



Health Impact Assessment: A Poultry Litter-to-Energy Facility in Shenandoah Valley, Virginia

The Shenandoah Valley in northwestern Virginia is among the nation’s largest producers of poultry. The litter produced by poultry farms is of particular concern because, when applied as fertilizer, the runoff can contribute to nutrient pollution of the environmentally vulnerable Chesapeake Bay watershed.

One alternative practice for managing excess nutrients is to burn the litter as a means of producing energy. At the time this project began, an energy company, Fibrowatt LLC, was developing a proposal to build such a facility in the Valley. Whether this solution is indeed better for the environment or public health is uncertain. The company did not publicly disclose details of the proposed Virginia facility (including the intended location), and the Virginia Department of Environmental Quality (DEQ) deferred making an air permit decision until a site was proposed.

Zoning authority for this type of facility is held by the boards of supervisors in the four counties where the site might be located: Augusta, Page, Rockingham, and

Shenandoah Counties. The decision taken by these counties could affect social, economic, and environmental factors that impact health.

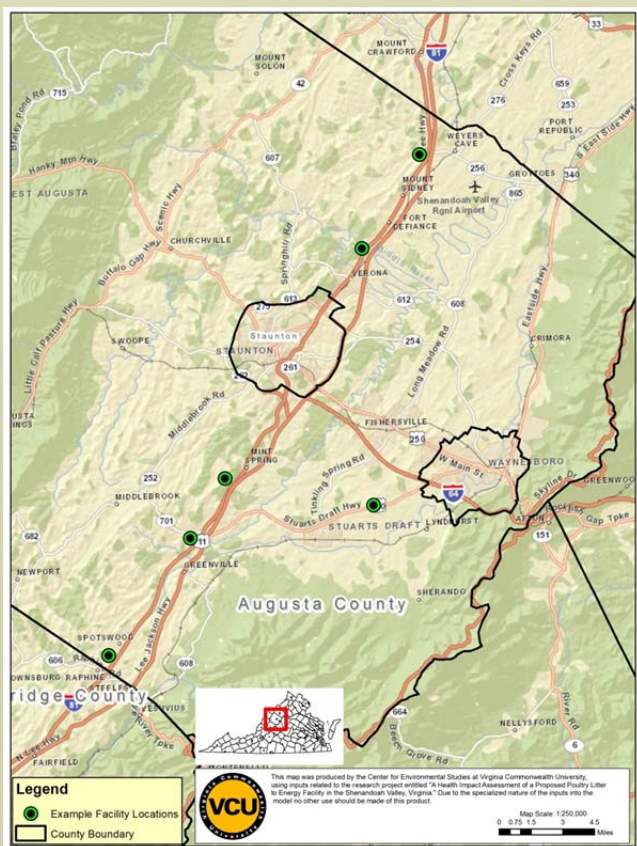
In preliminary community meetings, residents and environmental groups expressed concerns about effects on public health and the area economy. Nevertheless, the facility was mentioned in the state’s plan to meet new EPA standards for water quality in the Chesapeake Bay and state environmental officials began evaluating the environmental impacts. The competing stakeholder interests and the relative inattention to health outcomes made this an ideal topic for a health impact assessment.

Methods

This health impact assessment was completed by the Virginia Commonwealth University (VCU) Center on Human Needs in collaboration with the VCU Center for Environmental Studies and technical assistance from Human Impact Partners. The project is supported by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts. The views expressed are those of the authors and do not necessarily reflect the views of the Health Impact Project, the Robert Wood Johnson Foundation, or The Pew Charitable Trusts.

A group of interested and engaged stakeholders that included Valley communities, agency staff, and environmental advocacy groups guided the research plan as part of an advisory panel. Research questions addressed in the analysis were prepared based on feedback from community meetings, individual interviews, and a prioritization exercise with the advisory panel.

