**Step #1: 12 Steps to Sustainability at Your High School** Team page Where we are Now Date \_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **Green Campus Initiative** | **Past & Current Activity** | **Potential Projects** | **Team Members** |
| 1.       **Teaching and Research** - Strengthen and prioritize environmental studies, research, and policy programs. Teach environmental literacy to all students. Expand opportunities for using the school’s physical plant and business operations as a "learning lab" for students. Develop community environmental education programs and participate in public dialogue on environmental issues in the wider community. |  |  |  |
|  |  |  |  |
| 2.       **Purchasing and Administrative Services** - Implement an environmentally friendly products purchasing policy, i.e., buy only products that are durable, reusable, recyclable, made of recycled materials, non-hazardous, energy efficient, sustainably harvested, and produced in an environmentally sound manner. Use your buying power to recognize and encourage responsible behavior in suppliers. |  |  |  |
|  |  |  |  |
| 3.       **Solid Waste Reduction and Recycling** - Establish a waste reduction ethic in all areas. Perform waste stream analyses to determine recycling potential. Implement a recycling program starting with paper and cardboard and expand to metal, plastic and glass. Recycle tires, batteries, fluorescent lamps and ballasts, computers, and scrap metal. Compost organic waste. Recycle hazardous waste-containing products, such as fluorescent lamps and ballasts, anti-freeze, solvents, batteries, computer monitors and TVs. Seek to recycle at least 50% of your schools waste stream. |  |  |  |
|  |  |  |  |
| 4.       **Energy Conservation** - Create energy databases that document energy use. Perform an energy audit and complete energy conservation projects. Promote linkage between energy conservation efforts with programs to reduce your school’s carbon dioxide emissions and contribution to global warming. |  |  |  |
|  |  |  |  |
| 5.       **Energy Purchasing** - Structure energy purchases to benefit your conservation program. Use energy efficiency measures to flatten your school’s load profile to lower electric rates. Phase out use of dirty fuels like oil. Buy green power from wind, hydro and solar sources. Install solar photovoltaic systems at your school. |  |  |  |
|  |  |  |  |
| 6.       **Water and Wastewater**- Implement a water conservation program to repair leaks and retrofit inefficient plumbing fixtures. Protect ground water and storm run-off by minimizing use of salt for ice-melting. Use drought-resistant plantings and minimize irrigation unless using captured rainwater. Evaluate disposal of waste water from science rooms, home ec. and tech ed. |  |  |  |
| **Green HS Campus Initiative** | **Past & Current Activity** | **Potential Projects** | **Team Members** |
| 7.       **Hazardous Materials** - Meet or exceed legal "hazardous materials" handling, collection, disposal and tracking requirements. Educate hazardous waste generators about minimization and proper disposal techniques. Develop a chemical tracking or inventory database. Implement a "chemical swapping" program. Switch to non/least toxic paints, solvents and cleaning agents. Switch print shop to soy-based inks. Use integrated pest management techniques to minimize or eliminate use of pesticides. Recycle and recover ozone-depleting CFCs. Avoid chlorine-based products and incineration of plastics. |  |  |  |
|  |  |  |  |
| 8.       **Transportation** - Encourage travel by buses, carpooling, public transportation, bicycling, walking. Convert vehicle fleet to hybrid or alternative fuel, e.g., natural gas, electric and biodiesel. |  |  |  |
|  |  |  |  |
| 9.       **Food and Food Service** - Buy regional produce in season. Support local organic and non-organic farms. Promote less meat consumption and eating "low on the food chain" for health and environmental reasons. Minimize the use of disposable dinnerware. Implement a reusable mug program with discounted drinks at dining areas. |  |  |  |
|  |  |  |  |
| 10.   **Campus Grounds and Land Use** - Redefine campus beauty. Reduce lawn areas and grass cutting. Promote "natural succession" for unneeded lawn areas. Protect woodlands, wetlands, watershed, and wildlife. Implement a tree protection policy. Plant native species. |  |  |  |
|  |  |  |  |
| 11.   **New Construction** - Utilize sustainable or "green" high performance design principles for all new construction and renovations. Design for state-of-the-art energy efficiency and exceed energy codes. Incorporate renewable energy technologies including day lighting and passive solar. Include suitable recycling collection space in building design programs. Specify environmentally-friendly building materials and products. Evaluate options based on life cycle analysis. |  |  |  |
|  |  |  |  |
| 12.   **Campus Planning and Design** - Develop HS campus master plan which minimizes negative impacts and disruption of natural ecosystems and surroundings. Preserve and enhance green space. Protect natural areas from development. Concentrate building additions and arrange campus walkways and roads to minimize driveways and encourage pedestrian and bicycle use. Use water-efficient indigenous plantings; landscape for energy efficiency as well as aesthetics. |  |  |  |

