

Asilomar 2013: Climate Policy in an Energy Boom ***Continuing Needs Amid New Challenges***

International policies and initiatives for climate and energy are faltering. Continuing global increases in greenhouse gas emissions mean that the climate is unlikely to stabilize even after an increase of 2°C. Meanwhile, a boom in fossil energy is underway, upending once-held beliefs that oil scarcity would help drive the shift to alternative, lower carbon fuels and transportation.

With this scenario as a backdrop, attendees of Asilomar 2013, the 14th Biennial Conference on Transportation and Energy, wrestled with the challenges and celebrated the progress made in reducing transportation-related oil use and greenhouse gases. The conference, organized by the UC Davis Institute of Transportation Studies (ITS-Davis) under the auspices of the Energy and Alternative Fuels Committees of the U.S. Transportation Research Board, drew record attendance once again. Participants from private industry, government, academia and non-governmental organizations engaged in lively and thoughtful discussion and debate throughout the three-day meeting.

The conference opened with a reality check: the path of least resistance is likely to mean more fossil fuel development. Investment in tight oil prospects in North America has quadrupled since 2010 and is expected to reach \$80 Billion by 2015, explained UC Davis' Amy Myers Jaffe. New recovery methods allow industry to produce oil from source rock. Citibank's domestic outlook, which projects an additional 4 million barrels per day from shale in the near future, may be conservative. More than ten U.S. shale plays have high liquids potential, and recovery costs could drop to near those for conventional drilling. A major drop in oil and gas prices is possible.

Further complicating efforts to develop alternatives is what Oak Ridge National Lab's David Greene called the planning fallacy: to reach any goal, estimates of time and cost for new initiatives are almost always too low. In addition, an accurate prediction of the best technical answer to a future problem is nearly impossible. In short, predicting the path to a large-scale energy transition for the public good is difficult because there is deep uncertainty about the underlying technologies, market demand, and the timing.

The prospects of cheap, plentiful oil alarmed many participants. A fossil energy bubble can knock off track the nascent clean energy industry, slowing innovation and investment in low carbon fuels. Automakers have invested billions of dollars to bring more fuel-efficient, electric and alternative fuel cars to market. How will they compete in an era of low and moderate oil prices?

To further set the stage, presenters offered numerous scenarios. The global CO₂ scenarios presented in the IPCC's *Fourth Assessment Report* (2007 AR4) range from a small decline to a 10-fold increase in CO₂ by 2100. The International Institute for Applied Systems Analysis (IIASA) *Global Energy Assessment of 2012* suggests passenger travel could quadruple by 2100, with the biggest share in air travel. For each scenario, modeling approaches and assumptions influence the results, but the bottom line shows that society must decarbonize fuels to avoid the worst effects of climate change.

The scenarios panel prompted a lively discussion of the value of such spreadsheet analyses. One observer argued that the numbers and charts trivialize the paradigm change and underestimate the human effort and capital needed to meet the challenge. The modelers, defending their work, responded that the upward-curving lines on graphs are, in fact, dramatic and meant to illustrate the challenge. The purpose of scenario modeling is to outline possible futures and ways to arrive at them, in effect provide a collective learning exercise. Because scenarios are complex, the speakers acknowledged, they are easily misunderstood and sometimes misrepresented.

Participants in the panel discussion titled “China, the Giant” noted that China is surpassing the United States in oil imports now, and its CO2 emissions doubled between 2000 and 2010, with 50 percent of the emissions attributable to coal. Given increasing affluence and how cars have become a status symbol in China, their share of the nation’s emissions is certain to increase. Panelists projected that China’s roads will carry 300 million vehicles by 2020, matching the United States, and 500 million by 2050. The country has a goal of improving fuel economy by 5 percent per year between now and 2020, but these improvements would be dwarfed if reference scenarios of massive expansions of vehicles, with 95 percent running on petroleum in 2050 are realized.