The final report addresses the health effects based on projected impacts on air quality, water quality, truck traffic, poultry/agriculture employment, adoption of alternative manure-to-energy technologies, and the National Parks. As part of this investigation, we modeled how the plant might affect air pollution by studying emissions data from stack tests of similar facilities and modeling atmospheric and topographic conditions in six hypothetical locations in the Valley (map). We also examined potential effects on truck



traffic, conducted focus groups and key interviews, and investigated the literature for relevant research.

Findings

We modeled the potential dispersion of four individual pollutants: nitrogen oxides (NO_x), sulfur oxides (SO_x), fine particulate matter (PM_{2.5}), and arsenic. Due to the terrain and meteorological conditions in the Valley, the location of the facility has a significant effect on the impact to air quality. A facility sited in the northernmost location on our list would produce the highest levels of air pollution. The pollutant of greatest concern is PM_{2.5}. As recently as 2007, the concentration of PM_{2.5} in the Valley was significantly higher than the level considered safe by the EPA. Since that time, PM_{2.5} concentrations have diminished but in some years have reached concentrations that exceed conservative estimates of the level at which health is impacted.

According to our model, the concentrations of NO_x and SO_x would not approach EPA standards for health implications, but those substances can also contribute to PM_{2.5} pollution through atmospheric interactions with ammonia emissions, a byproduct of fertilizing crop land. The removal of poultry litter as a potential fertilizer may decrease ammonia emissions in the Valley but we did not find conclusive evidence that this would reduce PM_{2.5} formation.

The facility would probably not raise arsenic concentrations to a level that would greatly affect health risks. However, Waynesboro County and southern Rockingham County have comparatively high pre-existing arsenic concentrations that make these areas more susceptible than others.

The replacement of poultry litter with commercial products or other livestock manures for use as fertilizers could improve water quality, thereby reducing the risk of water-borne illnesses and improving employment opportunities in industries that depend on high water quality, such as fishing and tourism.

Since litter that is not used by the farm of origin is often trucked elsewhere for use by other farmers, the proposed facility could result in a net reduction in truck traffic given certain assumptions. However, the locations in the southern Valley that would, according to our model, minimize the risk from harmful plant emissions would require trucking litter over a greater distance to reach the plant from the northern parts of the Valley where most litter is produced.

Even if the facility can contribute to reduced truck traffic across the Valley, it would still concentrate traffic near the facility, causing local effects on air quality, traffic accidents, and noise levels. Traffic accidents disproportionately impact young adults, and seniors (those 65 years of age or older) are most at risk from traffic noise.

Prior research has consistently demonstrated the health consequences of unemployment and poverty. The proposed energy facility would, according to the company, bring more than 35 new plant jobs, but its net effect on truck drivers is unclear. Litter brokers might be adversely affected, and crop farmers might see an increase in fertilizer costs. Interviews with poultry farmers revealed their own concerns about getting a fair price for the litter and about protecting their economic interests. A facility built without the support of the poultry growers community could result in unnecessary increases in health risks.

Recommendations

1. Include stakeholders such as the Department of Health and the DEQ in the site selection process.
2. Size the facility so that litter produced within the Valley is sufficient for operations and little woody biomass is needed as fuel.
3. Locate the facility so that air quality does not exceed a PM_{2.5}-annual average of 11 µg/m³.
4. DEQ should investigate the contribution of ammonia emissions to the concentration of fine particulate matter in the Valley.
5. Prior to negotiating litter purchase agreements, Fibrowatt should negotiate for endorsement from a group that represents poultry grower's interests.
6. Form a committee of local residents and stakeholders to provide input on strategies to increase local hiring for positions at the facility.
7. Site the facility in a location that avoids population density and elderly residents. Noise barriers such as walls or earthen barriers should be used around the facility as well as any congestion point along routes to the facility.
8. Set the speed limit for heavy trucks at 55 miles per hour in the Valley to reduce the risk of traffic accidents and fatalities. Schedule truck deliveries only during daylight hours and have contingency storage plans for poor weather days.
9. DEQ or local universities should evaluate the health impacts associated with adoption of small, on-farm, poultry litter-to-energy technologies.

For additional information, or to download the complete report, visit humanneeds.vcu.edu.