

Ice? Just Say “No”

Conserving natural resources through habitual management

Generally, I don't ask for ice in my drinks. In Oregon, drinks are fairly cold to start with, and adding ice doesn't make them any more palatable. Recently, flying back home from a trip, I dozed off when the flight attendant came around to serve drinks. Later on, when I woke, I asked the attendant for orange juice. I forgot to mention “No ice, please,” as I was still recovering from my nap. She brought me the juice in a 270 mL (9 oz) cup, 99 percent ice cubes with orange juice in the empty airspaces. I finished the juice in a few sips and handed the cup, still filled with ice, back to the attendant who, I'm sure, threw it in the garbage—thus wasting the ice.

Ever since, I have been curious to find out more about ice—its production, consumption, and wastage in the United States. How does this translate into energy and water usage and/or wastage? How much energy and water could be saved if we adjusted our habits and avoided asking for ice if we don't need it?

I found an article, “Ice? Just Say ‘No’ ” by Peter Russell, a fellow of the Institute of Noetic Sciences, The World Business Academy, and The Findhorn Foundation, and an Honorary Member of The Club of Budapest. I acknowledge use of some of his assumptions; however, I have added information and background calculations.

We take ice for granted

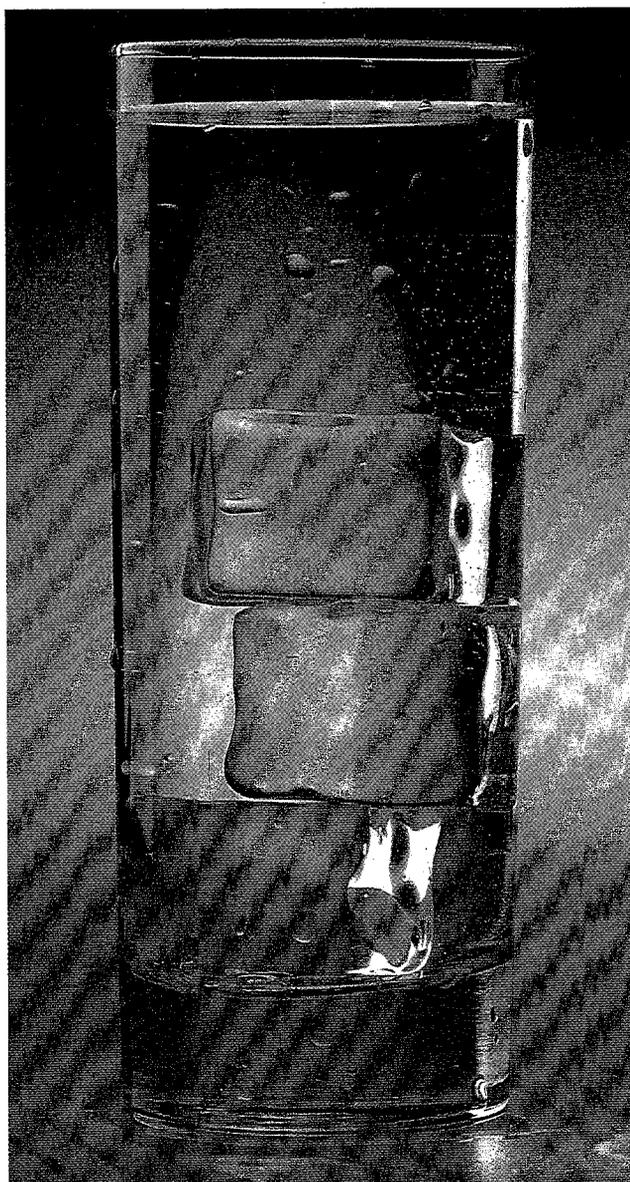
We expect ice in our glass of water at every restaurant. We want it in every soft drink. Most of us produce a continual supply of it in our home refrigerators. And for parties, we buy bags of it to fill our buckets and bathtubs. In addition to

the ice we melt in our drinks and ice buckets, there is ice that is produced, only to melt away, unused, in the drain. But at what cost?

Ice is the frozen form of water that is produced by extracting latent heat from the water. This process requires energy. Estimating how much ice we consume or waste each day is not easy. In the sidebar, I've calculated how much energy we could save by reducing this waste.

