

# Modern Solutions for Rural Arkansas Infrastructure



**U of A** **DIVISION OF AGRICULTURE**  
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University of Arkansas System

Community, Professional & Economic Development  
*Strengthening Arkansas Communities*

**MP569**



# Modern Solutions for Rural Arkansas Infrastructure

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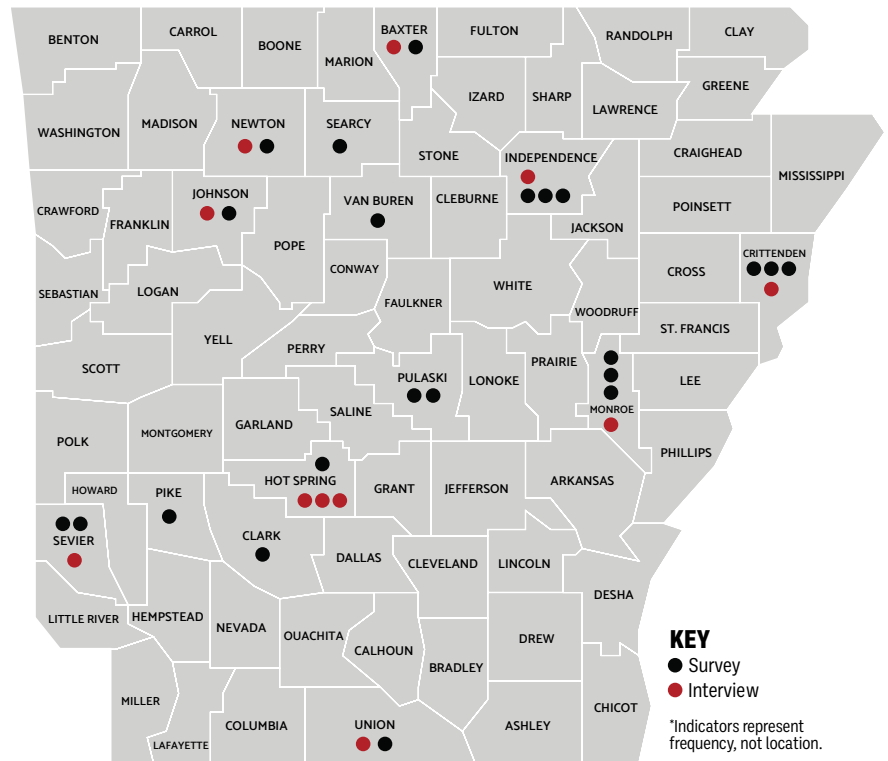
Cover photos provided by Arkansas Department of Parks, Heritage and Tourism. Images show Highway 103, Yancopin Bridge, and the Arkansas River Trail Bridge.



# Introduction

This report presents the findings of a study of the need for infrastructure investments and how county governments in Arkansas generate revenue for these investments. By completing this study, the research team hoped to improve the quality of life and sponsor economic and community development in rural Arkansas by recommending strategies and identifying potential funding opportunities for maintaining infrastructure.

Rural Arkansas has seen a significant decline in population and economic development in the past 30 years (Miller and Knapp, 2019). As more people move to urban areas, this reduces the economic base and starves local governments of revenue from the depletion of their tax base. This decline means that many rural communities barely have enough finances to remain economically solvent, much less enough to pursue large-scale infrastructure development.

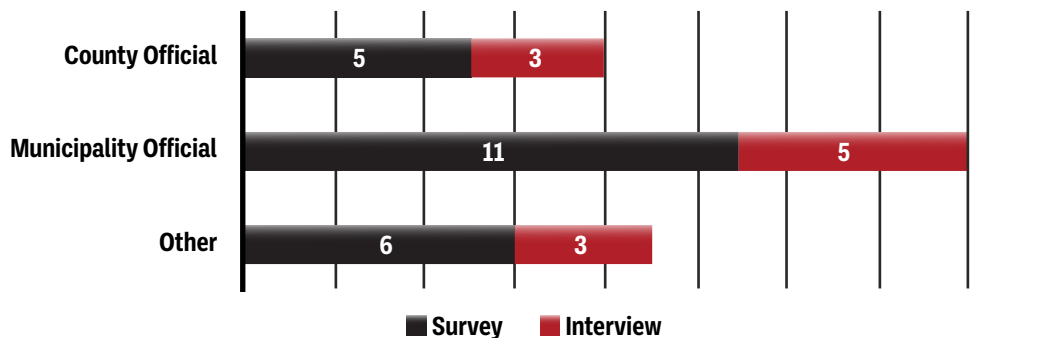


**Figure 1.1 Rural Development Survey & Interview Frequency of Respondents**

## Participants

Local government officials from 14 Arkansas counties participated in the study. Completed questionnaires were returned by officials or key informants in all 14 counties and follow-up interviews were conducted with participants in nine counties. In all, 22 completed questionnaires were collected and 11 interviews were conducted. Figure 1.1 represents the frequency of the survey and interview results from each county. Figure 1.2 represents the breakdown of the respondents in terms of county and municipality officials or 'other' such as a citizen or employee of the county.

