



Public broadband investment priorities in the United States: an analysis of the broadband technology opportunities program

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ABSTRACT

In 2009, U.S. Congress approved \$7.2 billion to accelerate the deployment of advanced broadband networks and services to unserved and underserved regions of the country. Although primarily a short-term response to the economic crisis, the appropriation also indicates a willingness to seek a new balance between private sector and public sector initiatives in the development of the nation's broadband infrastructure. This paper is a first step in assessing the potential impact of the new government initiatives. It discusses in detail one component of the overall program, the Broadband Technology Opportunities Program (BTOP). The rationales and objectives of BTOP and its initial implementation are explored. Based on information in the BTOP database, 265 awards were examined to document award types, target communities, applications, technology, and access speeds. Whereas it is too early to assess the initiatives' effects on employment and other important social and economic objectives, it is appropriate to consider whether the awards made under the BTOP program advance a national broadband development agenda. Overall, they appear to. However, the present analysis found that projects focusing on minority populations may have received less emphasis in the BTOP awards than that announced in the stated goals of the program.

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1. Introduction

Making advanced broadband internet service available to all Americans requires considerable infrastructure investment. The Federal Communications Commission (FCC) estimated that network investment of approximately \$350 billion would be necessary to make access speeds of 100+ mbps universally available (FCC, 2009, p. 45). U.S. communications policy has historically pursued a dual strategy: reliance on private sector investment complemented by regulatory and other public policies intended to overcome the shortcomings of market forces. This thrust is reflected in the historical universal service program for voice service and the E-rate program supporting broadband to schools, libraries, and rural health care providers adopted in 1996 (Cherry et al., 1999). It is continued in the Connect America Fund (CAF) established by the FCC in 2011 with the goal to further advance broadband connectivity.

Broadband service evolved in a changing policy environment. Not only had Congress in the Telecommunications Act of 1996 declared competition as the overarching principle to organize communication markets, it had also expressed the vision that the internet should evolve in a “vibrant and competitive free market” environment, “unfettered by federal or state regulation” (Sec. 230(b)(2) Communications Act of 1934 as amended). Cable modem and Digital Subscriber Line (DSL)

providers emerged from different regulatory traditions (contract carriage for cable, common carriage for DSL) that created an uneven competitive playing field. The resulting tensions were addressed in several declaratory rulings by the FCC. The agency resolved the conflict in favor of limited regulation rather than subjecting cable to the more stringent regulations that applied to DSL. Already in 2002, cable modem service had been classified as a nearly unregulated information service (based on Title I of the Communications Act as amended, that grants the FCC ancillary jurisdiction over all communications). Between 2005 and 2008, after the U.S. Supreme Court had affirmed the agency's authority to make such declarations in the *Brand X* case, DSL, wireless broadband, and broadband over powerlines (BPL) were also reclassified as information services. At the same time, other forms of regulatory intervention, such as line sharing (a type of unbundling in broadband markets) were also abolished (e.g., Bauer, 2005).

It is difficult to conclusively assess the effects of these policies as the empirical evidence is mixed. On the one hand, data indicates that U.S. investment in advanced communications was robust after these changes. For instance, private sector roll-out of fiber access networks accelerated after the measures took effect and American operators have invested at a higher rate than many of their counterparts in peer nations (OECD, 2011, p. 119–120). Switzerland, the world leader in broadband diffusion as of December 2011 likewise has pursued a market-driven policy. Recent comparative econometric evidence also suggests a positive link between fewer regulatory interventions and investment (e.g., Bouckaert et al., 2010). Despite these observations, it

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is impossible to know what might have happened in the U.S. if stricter regulations had prevailed. On the other hand, the market approach also revealed weaknesses known from earlier communications platforms, including a slow deployment to rural and remote areas. Selected OECD countries, particularly Japan, Korea, and the Nordic countries were able to expand broadband using a hybrid of market liberalization combined with government coordination (Fransman, 2006). Using a stronger pro-regulatory approach, the European Union (EU) narrowed the historical adoption gap to the U.S. in first-generation broadband access. However, as the concerns and changes in policy by the European Commission indicate, the region struggles with generating the investment needed to migrate to next-generation broadband (Briglaue & Gugler, 2012).

Overall, these positive and negative observations provided an impetus for a rethinking of the deregulatory approach in the U.S. However, the main trigger came in form of the economic crisis of 2008. Seeking to provide short-term economic stimulus, the American Recovery and Reinvestment Act (ARRA) of 2009 appropriated \$7.2 billion for broadband related activities. At least for the time being, these changes may be a harbinger of an altered policy direction that accepts a stronger role for public investment. Even if it should not be sustained, it may reshape the development of broadband in the country.

