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At No. 34, biomass energy was deemed necessary for transition away from fossil fuels but would eventually need to be phased out and replaced with cleaner energy sources. Biomass energy is created when pellets made from leftover logging slash are burned.

Overall, however, most of the solutions outlined in the book are environmentally and socially beneficial, from water-saving irrigation systems and protecting old-growth forests to reducing global meat consumption and closing the gender gap in agriculture.

The plan's authors used only peer-reviewed data and were conservative in their predictions of how quickly methods could be expanded and the impact the expansions would have. For example, to calculate the benefits of hybrid vehicles, they estimated market growth to reach just 6 percent by 2050.

Hawken has focused much of his career on the relationship between business and the environment. He's published several books promoting a sustainable global economy, and many of the solutions outlined in "Drawdown" have already proved their economic feasibility.

The book concluded that over the course of 30 years, it would cost more money to continue with the status quo than it would to scale up the implementation of the top 80

methods.

Omitted from its cost calculations, however, are two of the most critical solutions: educating women and family planning. The book stated it would be inappropriate to monetize these entries because they are human rights.

If combined, these two intertwined elements of the plan would take the No. 1 spot with 119.2 gigatons of CO2 equivalent emissions avoided. That's because when girls and women are educated and have access to family planning, they have fewer children.

An excerpt from the "Women and Girls"

chapter explains:

"Carbon footprints are a common and comfortable topic. How many feet are leaving their tracks is not, due largely to concerns that linking family planning with environmental health is inherently coercive or cruel – Malthusian in the worst sense. However, when family planning focuses on healthcare provision and meeting women's expressed needs, empowerment, equality, and well-being are the goal; benefits to the planet are side effects."

The solution that can avoid the greatest amount of greenhouse gas emissions might surprise you. Refrigerant management was ranked as the No. 1 solution, with 89.7 gigatons of reduced CO2 equivalent emission averted.

According to "Drawdown," the chemicals in your refrigerator and air conditioner, known as hydrofluorocarbons (HFCs), are the most potent greenhouse gases known to man. They're 1,000 to 9,000 times worse than CO2 when it comes to their ability to warm the atmosphere, depending on their composition.

The percentage of households around the world that have air-conditioning units has been increasing for years, and as temperatures rise, the use of air-conditioning is soaring.

As the plan states, "a great irony of global warming is that the means of keeping cool makes warming worse."

Because 90 percent of each unit's emissions are released at end of life, proper disposal is key. HFCs can be deconstructed into non-warming agents or reused when carefully removed from old appliances by professionals. And 197 nations have agreed to an amendment to the Montreal Protocol that mandates they phase out these harmful chemicals by 2028, beginning with wealthier nations such as the U.S. in 2019.

Since the book's release, Hawken has been touring the U.S. to promote it, with stops also planned in Paris and Oxford, England, in early May.

On April 20, he stopped at the Natural Capital Center in Portland for an event hosted by Ecotrust, where he explained to an audience of roughly 300 how the idea for the plan originated.

He said that in 2001, he began to ask experts if they knew what needed to be done to reverse global warming. No one seemed to have the answers. Twelve years