**Figure 1.2 Survey and Interview Respondents**



# Results by Infrastructure Type

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The following section presents the results of the survey and interviews when asked three questions:

- (1) What are the current needs of infrastructure in the county?
- (2) What are the best practices to provide sustainable infrastructure?
- (3) What are the current infrastructure investments being made in the county?

A typical response about overall infrastructure concerns was the inability to pay for the rising cost of maintenance and construction. When asked about an infrastructure challenge, one respondent said: “I think the financials, keeping up with what the state requires is a big challenge for small cities like us.”

## Solid Waste

Based on the survey and interview responses, the research team identified the two most common problems with solid waste. One is the lack of routine trash pick-up because it is too difficult for a dump truck to traverse the dirt roads common throughout a rural county. Instead, many county and municipal residents are expected to drop off their solid waste at the nearest landfill. However, transportation is difficult for the county and municipal residents who may not have a vehicle appropriate to haul trash or perhaps live far from the dumpsite. To address this problem, the research team identified a common practice across the counties they interviewed, which was summed up by one respondent: “In lieu of trying to provide pick-up services for everyone in the county, they have provided collection points throughout the county.” These collection points, or transfer stations, are sites where trash is collected and taken to the nearest landfill. Stations need to be open only a few days a week, but it was also recommended to have various operational hours to make these services accessible for most workers. These stations will have to be well maintained and cleaned frequently.

Another issue was the accumulation of litter throughout the town and especially on the way to the landfill or transfer station. One solution proposed by a few respondents was to require all trash loads to be tarped or covered. Many rural counties reported passing a small sales tax to fund the solid waste infrastructure.

## Roads & Bridges

Roads were a significant focus for many respondents because roads require constant maintenance and funding. One respondent said their community was reviewing different asphalt techniques and trying to avoid a typical mill and fill as it was not cost-effective. The research team also identified the need for more funding for roads and bridges, including the need for more federal grants.

Another area of concern for respondents was deteriorating or failing culverts. The team identified this area of concern quickly and was told by respondents that culverts could get clogged and prevent proper drainage, or they can rust away due to age or the soil conditions and ultimately create problems for the roads over them. A best practice was shared by one community which had set a standard for developers, requiring large culverts to either be made of concrete or sprayed with a protective coating to promote the sustainability of the culverts and roads nearby.

## Drinking Water

Respondents overall were happy with the quality of their drinking water. One respondent commented that, “the water system, it’s more of a quantity and not a quality issue now.” Under the umbrella of quantity and supply, many respondents reported the need for a water tower or storage to improve water pressure and capacity. Another shared need was replacing underground pipes that are old or deteriorating with wider, better-quality piping to improve flow. The old or deteriorating pipes popped up as a frequent problem for respondents because of the longterm issues that arise when pipes begin to leak. This underground leaking was reported to lead to sinkholes and costly repairs to water lines and the roads. Unfortunately, when asked about replacing the pipes, one respondent said: “We don’t have enough money to be proactive on that, we just have to be reactive with what we have.” Standard funding procedures for drinking water infrastructure are either raising the cost of the service or passing a sales tax. This may not be ideal, but it may be necessary, as expressed by one interview respondent: “They were really up against a rock and a hard place. They were so far behind on where they needed to be the only solution was the sales tax.”

## Wastewater

Wastewater had similar problems in terms of replacing old or deteriorating pipes that may leak and cause further financial problems. One respondent noted, “We certainly have a deteriorating infrastructure which doesn’t just include roads and bridges, but it also includes water lines, septic lines, water tanks that were all built 40, 50, 60, 70, 80 years ago, and now they have met the end of their lifespan.” Rural counties and municipalities have done well to maintain their wastewater infrastructures, but natural decay happens with time. Along with this decay, common responses for wastewater infrastructure improvements included increasing the size and capacity of wastewater pipes, pumps, ponds, and treatment facilities. Counties were recommended to fund investments through a sales tax or begin to find options regarding a nodal PPP system.

## Levees & Dams

Many of the respondents surveyed or interviewed did not have levees and dams in their counties, so the research team was able to collect limited information on this infrastructure. The responses collected focus on concerns for future flooding and funding to make the required improvements. Counties are recommended to perform yearly inspection requirements by levee boards that met state and federal standards.

## Transit

Some respondents recognized the potential benefit of having transit or other rural transport services available to their rural communities. More respondents, however, reported that transit was not of immediate concern because of the limited use it would receive. One respondent said, “When there are people who either cannot get to doctors or into town, friends or relatives can help them out, you know, so I don’t think it’s that it’s a big problem.” The research team identified a few taxi services available, such as Mid-Delta Transit. An additional service was South Central Transit, which can be utilized for free by individuals with Medicare.