Accordingly, this paper offers a preliminary analysis of the priorities of the Broadband Technology Opportunities Program (BTOP), one of the two significant programs of public information infrastructure investment funded through ARRA. It describes and critically evaluates the priorities for public broadband investment that are apparent through the funds allocated to various social purposes, target populations, and technologies. The research is intended as a first step that can guide further independent assessments of the BTOP initiatives. It points future investigations toward areas in which to look for the social effects of public broadband infrastructure investments based on the funding priorities evident in the BTOP awards (Fig. 8). Here these priorities are compared with those that are articulated in the National Broadband Plan (NBP) and other policy documents, those that become salient through international competitive comparisons, or that are raised in ongoing public discourse are being met by the significant public investment represented by the BTOP program. Although the NBP was adopted later, such a comparison makes sense as it allows assessing the contribution of earlier initiatives to the plan and the overall coherence of broadband policy.

Starting from an inventory of the grants that have been awarded, the present article assesses whether the funded projects contribute to these objectives. Such an analysis of the implementation of BTOP can be a first step toward an assessment of the outcomes of these projects, which will require additional work once the grant program is phased out in 2013. As we do not seek to test a causal model, the analysis will remain largely based on descriptive statistics. The remainder of the paper is organized as follows. The next section provides an overview of the different aspects of the BTOP program. After a discussion of the policy context and potential remedies, we explain the research method and document the major findings. We conclude the paper with a discussion and evaluation of the findings and an outlook on future research.

2. The BTOP program

The American Recovery and Reinvestment Act (ARRA) of 2009 (P.L. 111-5) earmarked \$7.2 billion of stimulus funding to extend broadband internet access and for broadband projects. These funds were channeled through two programs, the Broadband Technology Opportunities Program (BTOP), to be administered by NTIA, and the Broadband Initiative Program (BIP), to be administered by the Rural Utilities Service (RUS) of the Department of Agriculture. In the same act, Congress also instructed the FCC to develop a comprehensive

National Broadband Plan (released in March, 2010). Furthermore, it required more systematic international benchmarking (done by the FCC), and the development of a National Broadband Map (NBM, first draft released by NTIA in February 2011). These initiatives were designed under considerable time and economic pressures. Stimulus funding was released as a short-term response to the economic crisis of 2008. Although funding for the development of the NBP and for the NBM was also part of ARRA, these initiatives were not completed until after the BTOP and BIP programs had started to award the first round of funds. Despite this timeline, it makes sense to analyze these funding programs together with these other initiatives and to ask whether they contribute to an overall coherent program. The ARRA programs stand out as the most significant public sector investment in the broadband infrastructure during the past decade. With the exception of the E-rate program, funds appropriated are much higher than those for ongoing programs, such as the Community Connect program at RUS (see Table 1). It may not soon be matched given the austerity movement and political gridlock that have followed.

The main objectives of the ARRA broadband programs were to improve broadband access in communities “unserved” (defined as less than 10% broadband penetration) and “underserved” (less than 40%) by broadband, with 768 kbps identified as the minimum speed to qualify as “broadband.” The U.S. Department of Agriculture (USDA) awarded \$2.5 billion of this total through a program administered by the Rural Utilities Service (RUS) called the Broadband Initiatives Program (BIP). The National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce awarded the balance of \$4.7 billion through BTOP, which is the subject of the current investigation.

BIP and BTOP were designed differently. BIP focused on loans or grant/loan combinations to established service providers, with a particular emphasis on previous recipients of RUS funding. At the same time, it encouraged projects that expanded choice options for end users. BTOP was designed to award grants to new and established service providers, with grant terms and regulations more attractive to competitive carriers, possibly with the goal of deepening competition in broadband access markets beyond the incumbent service providers. The BTOP funds were awarded in two phases, with the first round completed in December, 2009 and the second and final round by the end of September, 2010. These rounds focused on different types of projects. Round one targeted broadband infrastructure (last mile, middle mile), public computer centers, and sustainable broadband adoption. Round two focused on comprehensive community infrastructure, public computer centers, and sustainable broadband adoption (Kruger, 2010). Given time pressure and the magnitude of the funding, many stakeholders expressed concerns about the complicated and confusing process. All awarded monies were to be expended by the end of 2012 with the possibility of no-cost extensions through 2013.

Although this analysis focuses on BTOP projects, there were also projects jointly funded by both initiatives which are included in the present analysis as well; however, sufficiently detailed information about awards made exclusively through the BIP program was lacking at the time the present analysis was undertaken. In addition to infrastructure construction, the BTOP program funded community broadband applications through public computing centers and through sustainable adoption projects intended to increase the use of broadband technology for the benefit of health care, education, children, employment, and public safety.

The BTOP initiative presents a unique context to trace the impacts of information infrastructure. Over 250 awards were made across all 50 states through BTOP sponsorship of basic infrastructure construction, community computing centers, and community interventions to promote sustainable adoption. Thus, projects can be compared among areas offering different broadband access speeds and access technologies, among projects that emphasize varying forms of community computing applications (e.g., education, health, public safety,

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