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Personal Energy Conservation

Facing energy shortages, global warming, and pollution can be an intimidating task for the individual energy consumer. Discussions on energy policy usually focus on the role of government in creating a sustainable society, often failing to consider the importance of personal energy choices or glossing over such specifics with buzzwords such as “energy efficient lifestyle” and “sustainable society.” Major policy decisions are indeed the key ingredient in the solution to our energy problems, but reducing our nation’s consumption also depends on the willingness of the public to change their way of living.

When I give talks to community groups, I find this is what people least want to talk about – what they might do themselves. A substantial number of people don't really believe there is a problem, and many others know there is but aren't willing to make any sacrifices for the sake of people who are remote in place or time. It's a question of balancing our interests, values, and aspirations against those of future generations. And yet, there is an active "Sustainable Living" group in Bloomington, which Brian may report on.

Before investigating the ways in which the public can contribute to conservation, it may be useful to consider why we haven’t already corrected our energy consumption habits given knowledge of pollution, global warming, future shortages of fossil fuels, and unstable gas prices. The main reason that America hasn’t embraced conservation is that a free market does not allow it

Because it wouldn't be economical?

within present conditions and will not support a sustainable society until it is made necessary by rising prices (Hunt 12). The market is even more handicapped by the regulation of oil prices which has created artificially low energy costs for years. If prices were to rise to their real value, the public might have more of an incentive to develop and invest in conservation (15). This low cost of energy has created an even larger problem as people have become more accustomed to the high standard of living it provides. Getting people to change their daily routines and give up the comfort of cheap electricity is a challenge which must be faced if the United States is to reduce its dependence on fossil fuels and energy in general (3).

This difficulty in changing the habits of an entire society is one of the reasons that such an emphasis has been placed on the development of new technologies meant to replace the existing power supplies, rather than reducing the overall demand for power. Developing and replacing technologies takes time and the transition is going to be difficult given present rates of consumption. None of the renewable energy sources available to us today can make up for the flow of fossil fuels which is running the nation and nuclear power, the one source with the potential to take over the market, has its own problems with costs and the disposal of wastes. All of the alternative energy sources have high overhead costs which make them unable to compete economically with cheap oil and coal. Because the barriers to sustainable energy are so high, it is imperative that conservation enter into the equation and that the public be informed about this necessity. Improving efficiency should be the first step toward eventually replacing traditional energy sources. Once the demand for energy is reduced, it puts less of a strain on the economy and society in general to replace aging technology and advance research. Some

sources claim that we could reduce our energy needs by as much as 40%, although how much people are willing to sacrifice and invest is difficult to predict (Hunt 6-8).

Most of these conservation efforts which have been successful to date have been organized on a small community scale. Change is easier to achieve when people feel supported by a group which is working together toward the same goals but may feel inconsequential and lost if the program becomes too big. Many cities across the country have been able to gather enough support on the local level to establish innovated conservation programs using city or private funds. Local work is also gratifying because the results of investment can be seen and used by the people who pay for them. It is also easier to distribute information on a small scale and create projects specific to the needs of the area. The main challenge of small scale conservation efforts is garnering public interest, something much easier to cultivate if the effects of energy consumption can be seen polluting their parks and emptying their wallets (Cose).

It will be interesting to hear from Brian how much success the city and citizen conservation groups in Bloomington have had in recent years.

A number of successful conservation strategies have been implemented by many communities across the country. Although they make up a very small percentage of the population, their successes show that change is possible on a larger scale if enough interest develops. Many of them center on transportation,

A good paper topic. I hope someone will write on this, since this is the biggest single way most of us waste energy in our daily lives. It's not all the individual's fault: it's partly a matter of how cities and city public transportation systems are planned. In a big city such as Indianapolis, it's practically impossible to get around without a car. But there's a lot of waste also due to consumer choices.

trying to improve public transportation or investigate alternative fuel sources. For example, a company in Boston called ZipCar is the first of its kind, renting cars by the hour for people who don't use them often enough to buy one of their own such as college students and elderly. The United States Postal Service in Los Angeles has recently added a fleet of 400 electric vehicles and Chattanooga has developed an electric bus system. Even FedEx has begun investigating hybrid-electric-diesel delivery vehicles. Although electric vehicles still use energy from power plants, they do improve efficiency and show a growing interest in conservation (DOE).

