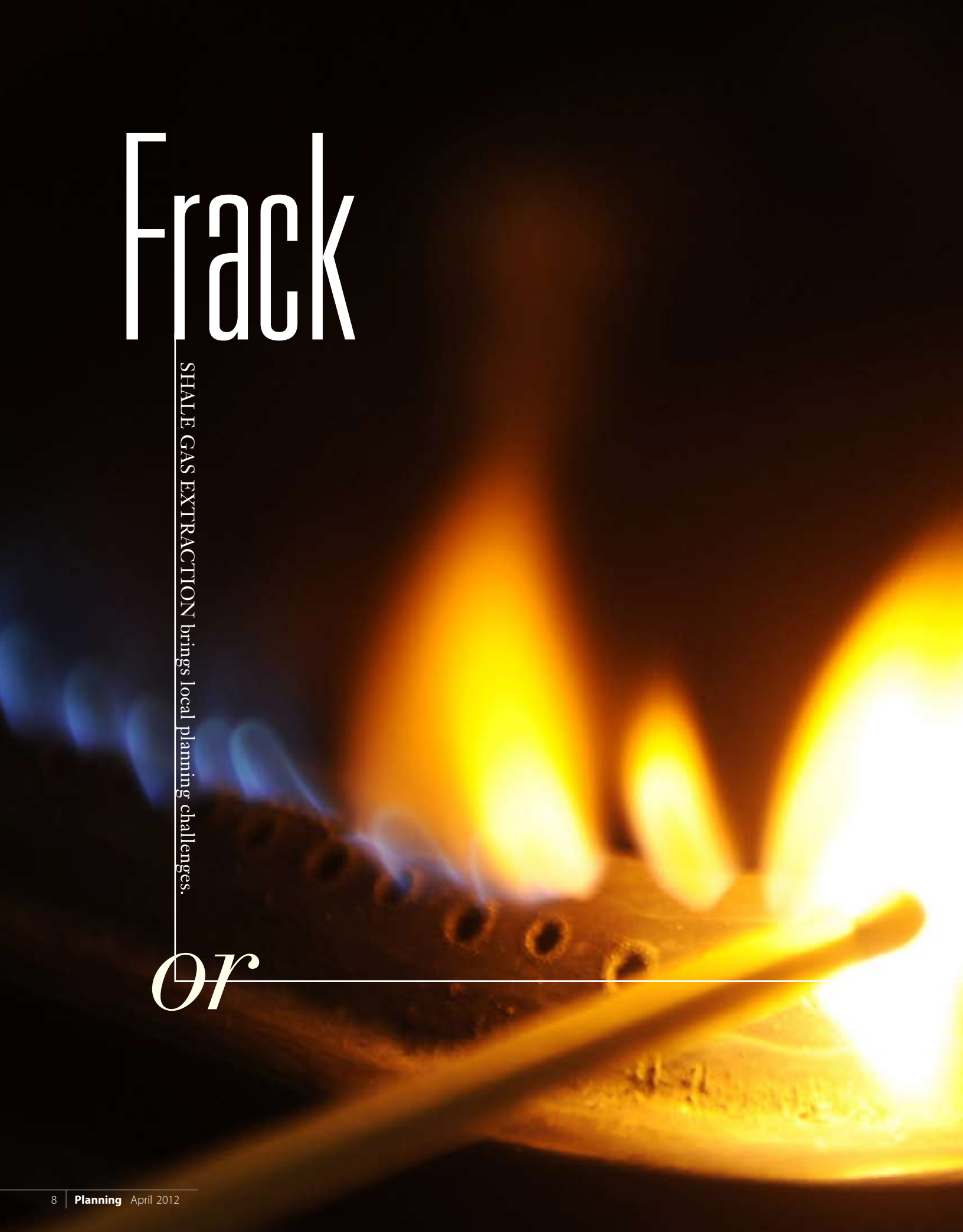


Frack

SHALE GAS EXTRACTION brings local planning challenges.

or

bust

By DAVID WEST, THOMAS KNIPE, *and* SUSAN CHRISTOPHERSON

Barbara Sax/AFP/Getty Images

"FRACK NO!" is the rallying cry of citizens opposed to high-volume hydrofracking. According to *Time* magazine, fracking, a natural gas extraction method where thousands of gallons of chemically laced water are injected into wells at high pressure, was *the* environmental issue of 2011.

