

Name _____

A.P. Environmental Science

Date _____

Mr. Romano

(with special guest appearances by Ms. Schneck and Mr. Masopust)

***The Promotion of Sustainable Development through the
Policies and Practices at the Federal, State, and Local Levels***

(that sound's almost like an "Aim" sans question format ...)

Garret Hardin's, quintessential scientific essay, *Tragedy of the Commons*, was written to appeal to a highly-educated scientific target audience. The author of this essay, who is aware of his constituency, takes a different approach than Hardin. I've heard that this author is "okay", but you can decide for yourself. Stay with the article - it does have a point. However, if the author just doesn't seem to pique your interest and you do find yourself drifting, my advice to you is: get up, stretch out, and help yourself to a piece of free gum from the drawer o' goodness (scientific studies indicate that chewing gum stimulates brain function).

So, I know that it is probably way too soon for you to be personally concerned about this, but it really won't be long before you are pursuing that career you desire and making enough money to *sustain* your life's wants and needs (see that clever vocabulary slip in). Now don't get me wrong - enjoy the next 5 or 6, or for some of you, 8 years of higher learning, because after that, life really does become.....
..... wait for it *really* "real" .

Some of you already have a job and work "on the books". You have experienced that sinking feeling of seeing your *net pay* (that would be take-home \$\$ after taxes withheld) and then looking at your *gross pay* (that's what your total earnings were before taxes), and realizing that your net is just gross (← feeble attempt at clever word play – how'd I do? You really don't have to answer, but if you do, please be kind). Unfortunately, I won't lie to you, seeing the taxes withheld from your paycheck becomes *exponentially* more painful (not really a physical pain, but there is some anguish). When you have a family to support, **and** the bills, "projects" and up-keep that coincide with the pride of home-ownership, **and** that car payment, **and** maybe those college loans that you are still paying off, **and** that absolute need for those yearly vaca-getaways, you miss some of that hard earned cash. To give you an idea... Let's say that you were so inspired by your experience in APES (just roll with this...) and you go on to pursue a career as an environmental lawyer in the northeast: starting salary \$120,000 (not too shabby ...) If you get paid bi-weekly, your gross pay would be \$4615.38 per pay period. That number will be located somewhere on your check as if just to tease you... Why you ask? Why does it mock you? Well, it's because that's not the amount you actually receive; there are several withholdings that diminish that amount. There are payments you will make for medical insurance, 401K plans, life insurance, social security, and of course ... the behemoth : TAXES! It's a fair and accepted rule to say that 1/3 of your workplace blood, sweat, and tears go to taxes. So out of that \$120,000 salary, you really only net \$80,400 annually and that means your bi-weekly take-home is really only \$3092.31.

Now of course you are totally okay with this because you immediately think of all the good things that come out of paying taxes; you are fully aware of your civic responsibility and there is no true disruption in your inner peace. Your mind conjures up that little “cloud thought-bubble” that appears over your head like in the cartoons. In that bubble, you will envision a pie graph like the one shown to the right and say to yourself, “Golly gee, it feels so nifty to do my part as a responsible citizen” (or something like that...) Maybe instead of “golly gee”, you are feeling a little more frisky and say “neat-o”

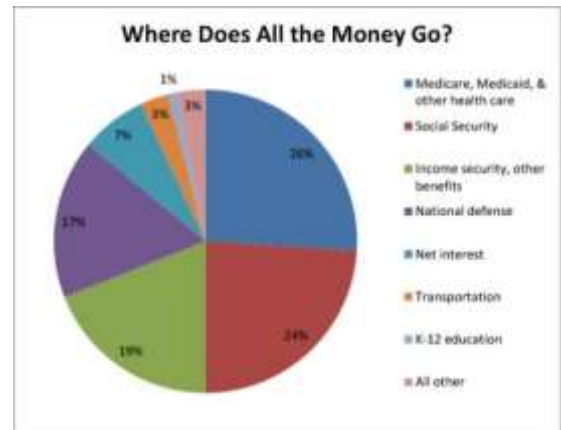


Figure 1.1: sample of pie graph that you envisioned in your personal thought-bubble

I personally do not know anyone who boasts about the delight they get from paying their taxes. But, all sarcasm and cynical rhetoric aside, generally a rational person usually recognizes the significance of a tax levy in a developed society such as ours, even whilst sometimes mumbling his or her dissatisfaction.

