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Unconventional Oil and Gas Development: Challenges and Opportunities for Local Governments

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Much of the public attention to unconventional oil and gas development has focused on the potential environmental and health impacts, such as water degradation and air quality. Yet the social and economic impacts of such development, including the full range of activities necessary to produce oil and gas from a specific location, such as leasing; seismic testing; construction of access roads, wellpad, and pipelines; drilling; water acquisition and disposal; and well completion can also be substantial (Brasier et al., 2011; Farren et al., 2013; Ferrar et al., 2013; Finkel et al., 2013; Jacquet, 2014; Raimi and Newell, 2014; Schafft, Borlu, and Glenna, 2013; and Williamson and Kolb, 2011).

Such impacts can create challenges for local governments which bear substantial responsibility for public infrastructure, human services, public safety, and other services that may be affected by unconventional oil and gas development. The nature of such development exacerbates these challenges, which include sudden, major impacts on infrastructure and services; local control; and perhaps, most significantly, the need to plan proactively and appropriately to the development process.

Infrastructure and Service Impacts

The onset of unconventional gas and oil development in a community can create sudden major changes in the demand for services, depending on the scale of development and the population size of the communities affected. Work crews for unconventional energy development are highly specialized, typically focusing on only a small proportion of the tasks required to complete a well, so they frequently shift between locations within and between drilling regions to conduct their individual specialty. One workforce study in Pennsylvania estimated that it takes more than 420 workers, spread across 150 different occupations, to drill and complete a well; yet the total time required by all of these workers for an individual well only totals 13.1 to 13.3 full-time equivalent people (Brundage et al., 2011). In addition, the highly specialized nature of the workforce means many local residents in regions without substantial existing unconventional oil and gas activity initially do not have the skills necessary to compete for certain jobs. As a result, non-residents temporarily move into the community, in some cases driving up rents and creating housing affordability and infrastructure challenges (Williamson and Kolb, 2011).

The influx of new workers, particularly in rural areas with relatively low populations, can strain housing, at least temporarily (Farren et al., 2013; and Williamson and Kolb, 2011). In some western states, this has forced local governments to upgrade public sewer and water infrastructure (Raimi and Newell, 2014). Perhaps the most common service impact on local governments is road maintenance and repair (Jacobson and Kelsey, 2012; and Raimi and Newell, 2014), precipitated by substantial increases in truck and other vehicle traffic. Other potential impacts include increased or changing demands for police and emergency services (Jacobson and Kelsey, 2012; and Raimi and Newell, 2014), and even increased problems for some local governments to retain their workforce (Raimi and Newell, 2014). Complicating governmental responses to such changing

service demands is the extent to which the demands will be temporary (e.g. lasting only as long as the boom) or long term. Often this isn't clear to local officials, yet it makes a significant difference in whether the services will be required for the future, much less how local governments should plan to pay for such investments. There are cases of local governments, such as Rifle, Colo., whose residents are stuck paying off infrastructure expenses long after the need for them while the energy companies and workers have moved on.

Documenting service and cost impacts on local governments can be difficult because local governments accommodate some increased service demands by shifting existing staff and other resources to cover the changes rather than increasing spending. For example, local officials in Susquehanna and Washington counties in Pennsylvania used such an approach to manage service impacts from Marcellus shale development (Jacobson and Kelsey, 2012). Measuring such impacts is much more difficult than looking at municipal or county budget changes, yet are no less real if other services have to be cut or reduced due to local government resources shifting to address impacts of unconventional oil and gas development.

Local Control and Coordination

The regionally dispersed nature of the drilling activity similarly creates control and coordination challenges for local governments. Much of the popular attention on drilling has focused on the well pads, including the drilling and hydraulic fracturing activity that occurs there. Yet unconventional oil and gas development activity is much broader than what occurs on the pads because it requires significant supporting infrastructure such as water withdrawal and impoundment sites; pipe and other material storage; sand unloading and storage facilities; gravel quarries for aggregate; equipment storage and maintenance facilities; and worker housing, some of which often are located an hour or more drive from the well pad they are supporting. Activity on any one well pad may only last several months, while activity at supporting locations can continue for years, as long as wells are being developed in the area. All this means that unconventional oil and gas development needs to be thought of as a regional activity, simultaneously spanning many communities (development typically extends across counties), rather than something that can be monitored or regulated solely by any one local jurisdiction.

