

## Sustainable air conditioning leads to sustainability

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**W**hen the temperature rises above 100 F in the summer, air conditioning systems stretch the electrical grids beyond their limits, while cars and trucks choke the air in towns and cities. Politicians

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and energy companies want to build a "more robust" electrical grid and build "safe nuclear" and "clean coal" power

plants, costing trillions of dollars and creating more greenhouse gases.

Let us envision a world 20 years in the future when most homes and buildings are electricity generators rather than users, and most public and private transport runs on clean electricity. The electrical grid redistributes surplus electricity from sustainable buildings to energy-intensive buildings and public transport during the day, and recharges electric cars and trucks at night.

This vision has buildings using little electricity, and most buildings producing more electricity than they use during hot weather. Electric utilities use a few efficient generating plants and transportation uses little gasoline. U.S. greenhouse gas emissions have been reduced by 80%.

This vision may seem a fool's paradise, but such a vision is the kind that we need: Better to aim for a 90% reduction and fall short by a few percent than aim for 30% and achieve our goal.

Can we create this sustainable energy future now? The truth is: Yes we can!

We have the technology to achieve this vision today. We can make electric vehicles. Sustainable buildings could be built, except current air conditioning systems use too much electricity, particularly at high outside temperatures. A 1988 report from Amory Lovins and the Rocky Mountain Institute revealed that newer air condition-

ing systems performed poorer than older ones, were less energy-efficient, cost more to install and maintain, and provided poorer comfort. This trend continues today.

The solution lies in developing an Energy Master Plan (EMP) for every building. An EMP develops a comprehensive lifecycle plan toward sustainable, high-performance end goals: a zero carbon footprint; minimum, easy maintenance; and maximum occupant comfort and productivity, with extended lifecycles. We need air conditioning systems that use little electricity during hot weather and buildings that generate more electricity than they use during hot weather. Sustainable buildings should produce more electricity than they use, repaying the energy used for construction and ongoing maintenance. These concepts should be the primary requirements for defining a sustainable building.

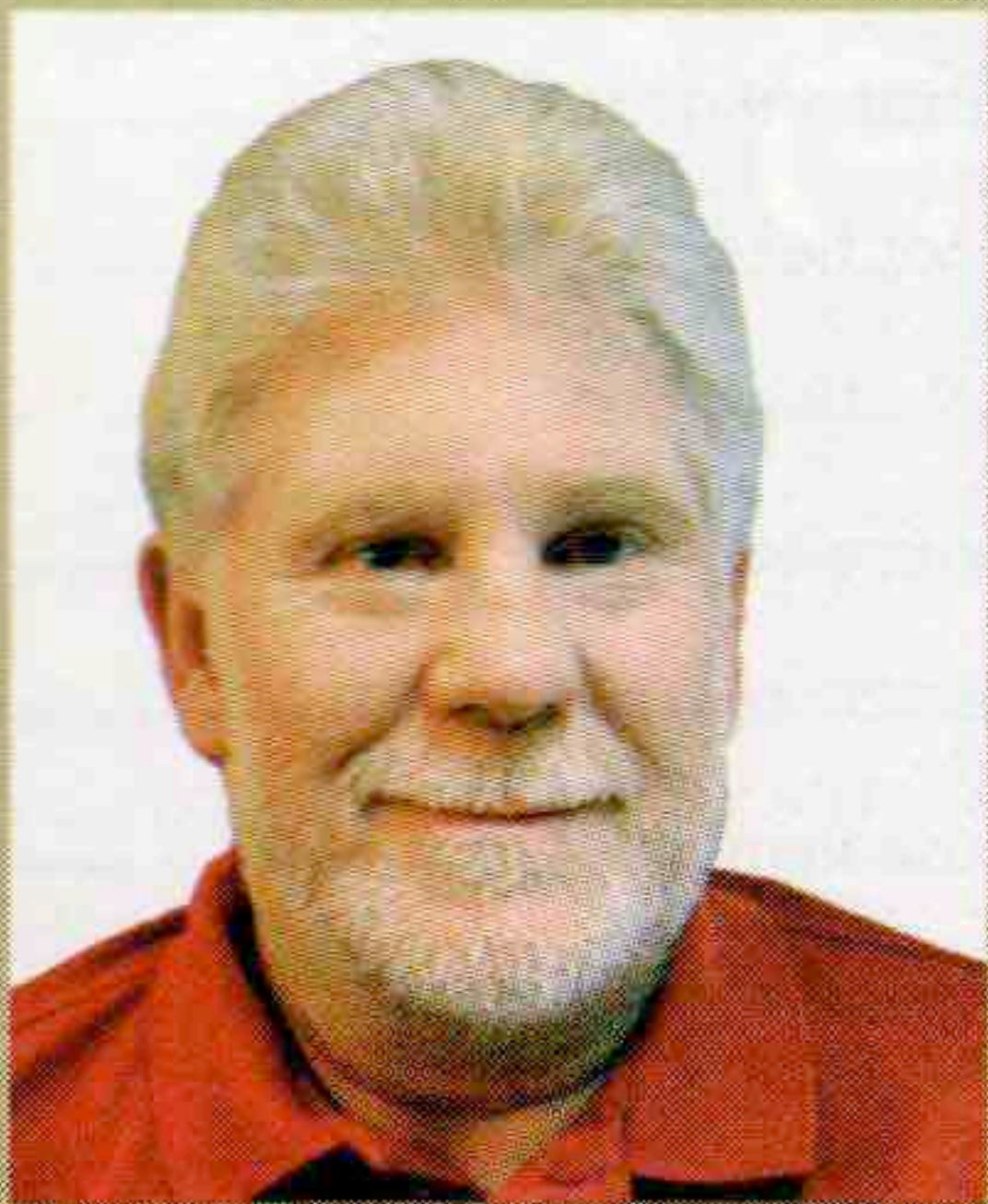
Three strategies will drastically reduce electrical use in air conditioning systems:

- Using ground source heat exchangers for cooling and warming, eliminating electric refrigeration
- Using desiccant systems for year-round humidity control
- Using radiant systems for cooling and warming.

To achieve a zero carbon footprint, buildings should be able to make full use of renewable sources such as ground source, solar thermal, solar photovoltaic, wind, and water.

We are at the tipping point on many global issues including climate change, pollution, and the economy. Must we wait for a catastrophic meltdown similar to the financial system, or should we use this economic recession to redirect our ideas to develop a truly sustainable green economy?

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*During Maisey's 45 years working in building environmental control, he discovered how mechanical systems actually work and developed techniques to integrate and optimize mechanical system energy, maintenance, and comfort performance. He develops Energy Master Plans and Total Quality Commissioning to ensure mechanical system lifecycle performance.*