKENZIE DH STAGE XI	40,436	9/1971

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Building Name	Area (GSF)	Occupancy Date
MCKENZIE RH 1 STAGE XI	5,527	1/1972
MCKENZIE RH 10 STAGE XII	4,428	9/1971
MCKENZIE RH 11 STAGE XII	4,428	9/1971
MCKENZIE RH 2 STAGE XI	5,751	1/1972
MCKENZIE RH3 STAGE XI	5,751	1/1972
MCKENZIE RH 4 STAGE XIII	5,527	8/1972
MCKENZIE RH 5 STAGE XIII	5,751	8/1972
MCKENZIE RH 6 STAGE XIII	5,751	8/1972
MCKENZIE RH 7 STAGE XII	4,428	9/1971
MCKENZIE RH 8 STAGE XII	5,206	9/1971
MCKENZIE RH 9 STAGE XII	4,428	9/1971
MCKENZIE BH A STAGE XI	17,424	1/1972
MCKENZIE BH B STAGE XI	14,678	1/1972
MCKENZIE BH C STAGE XIII	16,689	8/1972
MCKENZIE BH D STAGE XIII	21,780	8/1972
MCKENZIE BH E STAGE XIII	21,780	8/1972
MCKENZIE BH F STAGE XII	18,920	9/1971
MCKENZIE BH G STAGE XII	21,780	9/1971
MCKENZIE BH H STAGE XII	21,780	9/1971
MCKENZIE BH J STAGE XII	19,481	9/1971
MAIN ATTRACTION	8,500	7/1956
MAINGATE-DORM A-STAGE XIV	48,,891	9/1972
MAINGATE-DORM B-STAGE XIV	47,834	9/1972
PEET HALL STAGE V	46,284	7/1964
PIONEER CENTER	31,611	7/1959
POULTRY MANAGER'S HOUSE	1,285	7/1920
PRESIDENT'S HOUSE	4,330	7/1964
ROBINSON-CHAMPLIN STG II	33,986	7/1958
SALT STORAGE	1,107	7/1998
SAND& SALT STOR BLDG	2,652	8/1970
STUDENT DEVEL, CTR.	37,877	2/1993
SERVICE GROUP	21,840	6/1966
SERVICE STORAGE BUILDING	3,900	8/1989
ENGINEERING TECH	120,964	9/1969
SHEEP BARN	1,917	7/1954
SHULTS HALL STAGE VIII	47,372	9/1967
SHEEP SHED	3,365	7/1954
SOLAR CALF BARN	2,040	2/1998
STORAGE SHED	500	6/1970

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Building Name	Area (GSF)	Occupancy Date
STORAGE SHED	600	6/1970
ORVIS STUDENT ACT CTR	72,929	9/1969
STUDENT GATHERING SPACE	13,814	9/2007
SWINE PROD FACILITY	5,328	5/1986
TOWNHOUSE 1	7,056	8/2007
TOWNHOUSE 2	7,056	8/2007
TOWNHOUSE 3	8,754	8/2007
TOWNHOUSE 4	7,056	8/2007
TOWNHOUSE 5	7,056	8/2007
TOWNHOUSE 6	7,056	8/2007
TOWNHOUSE COMMONS	4,266	8/2007
VEHICLE STORAGE GARAGE	5,000	7/1971
VICTORIAN HOUSE	6,720	7/1964
AUTO BODY	15,930	9/1973
ADMINISTRATION	2,496	9/1969
AUTOMOTIVE SHOP	31,792	9/1969
BOOKSTORE	1,500	8/1983
VOC CLASSROOM I	757	7/1967
TEMPORARY CLASSROOM #2	784	7/1968
CLASSROOM BLDG #3	1,200	7/1970
BLDG CONSTRUCTIONAL LAB	21,000	9/1969
NEW DRAFTING LAB	7,206	9/1969
ELECTR. CONSTR. TECH.	17,000	9/1997
ELECTRONICS BLDG	6,402	9/1969
ELECTRICAL TECH BLDG	10,594	9/1971
FOOD SERVICE BUILDING	20,729	7/1969
LECTURE HALL	2,464	8/1986
HEALTH/STUDEN SERVICES	10,467	9/1969
INFIRMARY	1,000	9/1971
LIBRARY	2,225	9/1969
MASONRY BLDG	5,030	1/1976
VOC ACTIVITIES BUILDING	22,000	1/1980
SAWTOOTH BLDG	13,000	7/2006
MAINTENANCE	4,412	9/1969
NEW SR AUTO LAB	26,814	1/1987
WELLSVILLE STORAGE	3,300	8/2007
COMM TRUCK & BUS LAB&SHP	19,816	9/1978

Appendix B: Coefficients Used

Parameter	Coefficient*	Update Source
Air Travel	0.776 CO ₂ e / 1,000 Miles	http://www.bts.gov/publications/national_transportation_statistics/
Commuting	0.404 CO ₂ e / 1,000 Miles	http://www.bts.gov/publications/national_transportation_statistics/
Compost	-0.385 MT CO ₂ e / Short Ton	http://www.epa.gov/climatechange/emissions/index.html
Dairy Cows	4.138 CO ₂ e / Cow	http://www.epa.gov/climatechange/emissions/index.html
Diesel	0.010 MT CO ₂ e / Gal.	http://www.eia.doe.gov/oiaf/1605/coefficients.html#tbl2
Electricity	0.604 MT CO ₂ e / MWh	http://www.epa.gov/cleanenergy/energy-resources/index.html
Forest, Temperate Mixed	1.200 MT CO ₂ e / A	http://www.epa.gov/sequestration/rates.html (not CA/CP)
Gasoline	0.009 MT CO ₂ e / Gal.	http://www.eia.doe.gov/oiaf/1605/coefficients.html#tbl2
HCFC-22	0.771 MT CO ₂ e / lb.	http://www.epa.gov/cleanenergy/energy-resources/calculator.html
HFC-134a	0.590 MT CO ₂ e / lb.	http://www.epa.gov/cleanenergy/energy-resources/calculator.html
HFC 404a	1.49 MT CO ₂ e / lb.	http://www.epa.gov/cleanenergy/energy-resources/calculator.html
Natural Gas	0.053 MT CO ₂ e / MMBtu	http://www.eia.doe.gov/oiaf/1605/coefficients.html#tbl2
Paper, 50% Recycled	2.103 MT CO ₂ e / Short Ton	http://www.papercalculator.org/
Paper, 100% Recycled	1.625 MT CO ₂ e / Short Ton	http://www.papercalculator.org/
Organic Pasture and Hay Land	-0.350 MT CO ₂ e / A	http://www.epa.gov/sequestration/rates.html (not CA/CP)
Poultry	0.005 CO ₂ e / Bird	http://www.epa.gov/climatechange/emissions/index.html
Sheep	0.211 CO ₂ e / Sheep	http://www.epa.gov/climatechange/emissions/index.html
Solid Waste	1.179 MT CO ₂ e / Short Ton	http://www.epa.gov/climatechange/wycd/waste
Organic Vegetable Land	-0.200 MT CO ₂ e / A	http://www.epa.gov/sequestration/rates.html (not CA/CP)

*Coefficients are taken from CA-CP CCC unless otherwise indicated. Negative values indicate a carbon sink. See CA-CP CCC references for a detailed explanation of how the CO₂e coefficients are derived.