What will the transition to low-carbon energy and transportation cost? One UC Davis NextSTEPS scenario developed by Joan Ogden and Lew Fulton, using National Research Council 2013 projections, estimates that the United States would need \$100 billion to \$300 billion to pay for infrastructure for low-carbon alternative fuels and vehicle buy-downs through 2030. Considering that Americans spend close to \$1 trillion a year on new cars and fuel for all vehicles, some suggested that this additional cost is acceptable, especially since most or all of that investment is returned in fuel savings, in the case of PEVs, and in other longer-term social benefits. Despite the long-term benefits, most agreed that accomplishing an energy transition is akin to pushing a rock uphill.

Selling electric vehicles has indeed been an uphill climb, said GM’s Britta Gross; no major automaker is happy with the pace of consumer adoption of EVs, despite the awards and accolades given to PEVs. On reflection, she said, the industry’s plan to introduce this new technology to consumers has been very ambitious. If we are having this much trouble with electricity, which consumers know, think about how hard will it be with hydrogen, which consumers do not know and about which they have preconceived notions, she said. Other panelists identified hydrogen fueling infrastructure, capital needed to bring biofuels to market, and regulatory uncertainty as speed bumps on the road to success.

The session dedicated to freight and goods movement offered a glimpse of the progress being made to improve truck efficiency. Efficiency is important because heavy-duty trucks use 18 percent of the transportation fuel consumed in the United States, so improving their fuel efficiency directly and quickly reduces petroleum consumption. Global commercial transportation energy demand is projected to grow by 70 percent from 2010 to 2040, significantly faster than fuel use for personal vehicles, said Roland Gavel of U.S. Department of

Energy's Vehicle Technologies Office, citing ExxonMobil's *The Outlook for Energy: A View to 2040* (2012).

With trucks, high-efficiency and low-carbon technology options, such as electrification, are limited. Zero-emission delivery vehicles and urban consolidation centers often get the most attention, especially in Europe and Asia, but may not work in the United States due to sprawled delivery patterns and costs. Near-term strategies that show promise include voluntary labeling and certification programs, local planning policies, scheduling and pricing strategies at ports, and efficiency standards.

In addition to the recent adoption of U.S. truck efficiency standards, the federal government has initiated a competitive grant program to expedite private sector technology development and deployment through the U.S. Department of Energy's SuperTruck Initiative. Four competing teams are on track to meet the goals of improving fuel economy 30 percent by 2020 from a 2009 baseline. The technologies being developed are expected to enter the market over the next decade.

One technology innovator is commercial fleet provider Ryder. Ryder started a small pilot project using compressed natural gas in Southern California that has grown into a significant strategic initiative. Ryder now operates 350 CNG trucks and tractors, a network of fueling stations and support facilities, and has gained valuable experience with natural gas engine technology. Industry analysts are interested and watching closely. Despite higher upfront capital costs of roughly \$150,000 to shift from a diesel to natural gas truck, the fuel cost savings of about \$1.50 per gge, together with operational efficiencies and incentives, have helped bring the company's total cost of ownership down so that the natural gas option is cost effective in certain applications.

One trend that has surprised some transportation researchers is a decline in vehicle miles traveled. Annual VMT declined nationwide between 2007 and 2012, especially on the Atlantic and Pacific coasts, said Steve Polzin of University of South Florida. Although some inland states with high economic growth, such as North Dakota, saw VMT increase, overall, the national trend is downward. The drop in part reflects the economic downturn, with the biggest declines in the trucking sector. But the decline is not all due to the economy. An important question is whether the decline in VMT (and decline or delay in obtaining driver's licenses) among the millennial generation is due to temporarily high unemployment or something more permanent. While economic conditions clearly play a role, other more fundamental factors might be a more urban, minority workforce composed of young people who may have been raised in lower income families without access to a car and changes in the way work is accomplished today compared to decades ago. In addition, many young people today do not value cars, and travel the way older generations do; they may substitute communication technology for travel and depend less on travel for social interaction.