Public forums (including the media) tend to stress the potential for environmental damage, while many communities assume that local growth and jobs may compensate for harm. Now a growing number of planners and citizens are questioning the validity and extent of the claimed economic benefit of resource extraction.

The introduction of horizontal hydrofracking, where wells are drilled thousands of feet down into rock formations and then turn to run for almost a mile parallel to the surface, have at last made it economically viable to extract natural gas in tight shale formations. The new technology ignited a series of natural gas booms around the world starting in the mid-2000s, when natural gas prices reached historic highs. Texas was the first epicenter in the U.S. and the practice then spread to Colorado, Wyoming, Arkansas, and Louisiana.

Hydrofracking is now fueling the Marcellus shale boom in Pennsylvania, parts of Ohio, and most of West Virginia. In New York, where a one-year moratorium on horizontal hydrofracking has expired, the state is moving through the environmental review process, potentially on the way to allowing drilling.

Industry analysts consider the Marcellus shale area to be one of the largest stores of natural gas ever discovered, enough to meet current U.S. consumption needs for 15 years. Critics are skeptical about these forecasts, pointing to the shorter production lives of shale gas wells in Texas and Arkansas. Further, the U.S. Energy Information Administration reported this January that the Marcellus area may contain only one-third the natural gas that was originally estimated. (The same report said the nation's entire shale gas deposits may total only three-fifths the amount that was previously assumed.)

Source: American Association of Petroleum Geologists

Unpredictable boom-and-bust cycles create problems for planners and citizens alike because they create shifts in population growth, income, and needs for goods and services. "There have been some concerns about boom and bust, and what we need to put in place now to be ready for the bust," says Jim Weaver, the planning director for Pennsylvania's Tioga County.

Truth or consequences?

Economists can't rely on conventional models to explain what may happen to local economies. Those who tout the benefits of hydrofracturing frequently cite input-output analyses that project job growth based on the number of wells that may be drilled and where drilling-related expenditures will occur. In reality, the fracking industry may generate fewer jobs than expected.

These jobs often are filled by workers who live and spend their paychecks in other states. Most of the created jobs are gone after the drilling phase, which can be as short as a few months per well. Many of the expenditures associated with drilling actually occur out of state, benefitting regions that have historically specialized in extraction—especially Texas—rather than the host community.

Drilling is prone to speculative investment, too. Financing and lease terms encourage drilling wells quickly at the beginning of a boom, and natural gas prices are difficult to predict. When hydrofracking first hit the national stage, natural gas prices were rising quickly, peaking in 2008 at more than $14 per million BTU. By the winter of 2011 prices had fallen below $3, a level not seen in a decade, and some industry experts expect prices to drop to less than $2 this year.

With such low prices, natural gas extraction is barely profitable—and drilling far more volatile than the huge reserves might suggest. According to Weaver, "one of the companies is cutting the number of rigs they have and slowing things down" because the profit margin of gas is questionable at these low prices. The company calculated a target price of $3.50 to be profitable, Weaver says, and was forced to reevaluate its profit strategy as the price dropped.

In some states, drilling companies have abandoned "dry" gas fields—those with natural gas but no oil—and moved to deposits of "wet" gas that contain both. (Oil prices are still quite high and, compared to natural gas, yield unprecedented value for drillers). In Rifle, Colorado, planner Nathan Lindquist reports that drilling has dropped substantially since the summer of 2008, but seems to have reached a steady state. (To learn more about Rifle's experience, see "Bad Gas or Natural Gas," October 2009.)