## Alternative Energy Sources

A common concern regarding alternative energy sources for rural counties and municipalities was the financial barrier to entry, and whether it would be of benefit to their counties. One response was that alternative energy “would have to be pitched in the right

way because we’re definitely a more conservative community.” The research team noted that many rural counties and municipalities do not have alternative energy sources simply because they struggle to select the right provider.

## Recycling

Frequent problems regarding recycling in rural counties and municipalities were the lack of incentives and opportunities to recycle. Based on survey and interview responses, it would be ideal if their solid waste program could also handle recycling. Multiple recycling collection points throughout the county would also be beneficial. One respondent commented on their recycling collection points, highlighting the benefits: “Those collection points allow for recycling of plastics and paper and aluminum, as well as the disposal of trash, and other bins exclusive to wood and metal.” The cost of recycling was a concern; one respondent mentioned, “especially smaller towns, it’s just not very cost-efficient at the end of the day.”

## Positive Community and Network Relationships

Another concern identified throughout the survey and interviews was keeping open lines of communication with all community members, elected officials, and key stakeholders of each type of infrastructure. An example of this communication is when counties and municipalities reached out to the Arkansas Rural Water Association to perform a watershed survey to identify the best locations for culverts. Another example was elected officials keeping their cities well informed when a sales tax passed or when to expect an increase in utility rates. The research team found it to be important that all increases in taxes or rates be accompanied with clear, detailed plans for what the increase will provide. Many respondents reported the municipality or counties’ willingness to assist their citizens by quickly addressing concerns like potholes, broken culverts, or leaking pipes. One relevant comment was, “If you know whom to go to and whom to talk to, they will work for you, and help you out, and I appreciate that. And so, I think the problem is just that disconnect about not knowing who to get a hold of and how to handle the situation.” Many respondents, of course, recognized that their rural counties have limited resources, staff, and funding. Along with that, though, many respondents also reported a strong sense of pride in their county or municipality.

# Identifying Infrastructures of Interest

After reviewing the survey results, the research team identified which infrastructure types were functioning well and which needed upgrading. The results are reported in Figure 1.3 and Figure 1.4.

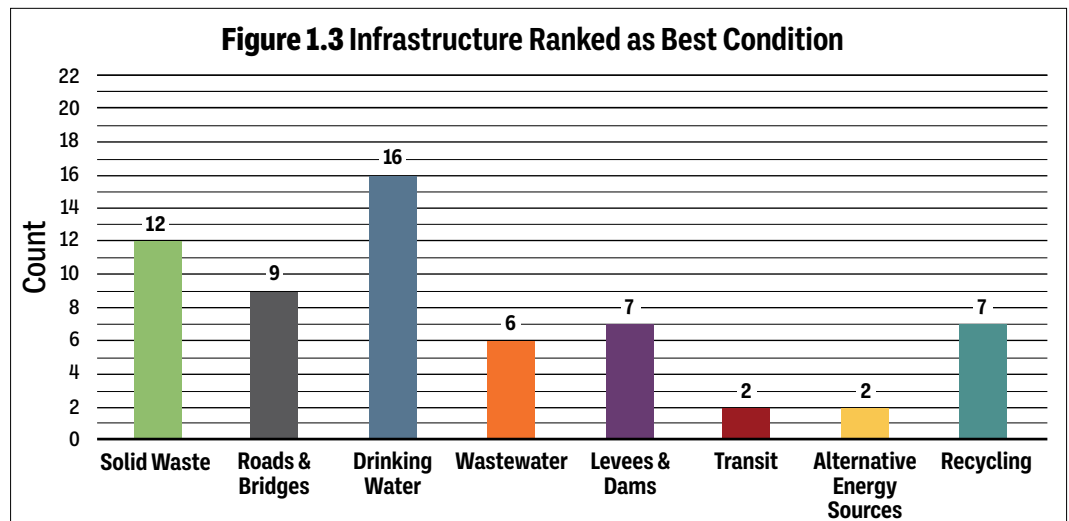
Survey respondents had the opportunity to select any of the infrastructures at least once, meaning each infrastructure could be selected a total of 22 times, potentially resulting in 66 total selections across all infrastructure types.

When the 22 respondents were asked to select three infrastructure types that were functioning well, the research team collected