Innovative programs have been implemented in some areas to help push for change, such as the City Energy Challenge program in Portland Oregon which levels a 1% fee on all city government energy bills and uses the money to finance efficiency programs for city facilities, a strategy which has actually saved the city money in the long run by reducing their total energy costs. Northhampton County Virginia has created a Sustainable Technologies Industrial Park which is meant to encourage economic growth in the area while supporting environmentally friendly progress and research into sustainable industry. Another county in Florida has built a 200 home community for low-income families facing homelessness from Hurricane Andrew, focusing on energy efficient technology, recycling, composting and water conservation. In addition, Boulder Colorado, a town with a long history of environmental awareness, has had laws protecting property owners' rights to passive solar energy since 1982 and dozens of other eco-friendly communities have sprung up in New Mexico, Illinois, Indiana, Washington, California, Minnesota, Florida, Oregon, Mexico, South Carolina, Colorado,

Massachusetts, New York, Pennsylvania, Virginia, Georgia, Missouri, Vermont and Arizona. (DOE).

The large majority of the population, however, does not live in areas where conservation is the trend, and although it is possible to start grass-roots programs where the community interest is sufficient, for the most part the energy-conscious consumer is on their own. Creating an energy efficient lifestyle in one household is not going to change the world, but it may be the only area that you can influence and it does little good to preach to the community about conservation when you're wasting energy at home. Home energy use amounts to about one third of the energy consumed in the United States and two thirds of the electricity, while transportation greatly increases this number. Even the most rudimentary adjustments to buildings and driving habits can have an impact on the amount of energy used and wasted, and if these measures were enacted on a wide scale the effect could be profound. Instead of looking for more sources of energy, it makes much more sense to invest a little time at home to decrease the need for it in the first place (DOE).

Electrical Energy Consumption in the home

<u>Appliance</u>	<u>Kilowatt-hour per year</u>
<i>Water heater</i>	<i>4500</i>
<i>Frost Free Refrigerator</i>	<i>2000</i>
<i>Standard Refrigerator</i>	<i>1200</i>
<i>Air conditioner 24 hr/day</i>	<i>1400 (per month)</i>
<i>Automatic dryer</i>	<i>1000</i>
<i>TV (4 hrs/day)</i>	<i>440</i>
<i>Automatic washer</i>	<i>100</i>
<i>Electric blanket</i>	<i>80</i>
<i>Electric toothbrush</i>	<i>0.5</i>

As far as conserving energy on the road, public transportation, walking or riding a bike, and carpooling are the most obvious ways to reduce consumption, but there are other methods which can make a difference over the long term.

- Lengthening the workday and shortening the workweek. The idea of a four day work week has been suggested in the past, the idea being that longer 10-hour days would reduce commuting time by 20%.
- Taking fewer and longer trips. In general combining two or more errands into one trip is more efficient than making separate ones given the time it takes for a car to warm up and reach peak fuel efficiency.
- Keeping vehicles tuned up. Making sure that a car is working at its best will increase gas mileage and prevent wasted energy.
- Keeping a steady moderate speed. Cars are generally most efficient at 40 to 50 mph and expend the most energy when accelerating at a fast rate. Avoiding jackrabbit starts, attempting to gradually accelerate whenever possible, and maintaining a steady speed overall will prevent needless acceleration and conserve fuel.
- Turning off the car while idling. If waiting more than one minute it is more efficient to turn off the engine and restart the vehicle.
- Removing heavy weights from the vehicle. The heavier a car is the more fuel it takes for it to move. Lightening the load will increase gas mileage.
- Reducing use of extras and air conditioning. Every device in a car gets energy from the battery, which in turn is charged by the engine. Keeping electronic features to a minimum will save energy, as will turning off the air conditioner whenever possible.

- Using automatic transmissions. Automatics are 15% more efficient than manuals (Hart 221-232).
- Working at home. Home offices, now commonplace, eliminate the commute and are perhaps the best way to reduce fuel costs (Wilson 192).

Energy use at home can also be greatly improved in most cases, although the alterations required can be more expensive than what most homeowners are willing to invest. Nevertheless there are some relatively simple ways to save electricity and make use of passive solar heating, especially if conservation is taken into account while constructing new buildings.

- Constructing homes with steep roofs facing south to act as solar collectors (Hart 199-200).
- Using landscaping to direct airflow around buildings. Deciduous trees can be planted in rows to channel air toward houses in the warmer months, then lose their leaves in the winter and allow wind to pass through them, around the building (Hart 26).
- Shading houses with trees and/or awnings on the East and West sides. Shading the South side is not necessary because it will get the best light in the winter when it can help to heat the building (Wilson 111)

However, when a building has already been constructed without these factors in mind, it is difficult to alter such basic design elements. Most people must work with what they have, which can mean replacing old appliances with more efficient models or adding insulation.

