Socolow’s talk, “Stabilization Wedges: Mitigation Tools for the Next Half-Century,” dealt mainly with two quantities: the tons of carbon released into the atmosphere each year through burning fossil fuels, and the atmospheric levels of the greenhouse gas carbon dioxide, which scientists believe is largely responsible for global warming.

Socolow’s “wedge” strategy, developed with fellow Princeton Professor Stephen Pacala, was initially published in a 2004 article in the journal Science and has attracted widespread attention.

Step-by-step to a cleaner energy future

By Alvin Powell
Harvard News Office

A Princeton University energy expert laid out a framework to arrest atmosphere-warming carbon emissions over the next 50 years, saying he was optimistic that significant action could be taken to address global warming.

Princeton Professor Robert Socolow said his optimism stems from his belief that carbon emissions could be arrested at today’s rate using technology that is available today — much of it already used by industry.

Socolow added urgency to that optimism, however, saying that changes need to begin today to avoid a tripling of atmospheric carbon dioxide from preindustrial levels over the next 50 years, saying he was optimistic that significant action could be taken to address global warming.

Conservation and energy efficiency have the greatest promise among the different wedge strategies, he said. Therefore the approach has to be multipronged or else it will likely fail.

“They haven’t been built and can be built right,” Socolow said.

“Stabilization wedges” are ways to cut carbon emissions in the future, including increasing the use of nuclear power, dramatically expanding wind power, allowing the regrowth of forests that consume carbon as trees grow, increasing the use of biofuels, using carbon sequestration technology to separate carbon from fossil fuels and pump it into the Earth for storage, and increasing the use of solar power.

Socolow acknowledged that some people believe that there must be even greater reductions, but he said the goals presented in his plan require no new technology and can be achieved with technology proven and available today.

Further, he said, this action is needed to avoid the far higher carbon dioxide levels in the atmosphere that would otherwise occur, with unknown consequences for the Earth’s climate. Projections of “business as usual” that incorporate anticipated global economic growth show annual carbon emissions doubling to 14 billion tons annually over the next 50 years and atmospheric carbon dioxide levels more than tripling from preindustrial levels.

While he contends it is possible to maintain carbon emissions at today’s rate of 7 billion tons of carbon per year, Socolow acknowledged it won’t be easy. His proposed “stabilization wedges,” would each prevent the release of 1 billion tons of carbon into the atmosphere annually by 2055.

Energy consumption today — and in the U.S. particularly — is very inefficient. Improving efficiency can be responsible for a significant part of future reductions in carbon emissions.

A second wedge could be made up by building power plants whose technology prevents the release of carbon into the atmosphere, Socolow said. The world is faced with a historic opportunity today, since the power plants that will provide much of the future power, particularly in developing nations, haven’t been built yet. A lot of attention should be focused on ensuring that those plants, which will likely be in operation for decades to come, use the latest and cleanest technology.

“We have to look everywhere in the economy,” he said.

Socolow said he does not want to select which technologies and actions should make up the necessary wedges, but hopes rather to get a discussion started.

“I’m trying to promote discussion, get everyone talking and get people in a room and have a free-for-all,” he said.

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