So the government does “take”, but that money does get redistributed as shown in the pie graph. Do you see that piece of the pie that indicates “other”? Some of this includes programs that provide ways for individuals and businesses to get some of it back. Let’s now talk about (well actually, you read about what I have written about), **government incentives in the forms of subsidies, tax credits, tax breaks, and rebates that exist to persuade people to join the other soldiers of sustainability.** This is really the point of this article. Can you feel the excitement?

End of Act 1.
Intermission.
Begin Act II.

Here’s where I learn you good. This is the part of the scholarly article that includes the tasty morsels of knowledge that APES students crave. Just so I’m clear, and not chastised later for being cryptic by all you grade-conscious students out there: the English translation of the phrase *tasty morsels of knowledge* is “code” for *test-worthy material*.

The governments of countries that look to promote sustainable development, use positive incentives such as **subsidies, tax credits, tax breaks (deductions), and rebates** to entice businesses and individuals to be environmentally conscious in their decision-making processes. Governments also use **green taxes and tax increases** to deter behaviors that contribute to environmental degradation.

Subsidies are a benefit given to businesses, groups, or individuals, usually in the form of a cash payment. A subsidy can function in one of two ways. One way is to help keep the prices of a product or service low. Lower prices would encourage people to use more environmentally sound products in the business and private sector. The second is to help a business or organization to continue to function.

The U.S. government heavily subsidizes agriculture (we are talking \$20 billion annually), especially farmers who grow corn. One reason for this is because corn is a major U.S. export and a major factor in the world food economy (most as a non-food commodity to feed livestock). In addition, corn is used to produce ethanol, a cleaner-burning fuel source. The subsidies help farms to survive during periods of heavy competition and during times of low production. Some suggest that more environmental friendly subsidies be created to reward farmers who practice sustainable agriculture techniques such as reducing fertilizer use and sparing land for conservation.

Electric companies subsidize solar contractors who install residential solar panel systems. The rationale is this: it is cheaper for electric companies to give cash subsidies to contractors to help increase their installations than to build a new power plant to provide power needed for growing communities. Residential solar systems provide a cleaner energy source and eventually feed energy back into the electric company's grid.

A cash grant is another form of a subsidy that gives businesses the incentive to make "greener" decisions. For example, in California, truck owners may receive a \$65,000 grant for every diesel truck that they replace with a new natural gas model.

Government **tax credits** provide a dollar-for dollar reduction of your income tax liability. In other words, when it's time to file your state and federal income taxes every April, you will be credited a cash amount that will be subtracted from the total amount you owe. If you have enough tax credits, it can lead to a nice refund at tax time. A good example brings us back to alternative power sources (a.k.a. residential renewables), such as solar, wind, or geothermal energy systems. The federal government gives a tax credit worth up to 30% of the cost of the system and then the state piggy-backs another 25% credit on top of that. As you will soon see in an example I will provide you with later in the article, these credits convert to thousands of dollars of savings.

Then there are **tax breaks**, which are also referred to as **tax deductions**. Tax breaks reduces the amount of your income that is subject to a tax. Your income level determines your tax bracket. If you make \$120,000 annually, this would put you into the 28% tax bracket (don't worry if you don't totally get what that means, I just need to use numbers so you can understand this better). Let's say that you purchased one of the first 60,000 Toyota or Honda hybrids. The government offered a \$6000 tax break for all those people who had the original foresight to act sustainably. At tax time, because of your 28% tax bracket, your taxable income would be reduced by \$1680 (28% of \$6000). Bottom line: if your income is less, the amount of taxes you pay are less. There are many examples of tax deductions, and accountants are well aware of these incentives. At tax time, your accountant will ask you if you did any major home improvements. Maybe you retrofitted your house with more energy efficient windows or better insulation. These energy saving practices will help you retrieve some of the installation costs via tax breaks.

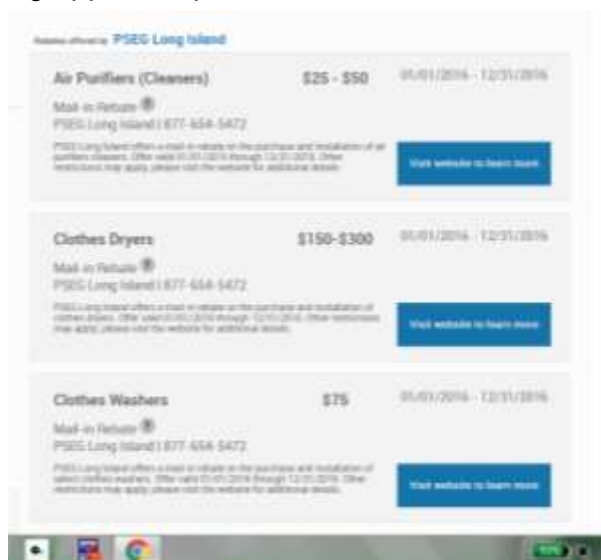
So as you can see, tax credits are more beneficial than tax breaks, but both really contribute to your overall savings. It is important to keep an organized log of your expenditures and all your receipts as proof of payment. Don't think that you will be able to recall a year's worth of "life" in that half hour meeting with your accountant.