**Step 2: High School Sustainability Evaluation “Where are we NOW?”** Team page

**Worksheet #1 – *CURRICULUM***

***Please circle the appropriate number in questions with this scale:***

*0 (don’t know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)*

**1.** Indicate the extent to which “YOUR SCHOOL” offers courses that that include sustainability. (*Such topics could include globalization and sustainable development;* *environmental policy and management; alternative energy; recycling; nature writing; sustainable agriculture; urban ecology and social justice; population, sustainable production and consumption; and many others.*)

*0 (don’t know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)*

Please list any courses you are aware of in which such topics are taught

|  |  |  |
| --- | --- | --- |
| What is being done? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**2.** What courses do you regard as essential that are not being taught?

|  |  |
| --- | --- |
| What courses should be taught? | If not, who could we ask to do this? |
|  |  |

**3.** In our school, how much is sustainability woven into traditional education in science, math, literature, history, the arts, etc.?

*0 (don’t know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)*

|  |  |  |
| --- | --- | --- |
| What is being done? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**4.** Are students required to take a course on issues related to the environment, ecology or sustainability? \_\_\_YES \_\_\_NO

|  |  |  |
| --- | --- | --- |
| List courses | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**5.** The shift to sustainability requires considering the role of the school and its students in the social and ecological systems of the world. Circle which of the following your school (through individual, group or departmental efforts) attempts to teach its students:

1. How your school functions in the ecosystem (e.g. looking at its sources of food, water use, energy use, as well as the disposal of waste and garbage)
2. Giving students a sense of place in the natural features, ecology, history and culture of the region

|  |  |  |
| --- | --- | --- |
| What is being done? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**School Sustainability**

**Worksheet #2 - *OPERATIONS***

**1.** What do you see when you walk around school that tells you this is a school committed to sustainability?

|  |  |  |
| --- | --- | --- |
| What do you see? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**2.** Looking back at the 12 Steps to a Sustainable High School, rate the current performance of your school in terms of the operational steps to developing a sustainable high school :

*0 (don’t know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)*

|  |  |
| --- | --- |
| \_\_ Purchasing and Administrative Services  **\_\_** Solid Waste Reduction and Recycling  **\_\_** Energy Conservation  **\_\_** Clean Energy Purchasing  **\_\_** Water and Wastewater Conservation  **\_\_** Hazardous Materials (collection, disposal and handling) | **\_\_** Transportation  **\_\_** Food and Food Service  **\_\_** Campus Grounds and Land Use  **\_\_** New Construction  **\_\_** Campus Planning and Design |

|  |  |
| --- | --- |
| What is being done very well? | Who is doing it? |
|  |  |

**Campus Sustainability**

**Worksheet #3 – *OUTREACH AND SERVICE***

**1.** A sustainable school supports sustainable community development in its local area and in the surrounding region through partnerships and relationships with local governments and businesses. It may also seek international cooperation in solving global environmental justice and sustainability challenges through conferences, student/faculty exchanges, etc. To what extent is “YOUR SCHOOL” involved in sustainable community work or partnerships at local, regional, national or international levels?

0 (don’t know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)

**2.** What sustainability related community service, service learning and/or internship programs exist at your school?

|  |  |  |
| --- | --- | --- |
| What is being done? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**3.** To what extent are student groups in your school directly involved in sustainability initiatives?

