**Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming**

Edited by Paul Hawken

**A Review by Pat Miller**

Let me introduce myself as a member of Monmouth Community Climate Coalition (MCCC) and Citizens’ Climate Lobby (CCL), as well as Al Gore’s Climate Reality Leadership, and now as an unofficial volunteer member of Middletown’s Green Team. As most of us say, I am not a climate scientist. I have been doing climate-related work for a relatively short time; my credential as a scientist is an MS in Statistics and a career managing several different communications areas at Bell Labs and Telcordia. I decided to read (part of) Hawken’s book *Drawdown*, because we have discussed the book and Paul Hawken as a potential speaker for an upcoming MCCC seminar, and Paul Hawken will be the broadcast speaker at the August 12, 2017, CCL meeting.

At our MCCC meeting the book *Drawdown* was described as “dense.” And indeed it is. It is a weighty trade paperback of 240 8 ½ x 11 pages, densely filled with small print, plus a generous serving of color pictures. A suggestion was made to read the top 10 of 80 solutions for preventing or eliminating carbon in the air, and this is what I decided to do.

Another comment made at the MCCC meeting was that various people have questioned the numbers that Hawken presents and uses to order the solutions from 1 to 80. It was obvious to me why this might be the case, although I don’t think that argument is materially relevant to the value of the work. Hawken uses a single statistic to order the solutions: the total amount in atmospheric CO2-equivalent each solution can potentially avoid or remove from the atmosphere globally. For each solution he gives a one-or two-page (surprisingly readable) description of what it is and in a final paragraph titled “IMPACT” the assumptions used in computing the carbon-reduction measure. The solutions are thoroughly and well researched. The assumptions are always reasonable but are independent of time, feasibility, and each other, for the most part. I imagine that if any other person did the same research, he or she could make a similarly reasonable but different set of assumptions, and generate a list with a totally different order, even if all the solutions were the same.

Hawken’s top 10 solutions are the following, with carbon reduction ranging from 89 to 24 GT:

1. Refrigerant Management
2. Onshore Wind Turbines
3. Reduced Food Waste
4. Plant-Rich Diet
5. Tropical Forests
6. Educating Girls
7. Family Planning
8. Solar Farms
9. Silvopasture
10. Rooftop Solar

One caveat for reading in this order, as I did: this is not at all how the book is organized. There are large sections called Sectors such as Energy, Food, Transport, and within each section 15 or so different solutions with their one- or two-page description. At the back is the ordered table of solutions with their Sector. One must read the Sector in this table, go to the Table of Contents at the front of the book, find the Sector, then find the solution with a page number, and then go to that page for the description. But orders are a matter of judgment, and we are all smart enough to navigate that.

I do have one issue with an assumption that I don’t consider reasonable. In my mind, two of the top solutions would be Wind and Solar. However, Hawken divides each of these categories into two: Offshore and Onshore Wind Turbines (total of 99 GT), and Solar Farms and Rooftop Solar (total of 61.5 GT). If combined, Wind would be #1, and Solar #5, more in line with my expectations.

Another pair of solutions, #s 6 and 7, Educating Girls and Family Planning, might seem a little quirky at first, but I am very happy to see them there. Both have to do with limiting births and family size, or population. This is an obvious point, when you think about it. Fewer people mean less carbon, period. This question came up during one of our talks, and the idea of controlling population evoked thoughts of China. But educating girls globally and providing access to birth control are things we could actually accomplish, and improve the world in other ways besides. (Since the two have really the same impact, Hawken just splits the carbon reduction equally between them.)

Plant-Rich Diet is a more acceptable way of saying Vegetarianism. Hawken doesn’t even assume that everyone in the world gives up eating meat, but only a certain amount of reduction. Still, the fact that it comes in #4 shows how powerful the impact of raising and eating meat is.

The top solution, Refrigerant Management, surprised me. The most damaging refrigerants (CFCs and HCFCs) have already been removed as a result of the 1987 Montreal Protocol in the successful effort to save the ozone layer. But these were replaced with HFCs, whose capacity to warm the atmosphere is thousands of times greater. So actions that would account for a large reduction carbon yet to come include eliminating open refrigerator cases and AC leakage, and disposal of ALL used or replaced refrigerants without letting them escape into the atmosphere.

There are other surprises, too: that Reduced Food Waste is so high at #3. This is mainly due to the large amount of squandered resources that are lost through waste: seeds, water, energy, land, fertilizer, labor hours, and financial capital, all of which generate greenhouse gases at every stage, including the methane produced when organic matter lands in the “global rubbish bin.”

Another surprise is that Electric Vehicles are only #26, perhaps because early and current EVs are not being charged with entirely clean energy. Also production and acceptance by customers is being slowed by what Hawken calls “range anxiety,” the issue of the range (and battery life) not yet being high enough or charging stations ubiquitous enough that one might be stranded without a charger.

The entire book is an interesting analysis with a lot of interesting results. Hawken also brings to light a lot of interesting facts in his discussion of the various solutions. For example, did you know that silicon photovoltaic technology (used in solar cells) was discovered by accident in the 1950s alongside the invention of the silicon transistor at Bell Labs? And that Henry Ford tried to produce the EV in 1914 but was unable to deliver on a low-cost battery. As I said, the book is very readable (if dense), and I have no doubt that we will find that Hawken is also an engaging speaker.