

Brighter Schools Carbon Footprint Worksheet

About Your School

How many **students** attend your school? *students*

How many **school days** are there in your school year? *days*

What is the total **area** of your school's buildings? *square feet*

Heating and Cooking

How much **natural gas** does your school use each year? *Mcf*

How much **heating oil** does your school use each year? *gal*

Mcf = million cubic feet of natural gas
gal = gallons of heating oil

Electricity

How much **electricity** does your school use each year? *MWh*

How much comes from the **electric power grid**? *MWh*

How much comes from local **renewable energy sources**? *MWh*

What is the name of your school's **electric utility**?

What is your region's **carbon dioxide emissions rate**? *lbs / MWh*

(Go to <http://www.epa.gov/cleanenergy/energy-and-you/how-clean.html>, enter your school's zip code and click next. Enter the name of your school's electric utility and click next again. The second chart shows your region's carbon dioxide emissions rate.)

MWh = megawatt-hours of electricity
lbs / MWh = pounds of carbon dioxide per megawatt-hour of electricity

Terms to Learn

Natural Gas

The cleanest-burning fossil fuel. It produces fewer greenhouse gases than oil or coal. Natural gas is often used to heat buildings, to generate electricity, and in cooking ranges and some buses.

Heating Oil

A type of diesel fuel that is used to heat buildings.

Electricity

Most electricity comes from power plants that burn fossil fuels. A third of US greenhouse gas emissions come generating electricity.

Electric Power Grid

The system of power lines that distributes electricity from power plants to homes, schools, and businesses.

Renewable Energy Sources

Ways to generate electricity without burning fossil fuels. Wind turbines, hydro-electric dams, and solar panels are examples of renewable energy sources.

Electric Utility

A company that is in charge of providing electricity to homes, school, and businesses. Electric utilities own and operate power plants and the power grid.

Carbon Dioxide Emissions Rate

How much carbon dioxide the power plants in your region produce as they generate

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Transportation

How much **diesel** do students use each year getting to and from school in buses? *gal*

How much **gasoline** do students use getting to and from school in cars? *gal*

How much **gasoline** do teachers and staff use getting to and from school in cars? *gal*

gal = gallons of diesel or gasoline

Paper

How much **paper** does your school use each year? *lbs*

What is the **post-consumer recycled content** of this paper? %

lbs = pounds of paper

Trash

How much **trash** does your school throw away each year? *lbs*

How much of this trash ends up in a **landfill** that uses...

No methane recovery? *lbs*

Methane flaring? *lbs*

Methane flaring and electricity generation? *lbs*

How much of this trash is **burned** in...

A mass-burn incinerator? *lbs*

A refuse-derived fuel incinerator? *lbs*

lbs = pounds of trash

Terms to Learn

Diesel

An oil-based fossil fuel used in buses, trucks, and other large vehicles.

Gasoline

An oil-based fossil fuel used in cars, pickup trucks, motorcycles, and other small vehicles.

Landfill

A site that buries trash for storage.

Methane

A powerful greenhouse gas that is produced when trash buried deep in a landfill decomposes.

No methane recovery

When a landfill simply releases any methane that is produced into the atmosphere.

Methane flaring

When a landfill collects methane and burns it. This process still produces greenhouse gases, but not as many as simply releasing any methane into the atmosphere.

Methane flaring and electricity generation

When a landfill collects methane and burns it to generate electricity. This means that a power plant somewhere else does not need to generate as much electricity.

Post-consumer recycled content

How much of the paper was made from recycled paper.

Name _____

Date _____

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Wastewater

How much **wastewater** does your school produce each year? *gal*

How much of this **wastewater** is treated in...

A **septic system**? *gal*

An **aerobic central treatment system**? *gal*

An **anaerobic central treatment system**? *gal*

An **anaerobic digestion system**? *gal*

gal = gallons of wastewater

Terms to Learn

Septic system

A system at your school that treats wastewater to make it safe to release.

Aerobic central treatment system

Collects wastewater from many sources and keeps it exposed to air as it is treated. This reduces methane emissions.

Anaerobic central treatment system

Collects wastewater from many sources, but does not expose it to air as it is treated. This produces methane emissions.

Anaerobic digestion system

Collects wastewater from many sources and does not keep it exposed to air, but captures and burns some of the resulting methane.