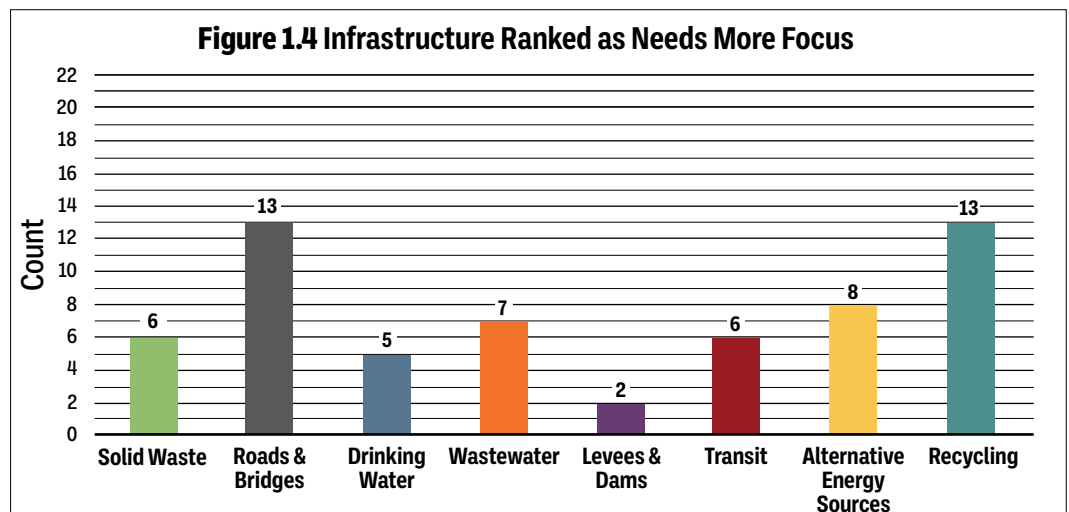
61 responses. When the same respondents were asked to select three infrastructures that needed more focus, the research team only collected 60 responses. While a total of 66 responses were possible, respondents were allowed to select fewer than three infrastructures, which explains why 66 responses were not recorded. Respondents were also asked to rank their selected three infrastructures, and once the research team coded those responses the findings showed a similar distribution.

One important observation made evident by the quantitative and qualitative data was how participants rated

solid waste, roads and bridges, drinking water, and recycling as being in the best condition, yet also needing more focus. Despite being frequently selected or ranked as being in the best condition, respondents were aware that these three infrastructures would require additional focus now and in the future. Other frequent concerns were for improving alternative energy sources and wastewater. Due to these responses, the research team decided to focus primarily on these five for their recommendations: solid waste, roads and bridges, wastewater, alternative energy sources, and recycling.



Represents the 61 completed survey respondents. Respondents could select up to three of eight infrastructures.



Represents the 61 completed survey respondents. Respondents could select up to three of eight infrastructures.



# Recommendations

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These recommendations were derived from the identified top five focus areas and will be presented as separate recommendations for both the municipal and county level. The research team found this to be important as municipal and county governments hold different responsibilities and can utilize different funding mechanisms for rural infrastructure development. Each infrastructure area will have recommendations that have been sourced either from the data collection process or best practices from Arkansas communities or surrounding states. Following this section are potential funding strategies to help actualize these recommendations.

## Solid Waste

### Trash and waste services

One of the main issues for rural solid waste systems is the lack of a consistent system for rural trash pickup and storage. If a rural community has landfill access, there is generally no formal infrastructure system of residential pickup for solid waste. Along with this issue, many participants expressed a need for less messy alternatives to rural collection sites. Participants consistently said many collection sites have litter along the roads leading to them, as individuals do not tarp or cover their trash loads.

### Municipal Recommendations

For rural municipalities, increasing the number of collection sites, expanding operational hours, and expanding staff at these sites can help mitigate the pressing trash problem. Many rural collection sites do not have consistent or appropriate hours due to a lack of funding for additional staff to serve the collection sites. Expanding the number of collection sites would reduce the load that individual collection sites face, give individuals more opportunities to dispose of trash in a responsible manner, and help rural municipalities remain free of litter. Expanding the number of sites is easier for municipalities than for counties as there are more clustered focal points within their communities that can be easily turned into collection sites. It is important to establish these expanded sites on well-established travel routes like state or county

highways to allow for the easiest access for residents. Establishing these collection sites with population trends in mind can also increase user participation rates. Locating these collection sites near population centers will greatly increase accessibility and provide individuals many opportunities to make use of the collection sites.

### County Recommendations

Counties can also benefit from the expanded capacities of solid waste collection sites, but the larger geographic spread of counties can make finding and creating new collection sites time-consuming. The larger geographic spread also can exacerbate the problem of litter from trucks going to existing collection sites. To mitigate this, county officials can educate individuals about the harm of improperly transporting trash or go as far as requiring trucks entering the collection sites to be tarped or covered in some way. Requiring a tarp on open-air trucks will reduce the amount of litter along roads and has already proven to be effective in some rural communities in Arkansas.

## Roads and Bridges

### Vehicle transport systems

For rural communities, past transport policy has led to miles and miles of paved roads and a lack of funding for the maintenance that is required. As they are the most frequently used infrastructure in rural communities, roads and bridges routinely rose to the forefront of the project. Individuals notice immediately when roads and bridges are in disrepair. Large potholes can cause drivers thousands of dollars in vehicle repair, and a collapsed bridge can spell fatal disaster for a rural community. Because these systems are so frequently used, the solutions must be financially and structurally stable in the long run.