"This area has always had significant resource extraction, and we expect that to continue in the long term," he says. "The bust, as some would call it, hasn't been so bad. Rifle didn't lease any city-owned property but still gets approximately $1 million annually from the state severance tax."

Rifle also learned from an extreme bust in the 1980s. Even while its natural gas industry was booming a few years ago, the community decided to redefine itself as a center for solar and other renewable energy development. Rifle now has the state's second largest combined municipal solar array and last summer christened the nation's largest community-owned solar array, allowing residents to buy panels that are installed in a centralized location rather than on their homes, and then earn income for the electricity produced.

Tapped out

Natural gas is a nonrenewable resource, which means that a commercially viable area is tapped until it is no longer profitable. Then the rigs move on to other locations. Booms and busts can be rough for municipalities, since effects are directly related to the pace and scale of the cycle. Social, political, and fiscal problems may occur in the boom phase. (See "*El Dorado North*," August/September 2011.)

Housing and labor shortages can create their own set of problems. Local planning staffers can be swamped with permit applications and regulatory agencies overrun by new responsibilities. In Tioga County, Pennsylvania, Jim Weaver says the number of permits needing review has jumped since 2008 but his department staff has not. "I'm a planning department of one," he says.

When the drilling workers leave, though, the facilities that were so hastily built for them may sit empty for years. Schools, hospitals, and new roads may be left with a smaller population and a smaller tax base to support them.

In the counties and cities of New York's Southern Tier, paralleling the Pennsylvania border, many localities have struggled for decades to fund infrastructure that was built years ago for a bigger population. Nevertheless, land-rich and cash-poor residents are tempted by hydrofracking's potential for jobs, signing bonuses, and royalty payments. "We've got to think about what happens when we have millionaires milking cows," says Weaver.

Meanwhile, the economic boom is not great for everyone. "A lot of it has been positive," says Bob Blair, director of the Tioga County Economic Development Corporation, "but some of it has been challenging, particularly for existing local businesses. As wages rise, small businesses are being forced to reevaluate their wage scale."

What happens if the gas industry crowds out developing or established industries, leaving the region less diverse and less resilient when the bust comes? "Everyone who wants a job has one," according to Blair. "Some companies are wondering if they want to continue to expand here, if the labor market will be there."

When the timing is off

There is also the question of pacing. Revenues from natural gas extraction may not coincide with the expenses that extraction creates, according to studies at Cornell University. Municipalities need additional staff to handle increased permit requests long before drilling even starts, but they may not see increased revenues for some time. Meanwhile, environmental damage from leaking retention ponds, pipeline spills, etc., may persist long after tax revenue from extraction dries up.

In addition, while wells create revenue in specific areas, they have regional impacts. Workers in extremely rural areas are likely to travel to the wells from up to an hour away. They may cross county or even state borders to settle in an area with services like restaurants, bars, and self-service laundries. Although New York currently bans hydraulic fracturing, its Southern Tier cities along the Pennsylvania border are experiencing both positive and negative impacts. Drilling crews spend their off hours and cash in restaurants, bars, hotels, and stores only 20 miles from Pennsylvania drilling sites.

New York is also seeing the downside: higher labor costs, pressures on the dairy in-

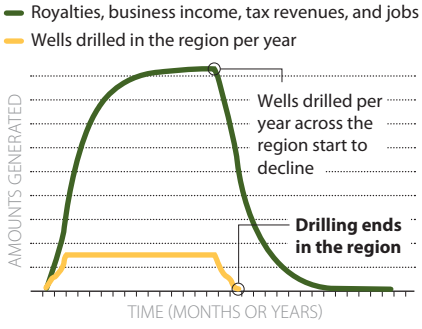
Photo by Mark Ovaska/Redux

A drilling rig near Dimock, Pennsylvania, where federal regulators are investigating claims that fracking has contaminated the water.

Photo by Nina Berman/NOOR/Redux

Protesters at the inauguration of Pennsylvania Gov. Tom Corbett, a supporter of natural gas exploration.

