The original Microsoft operating system was called QDOS, for Quick and Dirty Operating System. Bill Gates's new book might well have been called "A Quick and Dirty Guide to Climate Policy."   The book, *How to Avoid a Climate Disaster*, provides a concise overview of climate policy, detailing the threat of the climate crisis and a roadmap to the options for reducing emissions. Despite frequent use of the first-person singular and a few personal anecdotes, the overall tone is brisk and businesslike.

By and large, the book's recommendations will be familiar to those in the field: clean up the grid, electrify as much as possible, use new technologies or fuels for remaining energy needs. There's also a brief discussion of adaptation to climate change, where we see flashes of passion for addressing world health and hunger. Gates's views on some issues such as the need to expand nuclear power are controversial but well within the mainstream.

Some readers, who hadn't previously been well-informed, will gain the information they need from this book. Whether roadmap's like this are useful for planning purposes is a more complicated question. An old military says that no plan ever survives contact with the enemy — or, one might way, with an uncertain and rapidly changing reality. On the one hand, because responding to climate change requires massive investments in equipment and infrastructure, we need plenty of lead time to reach our 2050 targets, and similar lead time to prepare for the climate impacts that can't be avoided. On the other hand, there are sure to be some big technological surprises over that time period, not to mention unexpected political, economic, and cultural developments that could affect climate policy. Some things will turn out to be much easier than we expect and some will be much harder. Thus, there has to be a delicate balance between launching changes as soon as possible, especially those involving major infrastructure, versus remaining flexible to be ready as circumstances change.

We can't afford to wait until all the uncertainties have been resolved. There are some principles that should guide us. One rule of thumb is to prioritize "no regrets" policies that seem very likely to be necessary and bring other benefits such as lower power costs or reduced air pollution. Expansion of solar and wind power, along with improved energy efficiency electrifying vehicles where feasible, currently fall into that category. They will also take time, so we can readjust our policies later if required.

Another rule of thumb is to hedge our bets as much as possible. We should continue to invest in researching a broad range of technologies, not just those that seem most likely to succeed right now. That may turn out to be wasted money, but the upside payoff could be huge if those technologies succeed while our current favorites turn out to have snags.

A final rule of thumb is to economize on the amount of institutional change that's needed to implement solutions — or in other words, look for solutions that *don't* require huge changes in law or governance. If there's a weakness in the Gates book, it's that he still doesn't appreciate just how hard political and legal change can be or why. He admits that he didn't even worry about government policy until the government's antitrust suit against Microsoft brought an ugly awakening. He's somewhat more understanding now, but he's may still not be truly aware of the difficulties of building coalitions among stakeholders. Governments really are very different than the world in which Gates has spent most of his life.

I agree with those who think that no single person should have as much wealth or power as Gates. The first person pronoun figures very heavily in his account. There's a risk that a single individual may distort the conversation or skew social investments simply on the basis of extraordinary wealth. Still, given that we do live in a world where the ultra-rich have disproportionate power, I'm happy that he's on our side rather than the opposition's.