### Municipal Recommendations

Municipalities have many options for improving roads under their domain. Since roads are consistently worn down over time, the solutions must be long-term. In terms of repairing potholes, the common “mill and



San Francisco Public Works crews install micro surfacing on an asphalt road. (San Francisco Public Works, 2020)

fill” method has proven to be good over the short-run, but inconsistent in the long-run. A better approach is “micro surfacing” which, while more expensive in upfront costs, has been shown to last longer and be a more environmentally stable method of repair. Micro surfacing involves mixing minerals, water, aggregate material, and polymer-modified asphalt emulsion to create a hard coating for road surfaces. This hard coating helps protect roads from erosion and will lead to fewer potholes developing over time. This will save individuals money on vehicle repair and produce better solutions for rural communities.

### **County Recommendations**

For rural counties, this micro surfacing method can also produce repairs that have long-term viability and sustainability. While these longer-term approaches require more initial funding, these investments will pay dividends in the future when there is a lower demand for costly repairs and maintenance. For many county officials, the sheer scale of the roads system is an ever-present problem. County officials should prioritize repairs and maintenance of their road systems based on the amount of traffic that each site sees. This prioritization allows for more efficient use of already constrained budgets and shows a community that their transportation needs are being addressed. Along with this repair prioritization, municipal and county governments can benefit from using steel pipes under roadways to prevent roads from washing

out in flood conditions. With this, failing culverts can lead to frequent road collapses, making it all the more important to use high-quality, long-term focused improvements. One Arkansas community has found success in mandating repair contractors to use concrete for culverts or mandate that any other repairs be done with a protective coating to improve the long-term sustainability of the improvement.

## **Wastewater**

### ***The plan or network for the collection, treatment, and disposal of sewage***

Rural communities with a large geographic spread have little to no use for a community-wide network for wastewater infrastructure. The cost of installation and maintenance for wastewater lines that stretch for miles through rural areas are prohibitive for rural communities. For closer-knit communities that have a small-scale system, the high cost of repairing deteriorating lines, maintaining sewer ponds, and managing daily pump maintenance have left rural systems with fractured and costly systems.

### **Municipal Recommendations**

Smaller, more close-knit rural municipalities with a dedicated wastewater treatment system can benefit from a maintenance approach that prioritizes smaller, incremental updates and repairs on a consistent basis. Many communities have dedicated, hard-

working staff for these wastewater systems, making updates and repairs easier once funding is acquired. Replacing broken down lines with high quality, steel pipes can increase the longevity of systems, reducing the total cost over time of installation, repair, and maintenance of the system. It cannot be overstated how quality improvements can save rural communities hundreds of thousands of dollars over the lifetime of the improvements. For rural municipalities without a dedicated, formal system for wastewater management, there are some opportunities for a P3 arrangement with local businesses operating as nodes in a central system of septic tanks. While this is an option to consider for rural communities less spread out, no rural communities in Arkansas have implemented such a system, making possible results unpredictable.

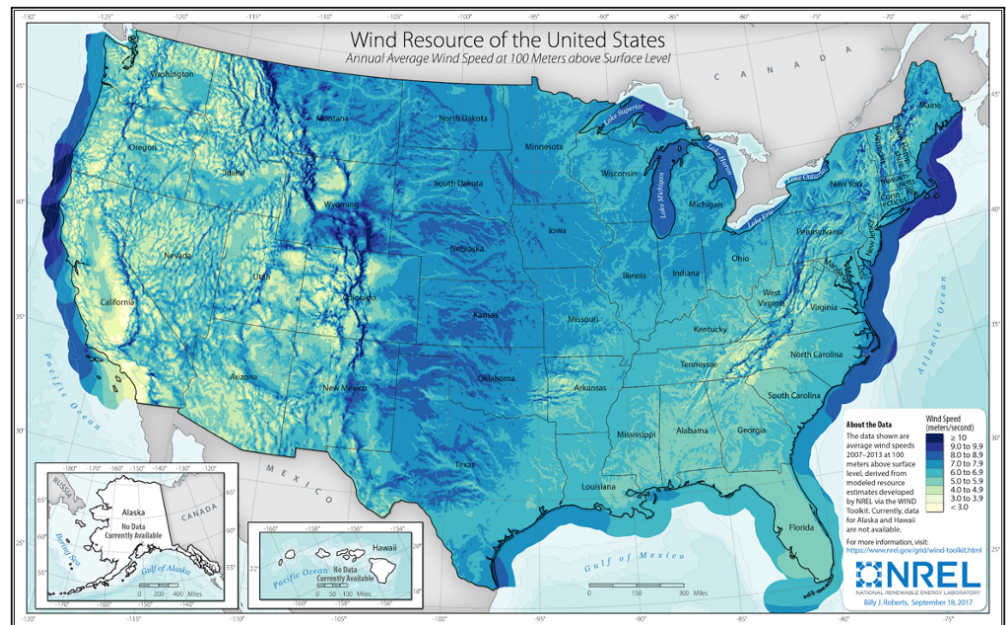
### County Recommendations

Many rural counties operate on individual septic systems with no formal arrangement for wastewater disposal or treatment. Possible solutions for improving county services include requiring septic tank inspections to ensure proper function and instituting more installation requirements for contractors or individuals who install new systems or replace old systems. While there isn't much room for counties to act in providing wastewater services, these smaller measures can ensure that rural residents have consistent access to services like wastewater disposal without developing large-scale, costly systems.