- Caulking leaky windows. Most houses lose a significant amount of heat through small leaks around doors, windows, pipes, and chimneys. Keeping everything tight will keep heat in during winter and out during summer.
- Adding insulation to the attic or crawlspace. An entire foot of insulation is recommended to keep heat from escaping through the roof. Insulating basements and around attached garages can also cut down on heating and cooling bills.
- Insulating hot water pipes and heating ducts. Putting extra insulation around the hot water heater and all heating pipes can make sure that the energy is going where you want it.
- Installing storm windows or energy efficient models. An enormous amount of heat escapes through glass. Using heavy drapes will help keep heat in, and opening them will let light and heat inside. Opening and closing windows as needed can help maximize passive solar heating.
- Setting the thermostat back at night. This is a relatively painless way to conserve energy, especially since timers are available to automatically raise the temperature before people get up in the morning (Wilson cover).

In addition to improvements on the home itself, there are many appliances which routinely use energy in homes. Paying attention to which models you buy and how you use them can easily reduce energy costs.

Demand vs. storage water heaters. Demand models heat the water when it is needed and are 10 to 15% more efficient but with a reduced flow rate that can't handle many tasks at once. They are best for small households (Wilson 116).

- Turning down the water heater to 120 degrees or warm.

- Delaying heat producing tasks until cooler hours.
- Relocating freezers to the garage or basement, away from hot areas and appliances (109).
- Unplugging appliances that are not often used. Many such as televisions and VCRs use energy even when apparently off (190).
- Putting waterbeds, electric blankets, and thermostats on timers (192).
- Using energy saving settings on appliances.
- Replacing or cleaning filters on furnace, air conditioner, and heat pump.
- Buying low flow showerheads, faucet aerators, fluorescent bulbs (cover).
- Using cooler cycles with lower water use when washing clothes or dishes (159).
- Buying front loading washers. They are much more efficient than top loading models. It also pays to take clothes out slightly damp and hanging them up to avoid using an iron later and drying multiple loads in a row to make use of the heat that's generated. Clothes can also dry using solar energy outside (165).
- Using a dishwasher with a booster. Some models have a booster which heats the water up when it arrives at the dishwasher so that it's hot enough to use. Using the booster takes more energy to do the task, but it allows the main water heater to be turned down and saves energy in the long run (153).
- Comparing hand washing and dishwashing. It probably takes less water to do one full load of dishes than it does to wash by hand throughout the day. Saving on water means saving on the energy needed to heat it (158).
- Using natural daylight, task lighting, and fluorescent bulbs. Skylights and light walls can help transport light into the room. Using task lighting, such as desk lamps, allows

larger background lights to be turned off or dimmed. Fluorescent bulbs, which now come in sizes similar to incandescent ones, last ten times longer and use $\frac{1}{4}$ - $\frac{1}{3}$ the electricity. Of course, turning off the lights when you leave a room is the best thing to do (169).

- Using smaller cooking appliances when possible. If cooking a small dish it is usually best to use the microwave rather than heating up a large oven. Crockpots are very efficient when cooking dishes that require a long time and microwaves use the least energy to heat up food, up to two thirds less than a standard oven. Pressure cookers increase the efficiency of cooking on a stovetop.
- Minimizing preheat time for ovens. Usually it isn't necessary to preheat the oven unless baking. Avoid peeking into the oven and opening the door, which allows heat to escape. Another good idea is to cook double portions of meals at once and freezing the leftovers. It will take less energy and time to reheat it later than to cook it separately (151).

A nice list – great ideas. I plan to give everyone a small book at the end of the semester that tells which things are the most important to do.

Finally there are some ways to supplement these conservation measures in how people dress and eat. A simple way to cut down on the cost of transporting food across long distances is to eat what is in season locally as much as possible, through co-ops, farmers markets or growing food at home. Eating meals at home regularly is much cheaper and saves energy in processing. It is also possible to dress to conserve your own natural body heat and reduce the need for heating during the winter. Dressing in layers so that you can adjust to different temperatures without changing the thermostat is helpful.

Most of these common sense conservation measures save a very small percentage of the energy people use, but all of them combined can result in a much more energy efficient lifestyle. Starting with individual homes it is possible for entire communities to decrease energy bills and reduce the need for fuel without installing new appliances or expensive solar gadgets. Such methods will probably become more commonplace as fossil fuels become scarcer, easing the transition to alternative energy sources. Working on national and local environmental energy policy is of great importance, but until governments start larger conservation efforts it is up to small communities and individuals to control their own energy habits as much as they can.

Yes, conservation is the easiest, most immediate, and most economical thing the country can do. I think the energy consumption per person could be reduced by a factor of two in the U.S. without much sacrifice in lifestyle. Many of the changes (e.g., bicycling and walking more) would raise the quality of life by being healthier and causing a cleaner environment.

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