Next on our list of government incentives to promote sustainable living, would be cash **rebates**. A rebate is money given directly to the consumer for environmentally responsible behavior. Probably the best example of a rebate would be the Energy Star program. As stated on www.energystar.gov, "ENERGY STAR products are independently certified to save energy without sacrificing features or functionality. Saving energy helps prevent climate change. Look for the ENERGY STAR label to save money on your energy bills and help protect our environment."

I'm thinking that you have had to somewhere, somehow, somehow seen this logo. →



This is where it really pays to be "in the know". Sometimes stores like Best Buy and PC Richard give you the rebate forms with the qualifying appliance purchased, but there are other ways to apply for rebates. On the Energy Star website, you can type in your zip code and a list of other rebates available in your region will be provided to you. Here is part of a list showing how PSEG (our energy provider here on Long Island) is helping the cause. Look at the clothes dryer rebate – \$300 is a pretty substantial percentage of the cost of a new dryer. Now of course you have to realize that PSEG is able to do this through government subsidies.



There are thousands of examples of government incentives in the form of subsidies, tax credits, tax breaks, and rebates. In addition to many of the policies at the federal level that benefit an entire country's population, there are also state and local policies geared to benefit that specific population niche. I thought this one was interesting and very unique. Urbanization over the last few decades has caused an excessive amount of air pollution, urban heat-island effects and loss of green spaces. To combat these and other environmental issues, cities such as Copenhagen, London, Singapore and Chicago have issued mandates or incentives for vegetated roofs to reduce storm-water volume, clean air pollutants, reduce the heat-island effect and carbon dioxide emissions. Superimposing a picture here in this article will not do the engineering design justice, so I'll show you some full-color pictures in class. I think you can agree that the idea is pretty cool, but I'm sure you'll appreciate it more after I show you ... so let's consider this one of those "to be continued ..." conversations and move on for now.

Our next point of discussion would be to illuminate ways in which a government or administrative body can encourage sustainable practices by monetarily penalizing non-sustainable behavior. For instance, there are excise taxes referred to as **green taxes** a.k.a. **environmental taxes** a.k.a. **pollution taxes** a.k.a. **eco-taxes** (now that's a lot of aliases ...). These are taxes placed on environmental pollutants or on goods whose use produces such pollutants. The United Kingdom, Ukraine, and India are the forerunners in this type of taxation. The carbon tax is a specific example of a green tax levied based on the carbon content of a fossil fuel. Japan, India, and Australia are already on board and have enacted carbon taxes to try to curb the usage of fossil fuels by imposing a monetary penalty, but other countries (like ours ... ahem ...) are not yet on board with the carbon tax. Some states (New York being one of them), have advocates that are working right now to try and change this. But don't get me wrong, the United States is moving in the right direction for more sustainable living. Green taxes on new cars that exceed fuel-efficiency, substances that deplete ozone, and on fertilizers and pesticides do exist.

And finally ... (fanfare please!) the government sometimes just uses **tax increases** to try to deter non-sustainable behavior. For example, there is a tax on gasoline. Some people consider this a green tax, but because it is built into the price of the gas, most people never know whether gas prices are going up because of supply and demand reasons or because there has been an increase in the gas tax. The federal gasoline tax is currently 18.4 cents per gallon, and state taxes add an average of 20 cents more (with New York boasting 2nd place to Washington with a 43.4 cent levy). Some people argue that the gasoline tax doesn't really function as a green tax in the United States because when people hear "cents", they aren't as deterred from engaging in the non-sustainable behavior that the tax was put in place to try and diminish. In other countries, the hefty gasoline tax reflects the true spirit of what green taxes are all about. In the United Kingdom, over 60% of the price per unit volume is just the tax! The price of gas in the U.K. is about \$1.49/liter. That converts to \$5.64 a gallon (\$3.39 of which is tax).