## **Alternative Energy Sources**

### *Renewable energy systems or non-traditional forms of energy management and delivery*

As renewable energy systems have become more common across America, rural communities



The map above displays the propensity for harvesting wind resources for electricity production. While the major areas are highlighted in darker blues throughout the Midwest and Great Plains Regions, shades of darker blue can be seen in the western mountainous areas of Arkansas. (National Renewable Energy Laboratory, 2017)

in Arkansas have also expressed interest in implementing their own systems. However, high initial capital costs for installation and a multitude of options have deterred some rural communities from following through with the installation of a renewable energy system.

### Municipal Recommendations

Renewable energy systems represent a great opportunity for rural municipalities as a more consistent, sustainable form of energy production can enhance economic and social development. Beyond the energy benefits, renewable energy systems can function as a cost-saving, long-term investment for rural communities. Instead of buying power from the grid at an increased rate, rural communities can begin to produce their own energy from the natural, reoccurring resources around them. This presents municipalities with a more autonomous, financially sound future where rural power is consistent, clean, and widely available for consumption. P3 opportunities abound within the realm of renewable energy systems with many solar and wind installation companies offering different financing packages based on project designs. Different opportunities are available in different parts of the state. For example, solar systems have been shown in recent years to be increasingly more common in the Delta and Southern



Arkansas with many successful projects established in recent years. In the Ozarks and Ouachitas, wind speed maps display a propensity for wind turbine installation that could present opportunities for many rural, mountainous communities.

### County Recommendations

Similar opportunities are available for counties as partnerships can be established with the 13 different electric cooperatives throughout the state, all of whom report at least some interest from members in developing more alternative energy sources. With the resources of electric cooperatives paired with counties, there are many opportunities for renewable energy system development, job creation, economic development, and social development for rural communities. Throughout the data collection, many respondents expressed an inability to afford the upfront costs and an unfamiliarity with the financial benefits after the system is in place. Partnerships with electric cooperatives, who already have some experience with these systems can ease some of this doubt, provide for cost-sharing of systems, and reduce unfamiliarity and increase the likelihood that rural communities can benefit from the development of alternative energy sources. Net metering also presents a unique opportunity for rural communities to save money on electric rates that are paid into the grids. Homeowners and larger scale plants alike can sell energy produced back onto the grid and receive a 1:1 credit for the energy. This means that these plants are not only producing for the needs of the community, but also earning revenue for excess energy that is sold to other communities. This concept reduces the timeline for the Return on Investment to be reached.

## Recycling

*Recovering scrap or waste materials such as steel, aluminum, glass, paper*

Rural communities have struggled with very low incentives for recycling and a lack of participation when recycling systems are provided. Along with these problems, the high cost of transportation and refabrication makes recycling systems less financially plausible for communities that are already struggling financially.

### Municipal Recommendations

Many of the same issues that plague rural communities in terms of solid waste are also present within the realm of recycling systems. The current state of rural recycling includes two forms: costly systems without means for improvement, or no formal system at all. For municipalities, increasing the number of collection sites will incentivize recycling among residents and lead to lower recycling costs. Many rural communities expressed that with the low volume of participation, the transportation of the recyclable material to recycling centers was not cost-effective. As the volume increases, the price decreases as there is more value created by each individual trip to the recycling station. Promoting recycling can also come from local governments own commitment to recycling practices. Providing this good example can show others in the community that recycling has positive benefits for the entire community. As these recommendations are implemented, recycling becomes easier and more cost-effective.

Higher-use systems are inherently cheaper, creating real incentive for municipalities to promote recycling and give people multiple avenues for recycling waste.

### County Recommendations

Rural counties experience the same issues with recycling as with solid waste: few collection centers with unhelpful or unproductive hours and staff restrictions that limit the services provided to residents.

Improving these collection centers'



NexGen Municipal rural recycling collection centers provide a recycling focal point for a rural community. (NexGen Municipal, 2010)



current capabilities while also providing recycling collection opportunities for residents can increase traffic to the collection center and help drive down the cost per load transported calculation. In this infrastructure area, there are P3 opportunities with private collection services that could feasibly implement a limited roadside pickup opportunity for rural residents. This improvement could help offset costs of operating collection sites and produce more cost-efficient transportation routes throughout a county. Roadside pickup of recycling would increase

recycling opportunities tenfold and ultimately lead to establishing recycling as a norm among rural residents who have not had previous recycling opportunities. In this infrastructure realm, cost will always reign supreme, so it is important for rural communities to find the most cost-efficient service available that also produces the best service for their residents. This continued balance will complicate rural recycling for years to come.