The boom-bust cycle



Source: Adapted from Tim Kelsey (2011), "Annual Royalties in a Community."

dustry, and an increase in the regional cost of living, especially for housing. Thousands of trucks, needed to bring fresh water to the drilling pads and haul away toxic backflow, crisscross the region and state boundaries to access water extraction points and disposal facilities. With northern Pennsylvania booming, New York water treatment facilities are already accepting frack water, and selling their freshwater, which means increased truck traffic and wear for New York roads as well as the possibility of a dangerous spill, among other environmental hazards.

Most of the natural gas, even for a good well, will be released during the first two years. Drilling crews spend about three months taking a well from drilling through completion, then move on to a new area. These short timelines make the period of economic benefit far shorter than the period of community impact.

Natural gas drilling frequently takes place in remote rural areas, where municipalities may be ill-equipped to handle the increased demands of a boom. "Every time we get someone trained and up to speed, the industry plucks them away because they can offer three times more for salaries," says Weaver. Municipalities can't expand quickly, and even if they do, they may be overbuilt when the bust comes.

New York's southern counties will face other challenges if the state opens up for new drilling. Jim Weaver's best advice is to make sure that land-use ordinances meet current standards and that the towns can guide growth. His county tried to institute zoning in 2007 and was shot down; now "people are coming in and asking why we don't have countywide development controls," Weaver says.

One of the problems New York communities face is state preemption of local regulation of hydraulic fracturing methods, including noise abatement, air pollution regulation, and zoning. Because 1981 legislation prohibits local regulation of drilling, attention has been focused on the state decision-making process and regulatory capacity.

In defiance of state preemption of natural gas regulation, more than 20 municipalities in New York State have undertaken action to ban fracking outright within their borders, citing home rule over land use. In rulings that surprised many following the fracking debate, two lower court judges in February upheld local laws banning fracking in the towns of Dryden (Tompkins County) and Middlefield (Otsego County). Both ruled that a ban does not constitute regulation of the oil and natural gas industry but is an allowable use of zoning. The gas industry is expected to appeal the decisions.

In New York State the debate rages on, just as the march to begin hydrofracking continues. In New York's Southern Tier and in regions in other states atop shale plays that are experiencing or may soon experience fracking, there is an opportunity for planning to guide communities to a balanced understanding of the potential economic impacts, to help them address the roller-coaster changes brought by the gas boom, and to attempt to mitigate the bust. There is no one-size-fits-all set of responses, but it is clear that planning is essential.

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Help for Housing

A sudden influx of workers, brought on by a booming natural gas industry, can affect local housing both during and after the boom. Impacts need to be understood, and the often competing interests of owners and tenants need to be considered. Wrestling with the housing impacts of shale drilling is particularly important from an equity perspective: Families on the margins are most likely to suffer, while large land owners benefit.

Because of data constraints, keeping an eye on housing and population levels at the micro level can be difficult, especially when planning departments are stretched to their limit with permit requests related to drilling. Rents have tripled or even quadrupled in parts of Tioga County, Pennsylvania, says to county planning director Jim Weaver. "It's created a homeless issue; the people with low incomes get pushed out and don't have anywhere to go," he says.

To make matters worse, emergency housing agencies in the area normally rely on hotel vacancies to meet the immediate needs of homeless families, but the hotels fill with gas workers during the drilling phase of a gas boom.

Housing presents a catch-22 for planners. During the drilling phase development can't keep up with an influx of new workers, but when the drilling phase is over, overbuilding during the boom, or a loss of population when low-income families are forced out, can lead to crashes in rental and owner occupied-housing values. The cumulative changes to an area's character from gravel lots, compressor stations, evaporation facilities, and any environmental damages may further depress property values.

Housing prices have been cut in half in Rifle, Colorado, since drilling peaked in the summer of 2008, according to government affairs director Mike Braaten. Although this crash is difficult to decouple from the national housing crisis, such dramatic changes are notable. Planner Nathan Lindquist sees a silver lining in the precipitous drop in housing prices: "Middle-income workers like teachers, who were previously forced to commute in from surrounding areas, are now able to buy," he says. "It's creating a stabilizing force in a town that has seen a lot of transience in the past."