0 (don’t know) 1 (none) 2 (a little) 3 (quite a bit) 4 (a great deal)

|  |  |  |
| --- | --- | --- |
| What is being done? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**4.** How is a concern for, and commitment to, sustainability given broad visibility on your campus? (for example: with guest speakers, conferences, Earth Day celebrations, etc.) Please describe key events that have happened in the past year:

|  |  |  |
| --- | --- | --- |
| What is being done? | Who is doing it? | If not, who could we ask to do this? |
|  |  |  |

**Campus Sustainability**

**Worksheet #4 –*PLANNING***

**1.** What “next steps” are planned at your school to strengthen your commitment to sustainability?

|  |  |
| --- | --- |
| What is planned? | Who is doing this? Who could help? |
|  |  |

**2.** What “next steps” do you feel ought to be taken?

|  |  |
| --- | --- |
| What should be done? | Who could we ask to do this? |
|  |  |

Please add any additional comments below:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**CO2 Coefficients**

**Determining Fuel and Energy Source Emissions**

**(**<http://www.eia.doe.gov/oiaf/1605/coefficients.html>)

CO2 is created when fuels are burned in combustion. The following factors can be used to determine the CO2 that is released with various source fuels.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fuel** | **Code** | **Emission Coefficients** | | |
| **Pounds CO2 per Unit  Volume or Mass** | | **Pounds CO2 per  Million Btu** |
| Petroleum Products | | | | |
| Aviation Gasoline | AV | 18.355 | per gallon | 152.717 |
|  |  | 770.916 | per barrel |  |
| Distillate Fuel (No. 1, No. 2, No. 4 Fuel Oil and Diesel) | DF | 22.384 | per gallon | 161.386 |
|  |  | 940.109 | per barrel |  |
| Jet Fuel | JF | 21.095 | per gallon | 156.258 |
|  |  | 885.98 | per barrel |  |
| Kerosene | KS | 21.537 | per gallon | 159.535 |
|  |  | 904.565 | per barrel |  |
| Liquified Petroleum Gases (LPG) | LG | 12.805 | per gallon | 139.039 |
|  |  | 537.804 | per barrel |  |
| Motor Gasoline | MG | 19.564 | per gallon | 156.425 |
|  |  | 822.944 | per barrel |  |
| Petroleum Coke | PC | 32.397 | per gallon | 225.130 |
|  |  | 1356.461 | per barrel |  |
|  |  | 6768.667 | per short ton |  |
| Residual Fuel (No. 5 and No. 6 Fuel Oil) | RF | 26.033 | per gallon | 173.906 |
|  |  | 1,093.384 | per barrel |  |
|  | | | | |
| Natural Gas and Other Gaseous Fuels | | | | |
| Methane | ME | 116.376 | per 1000 ft3 | 115.258 |
| Landfill Gas | LF | [1](http://www.eia.doe.gov/oiaf/1605/coefficients.html#note1#note1) | per 1000 ft3 | 115.258 |
| Flare Gas | FG | 133.759 | per 1000 ft3 | 120.721 |
| Natural Gas (Pipeline) | NG | 120.593 | per 1000 ft3 | 117.080 |
| Propane | PR | 12.669 | per gallon | 139.178 |
|  |  | 532.085 | per barrel |  |
|  | | | | |
| [**Electricity**](http://www.eia.doe.gov/oiaf/1605/ee-factors.html) **\*\* See next page for info** | EL | Varies depending on fuel used to generate electricity | | |
| Electricity Generated from Landfill Gas | LE | Varies depending on heat rate of the power generating facility | | |
|  | | | | |
| Coal | CL |  |  |  |
| Anthracite | AC | 3852.16 | per short ton | 227.400 |
| Bituminous | BC | 4931.30 | per short ton | 205.300 |
| Subbituminous | SB | 3715.90 | per short ton | 212.700 |
| Lignite | LC | 2791.60 | per short ton | 215.400 |
|  | | | | |
| Renewable Sources | | | | |
| Biomass | BM | Varies depending on the composition of the biomass | | |
| Geothermal Energy | GE | 0 |  | 0 |
| Wind | WN | 0 |  | 0 |
| Photovoltaic and Solar Thermal | PV | 0 |  | 0 |
| Hydropower | HY | 0 |  | 0 |
| Tires/Tire-Derived Fuel | TF | 6160 | per short ton | 189.538 |
| Wood and Wood Waste [2](http://www.eia.doe.gov/oiaf/1605/coefficients.html#note2#note2) | WW | 3812 | per short ton | 195.0 |
| Municipal Solid Waste [2](http://www.eia.doe.gov/oiaf/1605/coefficients.html#note2#note2) | MS | 1999 | per short ton | 199.854 |
|  | | | | |
| Nuclear | NU | 0 |  | 0 |
|  | | | | |
| Other | ZZ | 0 |  | 0 |
| 1 For a landfill gas coefficient per thousand standard cubic foot, multiply the methane factor by the share of the landfill gas that is methane.   2 These biofuels contain "biogenic" carbon. Under international greenhouse gas accounting methods developed by the Intergovernmental Panel on Climate Change, biogenic carbon is part of the natural carbon balance and it will not add to atmospheric concentrations of carbon dioxide.[3](http://www.eia.doe.gov/oiaf/1605/coefficients.html#note3#note3) Reporters may wish to use an emission factor of zero for wood, wood waste, and other biomass fuels in which the carbon is entirely biogenic. Municipal solid waste, however, normally contains inorganic materials principally plastics that contain carbon that is not biogenic. The proportion of plastics in municipal solid waste varies considerably depending on climate, season, socio-economic factors, and waste management practices. As a result, EIA does not estimate a non-biogenic carbon dioxide emission factor for municipal solid waste. The U.S. Environmental Protection Agency estimates that, in 1997, municipal solid waste in the United States contained 15.93 percent plastics and the carbon dioxide emission factor for these materials was 5,771 lbs per ton.[4](http://www.eia.doe.gov/oiaf/1605/coefficients.html#note4#note4) Using this information, a proxy for a national average non-biogenic emission factor of 919 lbs carbon dioxide per short ton of municipal solid waste can be derived. This represents 91.9 lbs carbon dioxide per million Btu, assuming the average energy content of municipal solid waste is 5,000 Btu/lb.   3 Intergovernmental Panel on Climate Change. Greenhouse Gas Inventory Reference Manual: Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 3, Pg. 6.28, (Paris France 1997).   4 U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-1998, EPA 236-R-00-001, Washington, DC, April 2000. | | | | |