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Heating and Cooking Emissions								
	Amount	Units	Emissions Factor	Units		Emissions	Units	
Natural Gas	_____	<i>Mcf</i>	x	120.593	<i>lbs CO₂e / Mcf</i>	=	_____	lbs
Heating Oil	_____	<i>gal</i>	x	22.384	<i>lbs CO₂e / gal</i>	=	_____	lbs
							Total	lbs

lbs CO₂e / Mcf = pounds of carbon dioxide-equivalent per million cubic feet of natural gas

lbs CO₂e / gal = pounds of carbon dioxide-equivalent per gallon of heating oil

Electricity Emissions								
	Amount	Units	Emissions Factor	Units		Emissions	Units	
Electricity	_____	<i>MWh</i>	x		<i>lbs CO₂e / MWh</i>	=	_____	lbs
							Total	lbs

lbs CO₂e / MWh = pounds of carbon dioxide-equivalent per megawatt-hour of electricity

Transportation Emissions								
	Amount	Units	Emissions Factor	Units		Emissions	Units	
Diesel - students	_____	<i>gal</i>	x	22.384	<i>lbs CO₂e / gal</i>	=	_____	lbs
Gasoline - students	_____	<i>gal</i>	x	19.564	<i>lbs CO₂e / gal</i>	=	_____	lbs
Gasoline - staff + teachers	_____	<i>gal</i>	x	19.564	<i>lbs CO₂e / gal</i>	=	_____	lbs
							Total	lbs

lbs CO₂e / gal = pounds of carbon dioxide-equivalent per gallon of diesel or gasoline

Paper Emissions								
	Amount	Units	Emissions Factor	Units		Emissions	Units	
Paper (% Recycled)	_____	<i>lbs</i>	x		<i>lbs CO₂e / lb</i>	=	_____	lbs
							Total	lbs

lbs CO₂e / lb = pounds of carbon dioxide-equivalent per pound of paper



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Trash Emissions							
	Amount	Units	Emissions Factor	Units	Emissions	Units	
Landfill: no methane recovery	_____	lbs	x	1.5	lbs CO ₂ e / lb	= _____	lbs
Landfill: methane flaring	_____	lbs	x	-0.12	lbs CO ₂ e / lb	= _____	lbs
Landfill: methane to electricity	_____	lbs	x	-0.32	lbs CO ₂ e / lb	= _____	lbs
Incinerator: mass burn	_____	lbs	x	-0.08	lbs CO ₂ e / lb	= _____	lbs
Incinerator: refuse-derived fuel	_____	lbs	x	-0.04	lbs CO ₂ e / lb	= _____	lbs
					Total		lbs

lbs CO₂e / lb = pounds of carbon dioxide-equivalent per pound of trash

Wastewater Emissions							
	Amount	Units	Emissions Factor	Units	Emissions	Units	
Septic sytem	_____	gal	x	0.0116	lbs CO ₂ e / gal	= _____	lbs
Aerobic central treatment	_____	gal	x	0.00106	lbs CO ₂ e / gal	= _____	lbs
Anaerobic central treatment	_____	gal	x	0.0181	lbs CO ₂ e / gal	= _____	lbs
Anaerobic digestion	_____	gal	x	0.00113	lbs CO ₂ e / gal	= _____	lbs
					Total		lbs

lbs CO₂e / gal = pounds of carbon dioxide-equivalent per gallon of wastewater

Grand Total _____ **lbs**



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Fuels	Emissions Factor	Units	Reference
Natural Gas	120.593	lbs CO ₂ e / Mcf	A
Heating Oil	22.384	lbs CO ₂ e / gallon	A
Diesel	22.384	lbs CO ₂ e / gallon	A
Gasoline	19.564	lbs CO ₂ e / gallon	A

Landfilled Trash	Emissions Factor	Units	Reference
No methane recovery	1.5	lbs CO ₂ e / lb trash	B
Methane flaring	-0.12	lbs CO ₂ e / lb trash	B
Methane to electricity	-0.32	lbs CO ₂ e / lb trash	B

Incinerated Trash	Emissions Factor	Units	Reference
Mass burn	-0.08	lbs CO ₂ e / lb trash	C
Refuse-derived fuel	-0.04	lbs CO ₂ e / lb trash	C

Wastewater Treatment	Emissions Factor	Units	Reference
Septic system	0.0116	lbs CO ₂ e / gallon	D
Aerobic central treatment	0.00106	lbs CO ₂ e / gallon	D
Anaerobic central treatment	0.0181	lbs CO ₂ e / gallon	D
Anaerobic digestion	0.00113	lbs CO ₂ e / gallon	D

Paper	Emissions Factor	Units	Reference
Paper with R% recycled content	2.845 - (R × 0.01054)	lbs CO ₂ e / lb paper	E

References

- A** US Energy Information Association
Fuel coefficients for voluntary reporting of greenhouse gases program
<http://www.eia.doe.gov/oiaf/1605/coefficients.html>
- B** US Environmental Protection Agency
Exhibit 6-8, "Solid Waste Management and Greenhouse Gases"
<http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html>
- C** US Environmental Protection Agency
Exhibit 5-6, "Solid Waste Management and Greenhouse Gases"
<http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html>
- D** US Environmental Protection Agency
Section 8.2, "Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006"
<http://www.epa.gov/climatechange/emissions/usinventoryreport.html>
- E** Environmental Defense Fund
EDF Paper Calculator v2.0
<http://www.edf.org/papercalculator/>