Whether and how local governments can respond to the influx of development depends critically on the legal framework in their state, including the extent to which state laws allow mining and related activity to be regulated at the local level. Both New York and Pennsylvania have recently had major court decisions regarding the ability of local governments to zone or otherwise regulate unconventional gas development, clarifying the extent to which local governments are preempted from controlling such activity. In New York, an appellate court ruled that municipalities had that right under existing state law to ban shale development (Norse Energy v. Town of Dryden), while in Pennsylvania, the Pennsylvania Supreme Court threw out provisions of a recently passed state law that attempted to take away local governments' ability to zone or regulate such activity (Robinson Township v. Commonwealth). Even in locations where state law preempts local regulation of drilling activity, local governments typically do retain substantial control over other impacts arising from the supporting infrastructure, such as on housing, traffic, and public safety.

Officials in these states may find that local control of unconventional oil and gas development is a double-edged sword. From a community development perspective, local control is beneficial because it gives residents a voice in what occurs within their community. On the other hand, local control raises significant questions about the capacity of local governments to understand, monitor, and proactively engage in regulating unconventional oil and gas activity, which will be discussed in the next section. It also potentially makes implementation of regional responses more difficult. More fundamentally, local control may further exacerbate levels of conflict within some communities due to the development activity (Jacquet, 2014; and Kelsey and Ward, 2011).

With the large amount of lease and royalty dollars that can go to mineral rights owners, zoning decisions affecting where drilling can occur literally can be decisions about "who will be a millionaire." Similarly, there is the strong possibility that such decisions will lead to "takings" lawsuits from residents aggrieved that they are unable to lease or fully use their mineral rights. It is unclear how courts would rule on such "takings" claims, yet even if local governments are successful in defending against such claims, they likely will bear significant legal costs. If they are unsuccessful, the compensation and penalties they would owe easily could be in the millions. Either outcome could financially strain small, local governments with shallow pockets.

Local Capacity

One of the largest potential challenges is simply ensuring that local governments have the capacity to manage the issues arising with unconventional oil and gas development regardless of the local control options they have available. Much of this development is occurring in very rural areas, which typically are governed by governments with limited staff and resources, and offer a narrow range

of services. Such staffing leaves little capacity to deal with sudden new demands on local government, and they can be overwhelmed by unconventional oil and gas development. In addition, the activity can be very fast with little advanced warning so that local governments and others can plan and adjust. Companies' plans may change unexpectedly, making local planning even more difficult (Jacobson and Kelsey, 2011).

Local government capacity can differ substantially, greatly affecting their abilities to respond to the issues arising with the unconventional development. For example, one of the Pennsylvania counties most affected by Marcellus shale development has a one-person planning office; in contrast, a larger neighboring county being similarly affected by Marcellus activity has almost 30 staff in its planning office. The larger county has been more effective in proactively planning and monitoring what is occurring, revising ordinances and plans, and dedicating staff to specific challenges such as transportation and housing.

The potential for sudden waxing and waning of drilling activity can make it difficult for local governments to decide whether or when to hire additional staff because it can be unclear how long additional staffing will be required much less whether new taxes and other revenues will be sufficient to pay for such positions. Even when they decide to hire, it can be difficult to find qualified candidates within the community itself due to the specialized skills required and difficult to attract non-local applicants due to disruptions in the local housing market.

The result is that much of the local government response to this activity is done with existing staff resources, who typically already have enough "normal" responsibilities to keep them occupied (Jacobson and Kelsey, 2011). Staff can get shifted to handle issues arising from the development, letting their previous responsibilities go unfulfilled. For example, some Pennsylvania local officials in highly active drilling areas reported that they spent one quarter of their time dealing with natural gas-related issues, while another township's two policemen spent almost all of their time dealing with gas-related traffic (Jacobson and Kelsey, 2011). Much of such shifting is to address pressing short-run issues, such as emergency road repairs, responding to citizens' questions and concerns, and inspecting infrastructure and building sites. It can be difficult in such a crisis mode to focus on long-run issues and to carefully consider the long-term implications of short-run decisions.