**Electricity related CO**2 **Emission Factors**

The fuels used to create electricity determine the CO2 emission factor for the electricity of a particular state or region. The average CO2 emission factor for the US is 1.1 pounds/kWh.

Connecticut and New England use more nuclear power, more oil and gas, and less coal in producing electricity. Our average Emission Factor for electricity is lower because of this.

**Average CO2 Emissions for Electricity in Connecticut** are 1.179 pounds/kWh

(http://www.iso-ne.com/genrtion\_resrcs/reports/emission/Marginal\_Emissions\_Analysis\_2003.pdf)

**2003 Marginal Emission Rates (Lbs/MWh)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Emissions | On-Peak  Ozone Season | Off-Peak  Ozone Season | On-Peak  Non-Ozone Season | Off-Peak  Non-Ozone Season | Annual  Average |
| SO2 | 2.46 | 0.59 | 2.26 | 2.39 | 1.98 |
| NOx | 0.79 | 0.29 | 0.89 | 0.86 | 0.73 |
| CO2 | 1,204 | 974 | 1,259 | 1,236 | 1,179 |

**2003 Marginal Emission Rates (Lbs/MBtu)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Emissions | On-Peak  Ozone Season | Off-Peak  Ozone Season | On-Peak  Non-Ozone Season | Off-Peak  Non-Ozone Season | Annual  Average |
| SO2 | 0.30 | 0.07 | 0.27 | 0.29 | 0.24 |
| NOx | 0.10 | 0.04 | 0.11 | 0.10 | 0.09 |
| CO2 | 146 | 118 | 153 | 150 | 143 |

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