## Funding Strategies<sup>1</sup>

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After speaking with leaders in rural areas across Arkansas, it became clear that access to funding is a hurdle for rural communities looking to develop. Many, if not most, solutions identified by community leaders were funded by raising sales or use taxes, including raising utility costs, but many worry about public backlash regarding higher taxes. Although raising local tax rates may seem like a straightforward way to pay for infrastructure projects, the research team recognizes the weight of public opinion and support involved with such undertakings that typically requires voter approval. There is also a real and philosophical limit on the tax rates counties and cities can charge to raise local revenue. With that in mind, the team focused on collecting various grant-funding opportunities rather than tax-funded mechanisms. The following funding strategies will be broken down by the top-five infrastructure interest areas, as identified by local leaders.

### **Solid Waste**

The United States Department of Agriculture (USDA), Rural Development Division, is an extremely valuable resource for grant-funding opportunities for rural Arkansas communities. The research team identified two potential funding opportunities: the Solid Waste Management Grant, and the Water and Waste Disposal Loan and Grant Program. Both are open to state and local governments for eligible areas with pop-

ulations of 10,000 or less, with special consideration given to areas with fewer than 5,500 and fewer than 2,500 people.

The Solid Waste Management Grant funds may be used to evaluate current landfill conditions and to provide technical assistance to enhance training and operations of landfills. Matching funds are not required, but it's important to note this grant is nationally competitive, and local and in-kind contributions are considered in the application process.

The Water and Waste Disposal Loan and Grant Program can be applied to both solid waste and wastewater. This grant provides funding for sanitary solid waste collection, disposal, and closure in rural areas. Funds come in the form of 40-year, fixed-interest loans, as well as grant opportunities if matching funds are available. In some cases, the funds can be used for land acquisition, land-use rights, start-up operations, interest incurred during construction, and the purchase of facilities.

### **Roads and Bridges**

Recommended funding mechanisms for road and bridge infrastructure come from both state and federal programs. The Rural Project Initiative (RPI) is a federal program that provides loans up to 49% of the project's eligible costs and at interest rates below

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<sup>1</sup>Since the writing of this publication, the U.S. Congress passed the Infrastructure Investment and Jobs Act, which provides funding to build and upgrade infrastructure in the U.S. Some of this funding can be used by local governments to rebuild roads and bridges and upgrade power infrastructure to deliver clean, reliable energy.

market rates for rural communities. The program provides loan guarantees to a non-federal lender, and the funds may be used to construct or repair roads, bridges and tunnels and other transportation infrastructure.

An additional funding opportunity for road and bridge infrastructure is the Infrastructure for Rebuilding America Grant Program. The INFRA provides discretionary funding to all levels of government, as well as to non-profits and for-profit businesses, for the development of critical infrastructure projects. INFRA also leverages grant funding to promote local governments and the private sector to pursue public-private partnerships.

## **Wastewater**

As mentioned above, the USDA, Rural Development Division, provides the Water and Waste Disposal Loan and Grant Program, which allocates loans and grants to assist local governments in funding wastewater projects in rural communities with populations under 10,000. Funds may be used for sewer waste collection, disposal, and closure, as well as storm water collection, transmission, and disposal. In some cases, funding may also be available for related activities such as legal and engineering fees, water and land use acquisition, start-up operations, interest incurred during construction, and the purchase of facilities to improve the service or prevent loss of service.

The Arkansas Natural Resources Commission (ANRC) has funding for water and wastewater projects from both state and federal programs. Wastewater programs include funding for sewer collection and treatment system. Many governmental units, including towns, cities and counties, can apply for these funds.

In addition to the above agencies funding wastewater projects, the Arkansas Economic Development Commission administers the Community Development Block Grant Program (CDBG) for wastewater. Eligible applicants include cities and counties with populations of under 50,000 with a low- to moderate-income (LMI) population of at least 51 percent, or for projects which benefit a targeted eligible clientele. The maximum grant amount for wastewater activities is \$1 million. Only projects for

the construction of new systems or for extension of service projects for existing systems where new customers are added are eligible to apply for up to \$1,000,000. All other projects are capped at \$300,000 (rehabilitation, etc.).

## **Alternative Energy Sources**

Renewable energy production facilities have the potential to create a localized source of energy that is remarkably stable, ecologically responsible, and economically feasible compared to traditional rural energy sources like coal, natural gas, and petroleum. While government-sponsored energy systems are preferred by many in the field, the team recognizes that public-private partnerships between county / municipal entities and electric power cooperatives are easier to obtain and have similar potential to create efficient and renewable energy systems.

The State of Arkansas, through the Arkansas Economic Development Commission, administers the Renewable Technology State Rebate Fund Program that provides rebates to nonprofit, commercial, residential, and local governments for alternative energy systems to generate electricity using wind and solar (AEDC, 2013). The Arkansas Energy Office also offers assistance to municipalities and counties looking to pay for efficiency upgrades through Energy Performance Contracting. This financing mechanism is used to pay for energy efficiency improvements that are paid back through annual energy savings. They also offer various outreach and education tools that are highly valuable to small communities looking to navigate the technical aspects of energy contract agreements and requirements.