A presentation on BMW's all-electric carsharing program yielded valuable insight on efforts to get people out of their own cars and into carsharing and alternative modes. The program, successful in four German cities, has encountered challenges in San Francisco due in part to a

dearth of available on-street parking for the cars. The lack of street-side parking for shared cars has hindered visibility of the cars and the program, which BMW says is critical. Consumers need to see the cars on the street in order to get comfortable with the concept.

Internet-based and on-demand new mobility services present yet another increasingly popular alternative to the personal automobile. While offering new options to riders, these services may threaten established modes, including taxis and public transit, conference attendees noted.

Reducing VMT and getting cars out of cities is absolutely imperative to sustainable cities, one participant asserted. Local governments play a huge role in reducing VMT and implementing greenhouse gas policies that can make transit more affordable, safer and faster. Challenges for local governments include declining federal funding for transportation and the need for innovative public-private partnerships to finance infrastructure. Pricing policies, such as charging for parking or driving, can help reduce VMT, especially if they also make transit easier, cheaper, faster and more appealing. Still, individual mobility is important — transit usually takes more time and policies that increase the cost of driving may have unintended consequences and social equity impacts.

Communicating the urgency of the energy and transportation challenge and the steps needed to avert a climate crisis continues to vex policy makers. James Hoggan, founder of *desmogblog*, observed that we, as a culture, have conceptually polluted our public square through polarization in public discourse. The public sees talking heads openly fighting, disagreeing and disinterested in each other's perspective. As a result, people turn away in distrust, feeling disengaged and disempowered. Demonizing those who disagree with us and trivializing concerns that opponents see as important is counterproductive. To reach people, he counseled, we must step outside our box and be willing to listen and observe.

Throughout the meeting, participants lined up to ask questions of panelists and offer insight. One marveled at the progress made in the last two decades, offering as an example the historic U.S. light-duty fuel economy and greenhouse gas emissions standards adopted in 2012. Another pointed to the opportunities stemming from expanded trade and the need for global harmonization of policies.

California Air Resources Board Chairman Mary Nichols outlined her agency's policy approach, involving a combination of incentives and mandates. The agency seeks to be flexible and willing to adjust policies based on sound science, while staying focused on long-term goals and being clear about its policy direction: reducing emissions. Addressing the oil industry representatives in the audience, she said the need to adapt incumbent infrastructure is critical. The car industry is changing, she said, the oil industry must change, too.

Southern California's Los Angeles-area air basin provides a good example of what can happen when clear, sustained emissions targets are established and human ingenuity is applied to meet strict standards, said Barry Wallerstein, executive officer of the South Coast Air Quality Management District. Industry has found innovative, cost-efficient ways to meet standards. These innovations have been enabled by sufficient lead-time and a structure that is flexible

enough to allow midcourse corrections. His region has benefitted from political will and leadership, an informed public, and comprehensive planning. These efforts must continue if the region is to reduce NOx emissions two-thirds by 2023 and three-quarters by 2032, as required by federal clean air standards.

One conference participant tallied up the forthcoming milestones. The period between today and 2050 will include nine presidential and gubernatorial elections, 18 congressional elections, seven to twelve automotive product development cycles of three to five years per cycle, and, likely, hundreds of lawsuits.

This long-term view is important, said another speaker, but do not lose sight of near-term actions when given opportunities to act. We need to work as fast and as smart as we can – and not be afraid to fail. We have a high challenge. We need to be creative, open to new thinking, and able to put aside old biases.

The consensus view was that we need significant reform in state and local planning and processes, and in institutions. With funds declining, we are losing time and facing catastrophic risks. To make meaningful policy progress, it was widely accepted that we need to help the public understand the urgency and we need to convince energy companies to embrace the transition, as the major automakers have. We also need to be adaptive. The pace of technology change has quickened. We speak of moving forward with evolutionary and incremental steps, but at the same time, we are seeing disruptive technological changes that require rapid policy adjustments. Adaptability is critical—we cannot anticipate the many surprises—so we need to be nimble and aware.