I hope you enjoyed the informational part of this lesson (remember, this packet is your notes). Now it is time for our very special guests... drum roll ... Ms. Schneck (woo hoo) and Mr. Masopust (yay). The following information that I am about to divulge is no joke. In fact, it is classified. Do not smile. Do not look around the classroom to see anyone else with a smile. Do not text anyone an emoji that smiles. Don't even think about any time in your life that you have smiled. I'm not kidding here. If our environment ever required a crusader army to battle the forces of non-sustainable behavior, Ms. Schneck would be our general. Now if you ask why not Mr. Masopust? I would have to reply: "have you seen what he drives?" Don't get me wrong. Mr. Masopust plays a crucial role in our army; he is our tank commander. Why tank commander? Once again I would reply: "have you seen what he drives?" So what about me? Where do I fall in the hierarchy of our environmental militia? Well... some disgruntled student started a rumor that I occasionally dispose of AA batteries in the garbage rather than bringing them to a recycling center (I am innocent I tell you!). As a consequence, I was recently demoted to the rank of private. I will now show you how Schneck became the fearless general at the helm of our battle against the forces of environmental evils.

In one of the aforementioned paragraphs (I don't know which one – I tend to drone on), I mentioned that I would give an example of how one can really reap the benefits of government subsidies and truly become iconic beings that exemplify what it means to be a responsible citizen of sustainability. Well, as Rafiki once said in the Pridelands... *"It is time!"*

A few years ago, Ms. Schneck lived through a total home remodel. She took on some shrapnel during the process, but don't worry, she is going to make it. I'm going to walk you through some math so that you can see how Ms. Schneck saved a ton of dinero by utilizing government incentives to "go green."

Here's how it all went down ... ready your calculator ...

Schneck invested in a solar photovoltaic energy system – initial cost: **\$64,000**

At that time PSEG (Public Service Enterprise Group) was known as LIPA (Long Island Power Authority). She received a LIPA subsidy that reduced the cost of the solar energy system by 50%.

- a. Schneck's cost of the system now became ... _____
(Wouldn't that be awesome enough savings? Well Schneck didn't stop there!)

Schneck then applied for a federal tax credit. The government gives a tax credit for 30% of the cost of the installation of solar energy systems. So remember what a tax credit is. At tax time, you get this money (dollar for dollar) toward what you owe. If you don't owe taxes, then this money becomes a cash refund.

So the next deduction from the original cost would be ...

- b. What is 30% of cost from part a? _____

- c. Subtract **b** from **a** to find out the new reduced cost of this system. _____
(Even better right? But we aren't done yet!)

Finally, Schneck applied for a state tax credit. New York State also gives a tax credit for 25% of the cost of the system, but with a maximum \$5000 limit.

- d. Calculate 25% of the amount calculated in part c.
How much did the state credit Schneck? _____

- e. Subtract **d** from **c** to get Schneck's final cost of her photovoltaic solar energy system. _____
(added bonus ... the cost was spread out over 6.6 years)

Pretty impressive savings right? But hold on to your potatoes ... the story of General Schneck doesn't end here.

Geothermal energy is derived from inside the Earth. People can use such a system to both heat and cool their homes. We will get more into the technical aspects of this at another time, but realize that this is just another way to reduce the use of fossil fuels as an energy source and is therefore supports the mantra of sustainable living.

Schneck invested in a geothermal system – initial cost: **\$60,000**

Schneck then applied for another 30% federal tax credit.

a. What is 30% of her initial cost ... _____

b. Subtract **a** from the initial cost to find out the new reduced cost of this system. _____

Next, Schneck applied for a state tax credit. Remember, New York State also gives a tax credit for 25% of the cost of the system, but with a maximum \$5000 limit.

c. Calculate 25% of the amount calculated in part **b**.
How much did the state credit Schneck? _____

d. Subtract **c** from **b** to find out the new reduced cost of this system. _____

LIPA also gives a customer a \$1500 cash rebate for each heat pump installed with the system. Schneck's system required 2 heat pumps. So do a little more math ...

e. LIPA rebate savings from 2 heat pumps _____

f. Subtract **e** from **d** to get Schneck's final cost of her geothermal system. _____

(once again, added bonus ... the cost was spread out over 7 years)

We are rounding home plate ... So just to sum up ...

Schneck's initial cost of both systems: _____

Schneck's final cost of both systems as a result of a **federal and state tax credits**, as well as **subsidies** and **rebates** from the power company: _____

Total amount of \$\$ saved by Schneck (doesn't she rule!) _____

'NUFF SAID