



Title: Economic and Policy Analysis of Potential Deployment of Rural Broadband in Indiana

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Abstract: This policy brief projects the statewide net benefits that could be obtained from installation of rural broadband in all of the areas served by Rural Electric Member Cooperatives (REMC) in the State of Indiana. It also explains why despite the large projected net benefits, some form of policy intervention likely will be needed to achieve widespread rural broadband deployment.

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Information is a driver of growth and change in our 21st century economy, and information flows through the internet. Unfortunately, many of our rural communities lack access to broadband networks. This study quantifies the benefits and costs of extending broadband networks to rural Indiana. This analysis was done in three phases. The initial analysis that was done for the Tipmont Cooperative and contained detailed analysis of benefits and costs for rural broadband in their service territory. Then six additional Indiana REMCs were added, although with somewhat less precision than the original Tipmont analysis. On the basis of those results, the rural broadband net benefits were extrapolated to the State of Indiana. Finally, the federal and state revenue and tax implications for rural broadband deployment were estimated. Table 1 provides a summary of the benefit-cost metrics from the analysis. The benefit-cost ratios range from 2.97 to 4.09 for the seven REMCs. From a societal perspective, the rural broadband investment is clearly quite attractive. However, the anticipated revenue from customers would not be adequate to cover the total system costs (last column of table 1), so some form of assistance or policy intervention would be needed to incentivize the investments.

The sum of net present value of benefits for the seven cooperatives is \$2,252,600,453. There are 92,726 members in these coops, so the net benefit per member is \$24,293 (weighted average) for the seven cooperatives. Extrapolating the net benefits for these seven REMCs to the State, the total for the State of Indiana would be \$11,976,222,899.

In other words, the State of Indiana would receive about \$12 billion in net benefits if the broadband investment were made statewide. That translates to \$1.0 billion per year annuitized over 20 years at six percent interest rate. These net benefits are net of all investment and operating costs, and they accrue to households, businesses, and governments.

Table 1. Metrics for Broadband Investment by Cooperative

Cooperative	NPV	Ann. NPV	B/C	Members	NPV/member	B/member cost	Rev/cost
Tipmont	560,280,195	48,847,781	3.96	22,631	24,757	4.49	0.54
Henry County	190,129,578	16,576,363	3.24	8,500	22,368	3.96	0.45
Jackson County	582,505,581	50,785,491	4.09	24,203	24,067	4.33	0.58
Marshall County	165,610,509	14,438,679	3.03	7,249	22,846	4.06	0.40
Noble County	246,440,421	21,485,799	3.47	10,646	23,149	4.13	0.48
Orange County	166,377,353	14,505,536	2.97	7,756	21,451	3.75	0.41
Whitewater	341,256,815	29,752,324	3.84	11,741	29,065	5.44	0.44

In addition to the benefit-cost analysis, this report also quantifies the additional State and Federal tax collections and cost savings that could happen with broadband investments in these seven REMCs. Table 2 summarizes the added federal and state tax collection and medical cost reductions that could result from the rural broadband investments. These tax/cost enhancements amount to \$56.5 million in year three for the seven REMCs, or 27% of the total net benefits of \$208 million. The shares should be similar for the duration of the broadband investment period.

Table 2. Summary of federal and state tax benefits as compared with total net benefits in year 3

Cooperative	Year 3 Net Benefit	Total Federal	Total State of Indiana	Total, Federal and State
Henry	17,602,347	4,509,702	825,662	5,335,364
Jackson	53,840,546	11,347,964	2,082,798	13,430,762
Marshall	15,347,027	3,522,749	685,967	4,208,716
Noble	22,777,888	5,170,303	940,571	6,110,874
Orange	15,416,517	4,019,580	757,246	4,776,826
Tipmont	51,638,797	10,610,488	1,940,658	12,551,146
Whitewater	31,253,692	8,761,850	1,358,954	10,120,804
Total REMC	208,035,086	47,942,638	8,591,854	56,534,492

These estimates are for the seven REMCs. Each year, added government revenues and cost savings would amount to about 27% of net benefits in the seven REMCs. The net benefits of broadband investment for the whole state of Indiana is about \$12 billion, which translates to about \$1.0 billion per year annuitized over 20 years at six percent interest rate. These net benefits include benefits that accrue to households, businesses, and to governments. If the rest of rural Indiana is like the seven cooperative service areas, then 27% of the \$1.0 billion per year annualized total net benefit would be government revenue and health care cost savings, or \$270 million per year. In terms of total net present value of benefits over a 20-year term, 27% of the \$12 billion total is \$3.24 billion of government revenue and health care cost savings. In other words, governments stand to gain substantially from rural broadband investments reaping over a quarter of the total net benefits.

The major policy issue is that even though the estimated net benefits for the state are large, and about a quarter of the benefits accrue to federal and state governments, the cooperatives cannot capture enough benefits in the market place to warrant the rural broadband investments. The situation is somewhat analogous to rural electrification. In the 1930s, a very small fraction of rural households and businesses had electricity. Congress passed the Rural Electrification Act of 1936 which provided loans to rural electric cooperatives to deliver electricity to rural areas [1, 2]. The policy change was remarkably successful resulting in rural electrification at a rapid pace.

Rural areas are different from urban areas with respect to both rural electrification and rural broadband because the household density is much lower, and capital costs for providing service are much higher. In urban areas, the distance between houses may be 25 feet, whereas in rural areas, they can be 25 miles or more. That added distance between “drops” increases costs substantially. Markets would not provide these services in rural areas because the installation costs could not be recovered from the prices that could be charged. However, with federal loans to help cover the installation costs, rural electrification was achieved.

Congress has already recognized the importance of rural broadband with the passage of two laws in 2008 and 2014 [3, 4]. The 2008 Act made some provisions to support rural broadband telecommunications networks. The 2014 legislation provided for a pilot project for rural gigabit broadband networks. However, these limited legislative measures by themselves will not provide for widespread deployment of rural broadband. State and federal governments may want to consider other policy measures to help keep rural citizens from falling behind the “digital divide.”

References

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