The numbers

The national energy production in ice use (or misuse) is estimated to be 13.2 million kWh, equivalent to approximately 5,366 tons of coal or 7,765 barrels of oil. If we adjusted our habits to minimize ice wastage resulting in a reduction of ice production, it would lead to significant savings in energy and clean water. Even a 50 percent reduction in ice wastage would lead to a net saving of approximately 3,882 barrels of oil (equivalent of 2,682 tons of coal) and 70.9 million L (18.75 million gal) of clean water. With the price of oil at about \$80.00 per barrel (cur-



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rent price, likely to increase), this translates into a net savings of over \$310,000 per day or \$113 million per year. In addition, we must factor in the cost of the equipment used to produce the ice, plus the damaging effect on the ozone layer of the CFCs released into the atmosphere when our ice-making machines fall apart on the scrap heap.

The water savings (70.9 million L or 18.73 million gal per day) from ice wastage can meet the demand of the entire population of some countries—such as Haiti, with a population of 9 million and an average per capita consumption of less than 7.6 L (2 gal) of water per day.

Change our ways can change the world

This change of habit will also help in controlling CO₂ emissions, thus reducing global warming. It is estimated that each kilowatt of energy generated using coal or petroleum produces about 0.9 kg (2 lb) of carbon dioxide. Our daily ice consumption thus releases an additional 13,200 (13.2 million x 2.0/2000) tons of carbon dioxide into the atmosphere each day, making its own contribution to the greenhouse effect. Reduction of ice consumption translates into an annual saving of approximately \$29 million with the current rate of \$6 per ton of CO₂ at the Chicago Climate Exchange. This benefit could increase significantly if the United States ratifies the Kyoto Treaty because of higher per unit of carbon credit prices in the international markets.

Does ice-cold water have any health benefits?

Not really. Rather, just the opposite. The temperature stress due to ice on our teeth can crack the enamel, increasing the likelihood of tooth decay, and the lining of the stomach is weakened by having to cope with temperatures for which it was not designed. The cooling in the stomach unnecessarily draws blood from other regions of the body. It also solidifies the oily stuff in food you have just consumed, which increases the amount of fat absorbed in the intestine. In addition, ice-making machines can harbor legionnaire's disease and other unsavory microbes. In many places where tap water is not safe to drink, you may drink bottled water, but chances are the ice in it is made from tap water.

People who live in much warmer climates do not expect ice in every glass of water or soft drink they consume. In fact, traditional Japanese, Chinese, and Indian medicines advocate drinking warm water with meals.

Saving Energy and Water by Reducing Ice Waste

1. U.S. population = 300 million
2. On an average, around a pint of ice is produced daily for each American, and 50 percent is wasted.
3. Clean water consumed in ice production:
= 0.473 x 300
= 141.9 million liters/day
= 37.50 million gallons/day.
4. Clean water savings at 50% reduction in ice production:
= 37.5 x 0.5
= 18.7 million gallons/day
5. Energy consumed in ice production:
= 473 x 334
= 157982 joules/day/person
= 0.044-kilowatt hours (kWh)
6. National energy consumption in ice production:
= 0.044 x 300
= 13.2 million kWh
7. Daily energy saving at 50% reduction in ice wastage:
= 13.2 x 0.25
= 6.6 million kWh/day
= 2682 tons of coal
= 3882 barrels of oil

Assumptions and unit conversions:

Density of water = 1 gram/cc
 Latent heat of fusion of water = 334 joules/gram
 Energy from coal = 2,460 kWh/ton
 Energy from a barrel of oil = 1.7 MWh
 1 pint = 473 milliliters (cubic centimeters)
 1 gallon = 3.785 liters
 1 joule = 0.000277778 watt hour = 1 watt sec

Why do we consume all this ice?

According to Peter Russell, ice is a social addiction. We don't need it, but we've been led to believe we can't do without it. Yet we get nothing from it but an oral stimulation. Every addiction has its cost. In this case, it is unnecessary energy consumption, increased environmental degradation, and possible damage to your health. So the next time you are offered ice, just say, "No," and help save energy, water, and the environment.

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