

## Fight climate change on two fronts

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Can we solve global warming? Will solutions require reverting to the Stone Age?

Some warming is now inevitable. To avoid severe climate change — which economists believe would trigger a Great Depression magnitude drop in gross domestic product — and to eventually allow the climate to restabilize, scientists say global emissions must level off by 2015 and be reduced by about 80 percent or more by mid-century. We need to cut emissions by about 2 percent a year for the next 42 years.

Although success will require big shifts in thinking, behavior and energy systems, numerous assessments show that it is possible to reduce emissions by 80 percent if we act quickly. Dramatically increased energy efficiency and use of renewable energy are two core elements of a winning strategy.

The United States produces the least output from the energy it consumes of any industrialized country. As a result, we are the most carbon dioxide-intensive nation, producing twice the emissions levels of northern Europe and Japan.

Just through business-as-usual efficiency improvements, the United States produces about 1 percent more GDP annually per watt of energy consumed than the previous year. But greater gains have been achieved. The early 1980s oil shock triggered efficiency improvements averaging 3.4 percent. Through tough standards for appliances and buildings, etc., since the mid-1970s California essentially has been able to hold per capita energy use constant while per capita use nationwide rose by nearly 50 percent.

California's economy seems to have done just fine, thank you, despite these requirements.

When Americans are motivated, the amount of energy wasted through inefficient design, construction, maintenance and use of buildings, industrial processes and vehicles can be reduced substantially.

In fact, a study by American Solar Energy Society found that about 57 percent of the carbon displacement needed over the next decades could be achieved through increased efficiency. Every utility, government and business should thus kick into high gear programs to acquire every watt of efficiency possible. This is the fastest and cheapest way to achieve the goal of leveling off emissions by 2015.

Ironically, the savings produced by increased efficiency often lead people to use more energy. Per capita use falls while aggregate use rises. For efficiency actually to reduce emissions, a cap must be established that limits and systematically reduces the amount of carbon emitted annually.

The second core element of a victorious emission reduction strategy is likely to be a shift to the use of electricity produced with renewable energy. Buildings, machinery and eventually vehicles can be powered electrically.

Wind and solar energy — including solar photovoltaics, solar hot water heating and solar thermal power plants — have the theoretical potential to supply all the energy the nation needs. Wave power, biomass, non-food based biofuels and other renewables, if and when they become commercially viable, would add even more supply.

Renewables, however, have constraints. Solar doesn't produce power at night, for instance, and the best locations for wind power often are far from major population areas. Many of these issues are being resolved or will be fixed in the coming decades.

Costs also are a factor, but they are rapidly dropping as these industries get to scale. Tax incentives and payments for power from utilities already make solar economically viable for many Oregon businesses.

The potential of renewables should not be underestimated. A new report by the Renewable Energy Network for the 21st Century projects that by 2030, renewables could provide about 40 percent of U.S. energy needs after efficiency is taken into account.

This finding suggests that energy efficiency and renewables combined have the potential to provide most, if not all of the reductions needed to achieve the 80 percent goal.

Could Eugene meet its energy needs though efficiency and solar power?

A back-of-the-envelope calculation shows that the Eugene Water & Electric Board would need to cover 263.3 million square feet, or just 4 percent of its service area, with solar panels to power Eugene with solar energy. Ray Neff, one of my graduate students, calculates that more than four times this much space would be available if solar systems were installed on the rooftops of commercial buildings in west Eugene, almost all of which have good solar access, plus the Valley River Center, the fairgrounds and the Autzen Stadium parking lots.

I'm not suggesting that Eugene or any other community immediately shift to full solar, although the notion should not be discounted. A different mix of renewables may make more sense in the future. Additional solar and other renewables also will be needed to power local transportation.

My point is that options currently are or likely will soon exist to move major portions of the economy toward the 80 percent reduction target.

So, global warming is solvable. Climate solutions will not be without costs. But success will avoid Depression-era size impacts, while creating thousands of jobs and in other ways leaving all of us better off.

We need leadership that speaks the truth about the climate tsunami roaring toward us, along with aggressive policies to bring about a sustainable energy future.

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