Planning for the Long Run

Of most importance is the critical need for local governments and communities experiencing such development to think long term rather than just focusing on the day-to-day crises which may arise during the onset of unconventional oil and gas development. The volatility of oil and gas prices can create sudden surges or declines in development activity, resulting in rapid influxes or outflows of workers in a community or increasing the difficulty in planning and providing public services. Even without this price volatility, the drilling phase of development requires much more labor than does the production phase (the Pennsylvania workforce study mentioned earlier, for example, found that a Marcellus shale well annually only requires 0.2 to 0.4 full-time equivalent jobs once it begins producing, considerably less than the 13.1 to 13.3 required during the drilling phase itself). Many of the jobs created from such a boom are in the extraction, retail, and construction sectors (Brown, 2014; and Marchand, 2012) which last only as long as the development activity occurs. Thus, the major employment impacts of unconventional oil and gas development largely occur during the drilling and development phases, which mean the end of drilling can result in a major economic shock to a host community.

Recent experience suggests that the short-term economic gains can be substantial; for example, state income tax returns from residents of Bradford County (Pennsylvania's top Marcellus drilling county) reported an overall 19.1% increase in personal income between 2007 and 2010 (inflation adjusted) with little change in the number of such tax returns filed (Hardy and Kelsey, 2013). The average change in personal income at the county level in Pennsylvania during this same time period was a 2.7% decline. Local governments similarly can experience short-run economic benefits, depending on the local tax structure. In their multiple state study looking at the short-term impacts, Raimi and Newell found that most local governments have experienced net fiscal benefits from the recent unconventional oil and gas activity, though the impacts have been negative for some governments in western North Dakota and eastern Montana.

For communities with struggling economies, such short-term economic activity can be hard to ignore. The risk is that such gains will occur only over a short period of time, and that the local economy may not be better off once the drilling slows or stops. When viewed as a temporary influx of dollars into the community, unconventional oil and gas development activity can create the potential for communities to grow and diversity their economies, making them better off in the long run than if the oil and gas activity had never occurred. An example of such a long run view is the myriad of Pennsylvania farmers using leasing and royalty dollars to pay off loans, buy new farm equipment, and repair buildings.

The long run implications of the volatility and eventual decline of economic benefits are less clear. The academic literature on the long term economic impacts of natural resource development offers mixed conclusions, with some studies suggesting that local economies do not benefit from such activity in the long term (James and Aadland, 2011; and Papyrakis and Gerlagh, 2007), while other recent work, such as Allcott and Keniston (2013) and Brown (2014), challenge this. It is clear, however, that local governments can fall into a "lottery trap," spending short-run gains without planning for a future downturn. Jokes about "doing better next time" are rife in areas that have experienced past boom and bust cycles.

The attitude of local officials toward the fiscal benefits from this development is critical. Because these tax and impact fee dollars result from extraction of a non-renewable resource, they will be unsustainable over the long term. Decisions about how to spend such revenues have critical, long-run implications for the communities. Incorporating these windfalls into annual operating budgets on items unrelated to the development activity, either by increasing spending or by providing tax cuts, puts the governments at risk of becoming too dependent on the extraction activity, exposing them to potentially difficult decisions once the drilling (and flow of dollars) slows or ends. Instead, if the funds are viewed as capital to invest in long-run community improvements of benefit after the drilling activity ends, such as strengthening or revitalizing infrastructure required after the drilling ends, improving parks or recreational facilities, or upgrading equipment or facilities, the dollars can help local governments make critical community investments for the long run that were not possible prior to the drilling activity.

Perhaps most importantly, the regional nature of unconventional oil and gas activity and the need to manage it at such a regional level has the potential of strengthening local governments' connections and working relationships with each other. Though difficult to do, improving such relationships can be of benefit in the future as new issues arise.

Activity based on non-renewable resources such as that with unconventional oil and gas development is unsustainable, and will end. Local governments and citizens need to manage the issues of the present while planning for the future to ensure that the decisions they make will leave the community at least as well off, if not better off, in the long run.

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