As with other drilling impacts, housing hotspots are common. "Certainly impacts are not evenly distributed," says Kim Barnes, deputy director of the Northern Tier Regional Planning and Development Commission in Pennsylvania. Research from Cornell University suggests that counties in gas regions with medium-sized urban centers may see the greatest spikes in rent during drilling, regardless of whether the county itself has many wells.

"In our five counties there's no city of even of 10,000 people," says Barnes, "so we're used to crossing the state border to Elmira to go to the mall. It's no surprise that workers would want to locate near those amenities as well." In contrast, rural areas tend to lack a large rental market, while large cities can generally absorb new renters or have already priced them out.

In rural Pennsylvania, as in southern New York, communities traditionally opposed to land-use planning have switched sides. That means one positive effect of the development pressure created by drilling is an embrace of regulatory tools for protecting community standards. Institutionalizing planning authority may provide a long-term benefit.

Tackling Tourism

It's easy to picture a collision between tourism and intensive gas extraction: heavy truck traffic, degraded scenic and natural resources, and a squeeze on hotel rooms. But there may also be opportunities, such as temporary increases in hotel occupancy tax revenues. Planners can work on both sides of the equation.

After several depressed years, counties in the heart of the Pennsylvania Marcellus Shale area are experiencing an economic boom. The growth is fueled by an influx of gas workers, not by leisure travelers. There may even be fewer tourists around than before the drilling ramped up. Michelle Bousquet-Ketchen of the Lakeview Lodge in Tioga County saw a 25 percent bump in revenue last year. That's pretty modest compared to other properties whose rates have shot up (she keeps her prices low so she can more easily choose which gas workers she takes in), but the increase has a big impact on her small business.

"If gas drilling hadn't come, we would probably be out of business now," she says. Restaurant sales are up, too, including Bousquet-Ketchen's. But she also wonders how hard it will be to return to the traditional tourist market when the gas boom ends. "When someone calls up and there aren't any rooms available, they choose another location, and raising rates hurts worse."

Bradford County planning director Ray Stolinas, AICP, also wonders how tourism will fare in the long run, but so far the effects have been neutral or positive. Spikes in occupancy rates and prices are driving new hotel construction. He hopes that gas spinoffs can maintain demand when drilling eventually drops off. Further, even with 30-day permanent residency exemptions, the county is seeing a big increase in room tax revenues, enough to double the number of occupancy-tax-funded grants to local groups.

George Frantz, AICP, has been investigating the visual impacts of drilling in northeast Pennsylvania since 2008. He and Stolinas agree that the biggest aesthetic impacts are not from the drilling rigs but from support operations like pipe yards, warehousing, truck depots, RV parks, and apartment complexes. Frantz suggests stronger local planning. "Most of the municipalities in this region, including the ones where most of the wineries are, have no land-use regulatory structure in place," he says. "This means that they are wide open to a lot of really ugly, unplanned, and poorly located development."

What can planners do? "Help municipalities with long-term planning initiatives and new land-use tools," says Stolinas.

Planners also can:

- Use the bump in hotel occupancy tax revenues (if there is one) to enhance tourism infrastructure; when drilling tails off, the community will remain a desirable destination. Examples include investments in museums and parks, arts and culture organizations and venues, marketing resources, wayfinding signage, and beautification. But be cautious about relying on increases in room tax, since they are not likely to stick around.
- Consider preservation of attractive corridors as Scenic Byways.
- Perform traffic impact studies.
- Evaluate permanent residency exemptions in hotel occupancy tax laws and consider lengthening the definition to avoid loss of revenues. Also, consider enforcement mechanisms like requiring properties to produce signed leases for a stay to qualify.
- Support measures to slow the pace and scale of drilling to avoid huge spikes in the gas sector. This may give other industries like tourism the chance to grow with the gas sector rather than be crowded out by it.