Methodology for calculating GHG inventory

The carbon footprint calculation will be carried out according to the general reporting protocol (GRP) of the California Climate Action Registry (CCAR).

The California Registry is a non-profit organization created by the California state government to develop reporting and verification procedures for corporations, other legally constituted bodies, non-profit organizations, city, county and State government agencies.
Methodology for calculating GHG inventory

GHG to be reported:

- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)

Categories of GHG Emissions to be included

**Direct emissions**
- mobile combustion sources (cars, trucks, etc.) owned by CSUN and used to move product or people
- combustion sources used to produce electricity, steam, district heating or cooling
  - process emissions (chemical processes)

**Indirect emissions resulting from:**
- purchased and consumed electricity
- purchased and consumed district heating and cooling

**Other indirect emissions resulting from:**
- employee and student commuting
- business travel
Carbon sinks (offsets)

- renewable power generated on site
  (Calculated carbon savings)

- sequestration by vegetation and trees on campus
  (Urban tree planting projects can be used to sequester carbon dioxide)

Direct emissions from mobile combustion

CO₂ emissions depend on the quantity of fuel consumed and the CO₂ emission factor for each fuel. CH₄ and N₂O emissions depend on emission control technologies, miles traveled and the emission factors for vehicle and fuel type.

Data sources

Vehicle fuel consumption data: EPA and California ARB (www.fueleconomy.gov/feg/)
Vehicle type, year and mileage for CSUN-owned vehicles: CSUN’s Facilities.
Vehicle type and year for commuters (staff, faculty and students): questionnaires and student surveys of vehicles in parking lots
CO₂, CH₄ and N₂O emission factors for vehicle fuels: CCAR GRP
**Direct emissions from stationary combustion**

Emissions depend on annual fuel consumption of each fuel, and the emissions factors for each fuel. CH$_4$ and N$_2$O emissions must be converted to CO$_2$ equivalent emissions using published global warming potentials.

**Data sources**
- CO$_2$, CH$_4$ and N$_2$O emissions factors for stationary combustion: CCAR GRP.
- Consumption data: Physical Plant management and Facilities planning

**Indirect emissions from electricity use**

These are determined from annual electricity use (kWh), and the electricity emissions factor (GHG lbs/kWh) for the supplier.

**Data sources**
- CO$_2$ electricity emission factor: supplier or pool-based from US EPA’s eGRID database: [www.epa.gov/cleanenergy/egrid/index.htm](http://www.epa.gov/cleanenergy/egrid/index.htm)
- CH$_4$ and N$_2$O electricity emission factors: CCAR GRP.
- Conversion factors for non-CO$_2$ emissions to CO$_2$ equivalents: IPCC’s Second Assessment Report (1996)
- Energy consumption and generation data: Physical Plant management and Facilities planning
Indirect emissions from commuting and business travel

Computed by same methodology as direct emissions from mobile combustion.

Carbon sinks

From vegetation and trees. GHG sequestration rates are based on vegetation type and area covered, or tree type and diameter of the tree at breast height.
Renewable power sources at CSUN include solar panels, microturbines and a fuel cell plant.

Data sources
Land cover, vegetation and trees: aerial photography
Tree types and sizes: Student measurements (carried out within Geog 416, scheduled for Spring 2009)
Tree emissions rates based on type, growth rate and size: Center for Urban Forestry Research Tree Carbon Calculator
CSUN Power generation data will be utilized to compute GHG emissions savings.
Student Addresses
(used to calculate commuting miles and GHG emissions)
CSUN Campus: Mapping of space

Map produced by Matthew and Priscila Hoggan

Helen Cox, CSUN, 2008

CSUN Campus: Mapping of space and recycling bins

Map produced by Matthew and Priscila Hoggan

Helen Cox, CSUN, 2008
CSUN Campus:
Mapping of recycling and trash bins

Recycle bins
Trash Cans
Walkways

Buildings:
Class Rooms/Offices
Construction
Dorms
Feed
Maintenance
Offices
Offices/food
Parking
Pools
Parks and courts

Map produced by Matthew and Pricila Hoggan  
Helen Cox, CSUN, 2008