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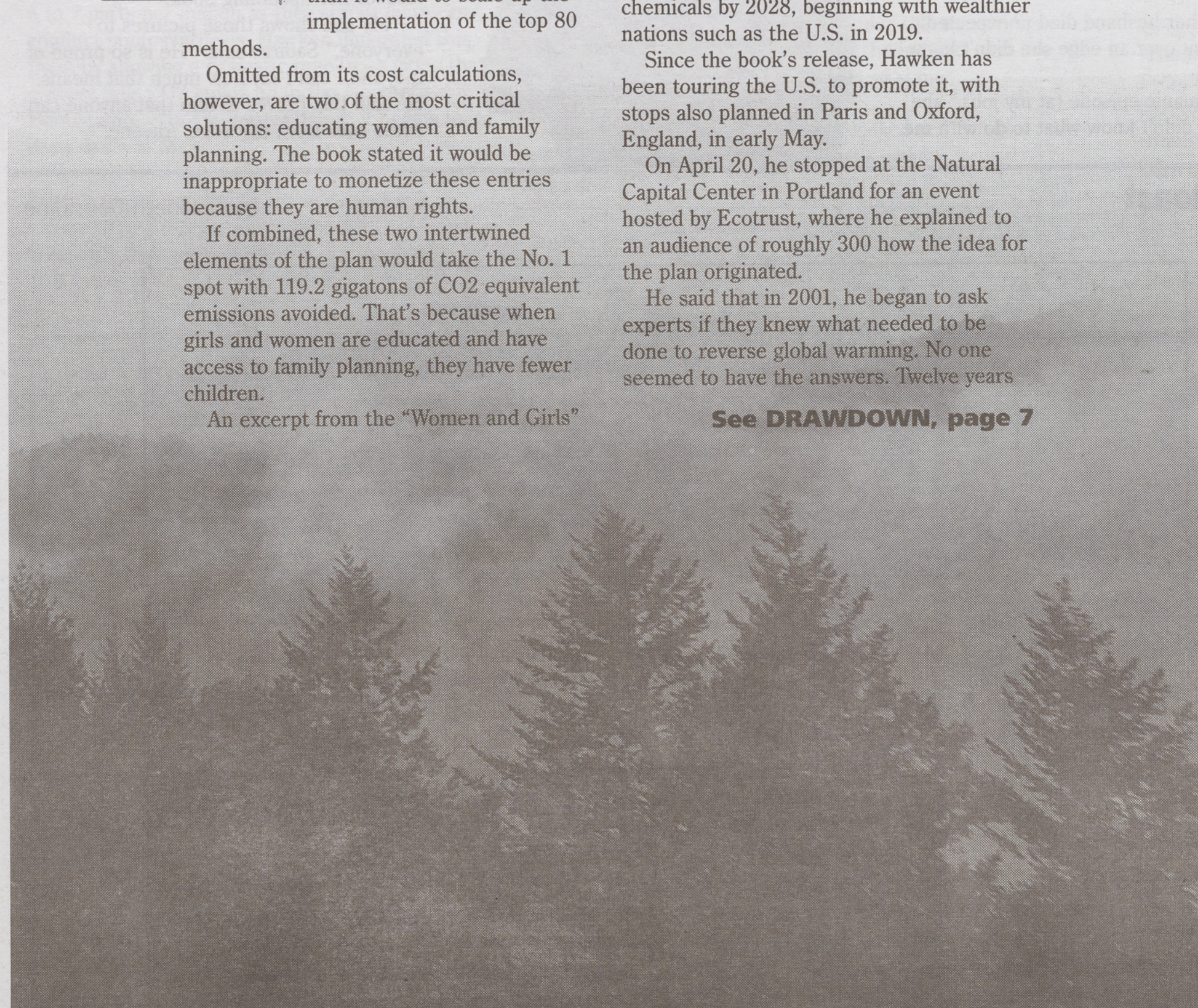
How heavy is a gigaton?

A gigaton is 1 billion metric tons.

That's 166.66 million male Asian elephants, weighing an average of 12,000 pounds each.

Or, if the average, untrained man can deadlift 155 pounds, it would take 12.9 billion men to lift a gigaton.

In 2016, about 36 gigatons of carbon dioxide were emitted into Earth's atmosphere.



Solutions will require action from everyone

Many aspects of Drawdown will require participation on an individual level, as well as from community leaders and governments. Here are ways you can take personal responsibility:

Refrigerants: It's against U.S. federal law to improperly dispose of refrigerants. Go to oregonmetro.gov to find a list of recyclers in your area that will take your old air conditioning units, refrigerator or other appliances that contain coolants.

Diet: Eat less meat, especially beef. The average American eats 90 grams of protein per day, when 50 grams is the recommended allowance, according to "Drawdown." Reducing global meat consumption is critical for the climate.

Food waste: Consumer behavior is crucial for reducing food waste, especially in countries such as the United States. Don't throw away food just because the "sell by" or "best before" date has passed. These labels indicate peak flavor, not safety. Shop smart by planning meals, using a list and avoiding impulse buys. Be realistic about how much food your family will eat and plan a "leftovers" night each week. When you do have expired food, compost it.

Educate girls: It costs pennies a day to educate girls in countries such as Afghanistan, Lebanon and the Congo. Through *International Rescue Committee*, you can send a girl to school for an entire year for just \$58, or support Tostan, Girls Not Brides and other organizations working to empower women.

Family planning: Support Planned Parenthood, and support politicians who support Planned Parenthood.

Transportation: You live in Portland, a city that makes biking, owning an electric vehicle and commuting with public transit much more convenient than it is in most U.S. cities. Time to get on board.

Activism: There are several proposed fossil fuel expansion projects in the Pacific Northwest that activists could use your help stopping. Go to 350pdx.org or PortlandRisingTide.org to find out more.

Energy: Visit Energy Trust of Oregon at energytrust.org to learn how to make your home more energy efficient and about cash incentives for residential and commercial solar projects. In 2016, legislation passed in Salem will soon make solar more attainable for many households with a community solar program that's still in the works. Households will be able to share the costs of installing solar projects with other grid users, and also share in the benefits. To save costs on your energy bill without a large upfront investment, qualifying lower-income households can get a free weatherization kit from Portland's Community Energy Project. The nonprofit will resume weatherization workshops in the fall.