The Arkansas EPC became law in 2013 and was expanded to cover municipalities in 2015. It guarantees over \$400 million in energy savings for the public sector since its inception (ADEQ, 2020b). The Rural Energy Savings Program (RESP) provides loans to entities that agree to make affordable loans to help consumers implement alternative energy measures. For this program, rural areas are defined as areas with populations of 20,000 or less, and are open to qualifying electric cooperatives, commercial and residential customers, and the agricultural, industrial, and public sectors (USDA, 2020b). Other key options include utilizing net metering provisions set by Solar Access Act 464 and the Arkansas Public Service Commission's Net Metering Phases.

## Recycling

Financial resources are available to help local governments develop recycling programs to reduce of the amount of waste going in landfills. The Arkansas Department of Environmental Quality (ADEQ) administers various grants through the Recycling Distribution Program (formerly called the Recycling Grants Program) to regional solid waste management districts that administer waste management programs. Grant amounts vary based on needs, but funds are available to every regional waste management district in the state.

## Conclusion

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Infrastructure improvements function as the base for future, sustainable economic development. With reliable infrastructure, communities can better support economic development efforts that require modern infrastructure systems to be competitive in today's global economy. Declining populations and a loss of business have plagued rural areas for decades. This has resulted in deteriorating infrastructure systems as budget constrictions and shrinking tax bases have reduced available maintenance and development funds. One of our respondents put it succinctly: "It really is a national problem; we have a crumbling infrastructure that both the Democrats and Republicans all agree upon."

To mitigate these destructive patterns for rural communities, it is important that specific, targeted improvements are made in rural infrastructure systems. By taking on the recommended projects listed above with sustainable funding mechanisms and key stakeholder support, rural communities can begin to upgrade their infrastructure that has been needed for so long. This community-centric approach was frequently mentioned throughout the data collection process, with one respondent saying "it [rural development] is a community problem and a community needs to find a solution where they hold each other accountable." During the data collection process, the research team met with many local officials who expressed the desire to see more development and more opportunities for their rural

communities. However, many of these officials also expressed an inability to act to upgrade critical infrastructure, frequently citing costs, available time, and already overextended systems as barriers. Identifying these potential projects and funding mechanisms for rural communities helps local officials focus on the implementation of these projects, creating long-term solutions to long-term problems.

# Appendix-Funding Resources

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## Solid Waste

USDA – Water and Waste Disposal Loan and Grant Program [www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program](http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program)

Solid Waste Management Grant [www.rd.usda.gov/programs-services/solid-waste-management-grants/ar](http://www.rd.usda.gov/programs-services/solid-waste-management-grants/ar)

## Roads and Bridges

USDOT – Rural Project Initiative (RPI) [www.transportation.gov/buildamerica/financing/tifia/tifia-rural-project-initiative-rpi](http://www.transportation.gov/buildamerica/financing/tifia/tifia-rural-project-initiative-rpi)

USDOT – INFRA Grant [www.transportation.gov/buildamerica/financing/infra-grants/infrastructure-rebuilding-america](http://www.transportation.gov/buildamerica/financing/infra-grants/infrastructure-rebuilding-america)

## Wastewater

USDA – Water and Waste Disposal Loan and Grant Program. [www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program](http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program)

ANRC - [www.anrc.arkansas.gov/divisions/water-resources-development/water-and-wastewater-funding/](http://www.anrc.arkansas.gov/divisions/water-resources-development/water-and-wastewater-funding/)

## Alternative Energy

AEDC – Arkansas Energy Assurance Plan. [www.adeq.state.ar.us/energy/resources/pdfs/arkansas-energy-assurance-plan.pdf](http://www.adeq.state.ar.us/energy/resources/pdfs/arkansas-energy-assurance-plan.pdf)

ADEQ – Arkansas Energy Performance Contracting. [www.adeq.state.ar.us/energy/incentives/performance.aspx#targetText=Energy%20Performance%20Contracting%20is%20a,back%20through%20annual%20energy%20savings.&targetText=Please%20contact%20Energy%20Finance%20Program,with%20specific%20questions%20or%20concerns](http://www.adeq.state.ar.us/energy/incentives/performance.aspx#targetText=Energy%20Performance%20Contracting%20is%20a,back%20through%20annual%20energy%20savings.&targetText=Please%20contact%20Energy%20Finance%20Program,with%20specific%20questions%20or%20concerns)

USDA - Rural Energy Savings Program. [www.rd.usda.gov/programs-services/rural-energy-savings-program](http://www.rd.usda.gov/programs-services/rural-energy-savings-program)

## Recycling

ADEQ – Recycling Distribution Program [www.adeq.state.ar.us/poa/recycling/financial/distribution.aspx](http://www.adeq.state.ar.us/poa/recycling/financial/distribution.aspx)



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NexGen Municipal (2010). NexGen Municipal. *Rural Recycling Drop-off Convenience Center*. [www.nexgenmunicipal.com/en\\_rural\\_waste\\_recycling.asp](http://www.nexgenmunicipal.com/en_rural_waste_recycling.asp)

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