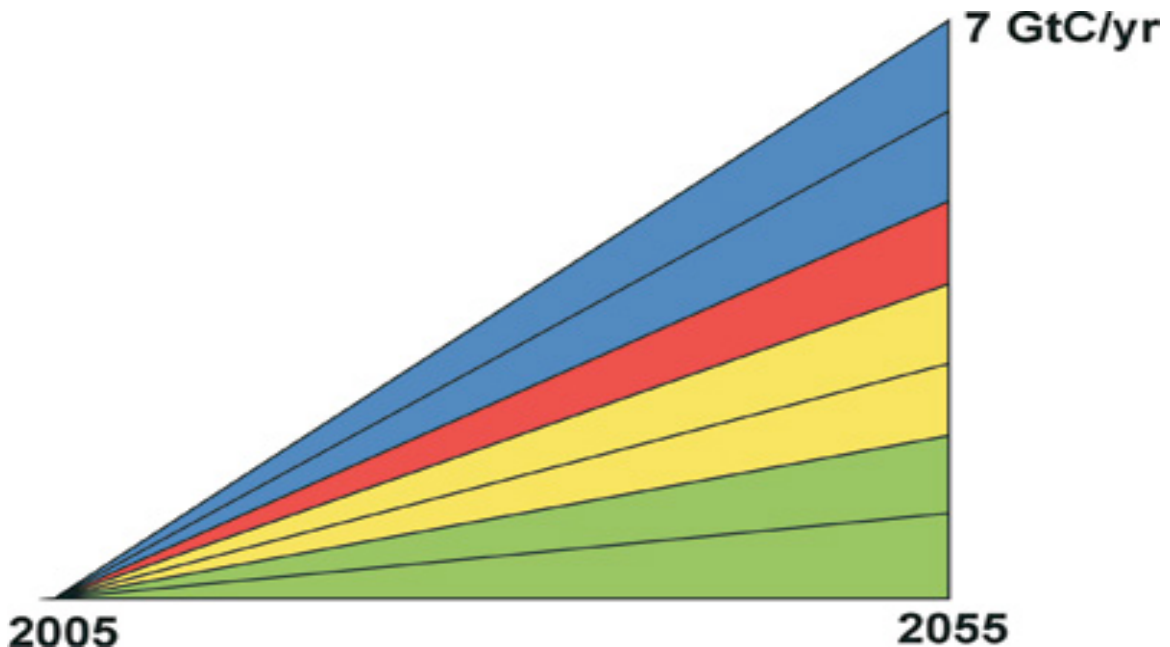


Reduce Carbon Emissions with Princeton Wedge Game

By **Patricia Goldman**; Special to the TAB
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As we try to figure out what we can do about global warming and climate change – as individuals, as companies, and as communities - the Princeton Stabilization Wedge offers a way to visually compare the impact of our choices. In fact, resources at www.princeton.edu/wedges are being used by concerned citizens from executives to high school students as a serious type of game to help think through hard choices.

The Stabilization Wedge is a simple diagram that represents the difference between continuing business as usual (with carbon emissions continuing to go up by billions of tons a year) – or using a variety of existing technologies to flatten CO₂ emissions where we are now, which is already roughly double the level of pre-industrial concentrations.



This Princeton triangle starts in the year 2005 and runs out fifty years to 2055. The bottom of the triangle represents existing carbon emission (C) levels, which are already twice pre-industrial levels. By continuing business as usual, Princeton University scientists projected that Carbon emissions would rise up the sloped side of the triangle 7 billion tons a year (7Gt= 7 Gigatonnes). To prevent that rise from occurring, Princeton scientists suggest that instead of choosing one method, we can divide the triangle into wedges representing 1 billion tons a year, that could each be achieved by one of the equivalent strategies, described in this article.

Each of the seven sections in the whole wedge triangle pictured here represents one way to avoid the memorable amount of 1 billion tons of CO₂ per year for the next 50 years. However, because we have seriously failed to address this issue since the concept was created in 2004, we would already need to reduce CO₂ emissions by another 1 billion tons a year, with another wedge.

The Stabilization Wedge was developed at Princeton University's Carbon Mitigation Initiative by Stephen Pacala and Robert H. Socolow, and was published in the Journal Science in 2004.

Some of their wedge choices to avoid 1 billion tons of CO₂ per year include the following equivalent ways:

1. Increase the fuel economy for 2 billion cars from 30 to 60 miles per gallon (mpg)
2. Halve travel for 2 billion 30-mpg cars from 10,000 to 5,000 miles per year
3. Cut carbon emissions one-fourth in buildings and appliances by using best efficiency practices.
4. Replace 1400 coal-fired power plants with natural gas plants (though China is apparently opening 2 new coal plants a week.)
5. Produce twice today's coal power output at 60% efficiency instead of today's 32%.
6. Add 2 million windmills (50 times the current capacity)
7. Install 700 times the current capacity of solar panels
8. Triple the world's nuclear capacity.
9. Stop tropical deforestation and double the rate of new forest planting.
10. Add 100 times the current Brazil or U.S. ethanol production (which would use one-sixth of the world's cropland.)
11. Adopt soil conservation practices on all cropland (10 times current practice).

The Princeton website also describes 4 additional strategies, including capturing and storing CO₂ at coal, natural gas, H₂ or synfuel plants. Their full list of 15 options can be seen on the Princeton website, along with a discussion of each of the options. Some of the wedges could be used twice.

It is also possible that additional wedge options could be developed. For instance, the Princeton wedge does not quantify or describe an option for reducing consumerism and the accompanying pollution that comes from manufacturing unnecessary things.

According to the website, the Carbon Mitigation Initiative is a joint project of Princeton, British Petroleum and the Ford Motor Company "to find solutions to the greenhouse and global warming problems." They are focused on developing strategies "that will be safe, effective, and affordable."

The site includes useful links to the U.N. Intergovernmental Panel on Climate Change (IPCC), the U.S. Department of Energy, and the U.S. Environmental Protection Agency. It also shows all the materials that can be downloaded free for the StabilizationWedge Game including lesson plans for teachers, and they ask for your input as they update the site. A Shockwave Flash Movie of the resources is available on the home page of www.princeton.edu/~cmi/resources/stabwedge/

There is no easy solution to reducing carbon emissions and preventing dramatic climate change. At least the Princeton wedge moves us away from a narrow view of trying to find one solution to a more liberating way of combining a variety of possible options. As the Princeton website suggests, the real choice is between action and doing nothing – or not doing enough.

Patricia Goldman was Executive Director of the Asthma & Allergy Foundation of America/New England Chapter, until she retired in 2004. She was also a contributing editor for the Newton Times.