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**Editor:** Krishnan Rajeshwar, rajeshwar@uta.edu

**Guest Editors:** Eric Wachsman and Subhash Singhal

**Contributing Editors:** Donald Pile, donald.pile@gmail.com; Zoltan Nagy, nagy@email.unc.edu

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## Kicking the Fossil Fuel Habit

*"If future generations are to thrive, we who have consumed Earth's legacy of cheap oil must now provide for a world without it."*

— David Goodstein, *Out of Gas*

The title of this column is also borrowed from Goodstein's delightful little book. Energy and health care continue to hog the national headlines but in terms of the technical interests of the Society, energy issues are perhaps more germane. On June 26, the U.S. House of Representatives "passed the most important environmental and energy legislation in our nation's history," in the words of Fred Krupp, President of the Environmental Defense Fund. He was talking about HR 2454, the American Clean Energy and Security Act, sponsored by Reps. Henry Waxman (D-CA) and Edward Markey (D-MA). This bill would implement a cap and trade system limiting the amount of CO<sub>2</sub> or other greenhouse gas that factories, refineries, and power plants emit, with an overall cap on the emissions. This system thus distributes pollution allowances to be bought or sold, depending on whether a given facility exceeds the cap or makes greater pollution cuts than are mandated. Over the years, the cap will be lowered to cut emissions 17% (of 2005 levels) by 2020 and eventually to 83% by 2050. Allowances get scarcer and the price of emitting goes up. The concern with companies moving offshore to countries without emission constraints was addressed by providing 15% free allowances to some 40 basic industry sectors that make and sell products to global markets. Nonetheless, opponents of this energy bill are many; for some examples, see the Web links at the bottom of the page.

While passage of the bill in the House is but a first step (it still faces a difficult slog, fraught with compromises, in the Senate before becoming law), many view this legislation nonetheless as a signal that the U.S. is serious about joining other nations in putting a price on carbon emissions. In particular, passage of the bill will truly help negotiations for the forthcoming treaty talks this December, which should hopefully put in place a global solution to the climate crisis. It is worth noting that a cap and trade program already exists in the U.S. for SO<sub>x</sub>, the pollutant linked to acid rain. The European Union also boasts the largest functioning cap and trade system for greenhouse gases in the world. In fact, this system was modeled after the highly successful U.S. acid rain counterpart. The European market sets carbon emissions limits for 11,000 facilities and already it has drawn billions of Euros into innovative, low-emitting energy technologies. One of the concerns, from a global perspective, is that without a comparable U.S. market to spur private investment in low-carbon fuels, this country will wind up having to import new green technologies just as we are spending precious dollars to import (and defend) foreign oil. Again on a global scale, one must not lose sight of the fact that for countries like India and China, coal will continue to be a dominant energy option in the shorter term. Unfortunately, there is little indication that emerging economies like these will accept the higher cost required to accommodate emission constraints because of the urgency associated with their infrastructure needs—a topic I peripherally addressed in my column in the last issue of this magazine.

Clean energy also happens to be the theme of this particular issue of *Interface*. ECS does another "first" in holding its fall meeting in Europe outside of the confines of its previous Paris venue and the eleventh symposium in the highly successful series on solid oxide fuel cells (SOFC-XI) simultaneously makes its appearance in Vienna, Austria. In celebration of this event, Eric Wachsman, Enrico Traversa, and Subhash Singhal have organized a series of three feature articles on SOFCs in the pages that follow. Included as a bonus feature, is another article by Sossina Haile and co-workers, on what they describe as a sixth type of fuel cell: the superprotonic solid acid fuel cell or SAFC. Finally, I would like to thank Nate Lewis and Sossina Haile (both of CalTech) for feedback on a draft of this editorial. Stay tuned.

Raj K.

**Krishnan Rajeshwar**  
Editor