Chapter 4

Infrastructure Sharing Among State Wireless Systems Is Minimal

WPTV has found it more feasible to share with private sector.

In establishing its system of transmitters, translators and support facilities statewide, Wyoming Public Television (WPTV) has shared only minimally with the two other state entities that operate wireless telecommunication systems: Wyoming Public Radio (WPR) and the Department of Transportation (WYDOT). Several factors hamper sharing of infrastructure among the state's three wireless systems, and WPTV has found sharing with the private sector more feasible. If policy makers want more state infrastructure sharing, WPTV is not positioned to provide the leadership necessary to accomplish it.

Infrastructure Sharing Has Become an Issue for Policy Makers

Governor's denial of WPTV digital conversion request highlighted infrastructure sharing issue.

WPTV's request for digital conversion funding raised the issue of infrastructure sharing among state policy makers. The Governor declined to support WPTV's FY 2002 supplemental budget request for digital conversion funding because he wanted a comprehensive plan for an "integrated distance service delivery system," including systems that would use the digital format. In requesting this report, the Management Audit Committee sought clarification of the potential for WPTV to share infrastructure.

WPTV, WYDOT, and Wyoming Public Radio (WPR) operate state-owned wireless systems.

We consulted numerous state telecommunications experts to determine what state telecommunication systems were potentially compatible with WPTV. They told us that state entities own or operate two types of telecommunication systems: wired and wireless. WPTV, WPR and WYDOT have wireless systems, meaning they transport their signals throughout the state over the air. These systems, experts told us, could potentially share and coordinate infrastructure with WPTV.

State entities also operate wired systems that use, for example, telephone lines and fiber optic cables rather than transmitters and

microwave signals to transport their signals. A prominent state wired system is the Wyoming Equality Network (WEN), a system of leased telephone lines that provides schools with Internet access and connects all public high schools through interactive video. The Department of Administration and Information (A&I) operates this system. A&I also operates the Wyoming State Leased Network, which provides data, Internet, voice, and interactive video services to meet the needs of government, libraries, and schools. The University of Wyoming is a primary user of this system's compressed video capacity for interactive distance education.

A&I operates wired systems - WEN and compressed video.

Telecommunications experts we spoke with believe that connecting wired and wireless systems is possible, but not without additional investment in infrastructure. The interface between wired and wireless equipment is difficult and, if possible at all, requires technological changes in infrastructure. Additionally, experts said, most wired systems are of a lower capacity than wireless systems. A wireless system carries more information per second than is possible over a wired system. For example, WPTV would not be able to send its broadcast over most wired systems because those systems lack the capacity necessary to transmit television.

Connecting wired and wireless systems would entail additional infrastructure.

WPTV Shares Limited Infrastructure with WPR, But None with WYDOT

WPTV and WPR share leased sites in two locations, and are located in adjacent sites in two others. WPR has a statewide system of 21 transmitter and translator sites throughout the state from which it receives and broadcasts its signal from a satellite uplink. Except for the Laramie site, which it owns, WPR leases tower space for its receivers. WPR and WPTV officials say they work together and share infrastructure whenever possible.

Like WPTV, WPR leases tower space.

WYDOT operates a statewide public safety microwave system to meet its highway patrol and maintenance responsibilities. The WYDOT microwave "backbone" also carries SALECS, the state agency law enforcement communications systems authorized by statute (W.S. 9-2-1101(b)) to provide radio communication capabilities to other state agencies involved with law

WYDOT microwave system also carries SALECS, for state law enforcement.

enforcement, such as the Game and Fish Department (see Appendix A).

WYDOT does not share sites with WPTV or WPR.

Neither WPTV nor WPR shares infrastructure or sites with WYDOT. Former WPTV management noted a long-standing agreement with WYDOT telecommunications to share sites wherever possible, but we found no indication that sharing has occurred. The two entities once entered into a contract to share a site and building (not a tower), although WPTV found it more advantageous to lease from a private owner who would allow the station on its tower.

WPTV Shares Infrastructure With CWC Projects

CWC radio station and distance education project, Star Schools, share with WPTV.

CWC operates a campus radio station and a local distance education network, both of which share infrastructure with WPTV. The radio station transmitter is co-located with the WPTV transmitter on Limestone Mountain above Lander, and WPTV assists the station with maintenance. Like WPTV, CWC uses this station in its broadcasting program for students.

CWC and WPTV officials say sharing with Star Schools aided WPTV digital conversion.

Through a federal grant, CWC participates in a multi-state distance education project, Star Schools, which provides wireless interactive video capabilities between several public schools in the CWC area. The Star Schools project and WPTV share infrastructure in the western part of the state. According to CWC and WPTV officials, this arrangement has proven beneficial to both: Star Schools was able to install its equipment on WPTV sites, and WPTV was able to deliver a digital signal to the Jackson area, which WPTV and CWC officials say contributed $600,000 toward the digital conversion.

All State Wireless Systems Eventually Will be Digital

FCC has not yet set time-table for public radio conversion.

Along with WPTV, both WPR and WYDOT face converting their signals to the digital format. WPR officials say that although the FCC will eventually require radio stations to convert, it has yet to announce digital standards for radio. They expect the FCC to wait to announce a time-table for the radio conversion until the television conversion is complete.

In contrast, WYDOT will imminently be upgrading its analog microwave system to the digital format. The WYDOT

WYDOT is already upgrading its system to digital.

telecommunications manager said this upgrade is necessary for the system to carry digital signals and to employ technologies that will be needed in the future. In the fall of 2001, the Transportation Commission approved funding for WYDOT to begin the digital upgrade of its microwave system.[1]

Several Factors Impede Infrastructure Sharing Among WPTV, WPR, and WYDOT

Logistical, governance, and policy issues affect sharing.

Our research identified a number of factors that have combined to keep the three entities using essentially separate infrastructures. These include logistical impediments, independent governance, and policy considerations. Further, despite apparent statutory authority for the state to coordinate telecommunications systems through A&I, organizational structures prevent this from occurring.

Sharing Is Not Always Logistically Feasible

Although the three systems share a wireless technology, there are differences in their modes of operation that make sharing infrastructure logistically difficult. As discussed in Chapter 3, to transport its signal, WPTV relies upon line-of-sight connections between its transmitter and translators. The signal goes from one tower to the next, either as an over-the–air broadcast or microwave. By contrast, because WPR receives its signal from a satellite, it is not similarly restricted in placing translators.

WPR transports its signal via satellite, which makes its tower siting needs different than WPTV's.

Further, the satellite receivers that WPR uses require significant amounts of space on towers. According to WPR engineering staff, it is not always possible to co-locate with WPTV because there may not be room on the towers. WPR and WPTV both lease tower and building space, and the facilities may be fully occupied with other tenants. According to a WPR official, the two share wherever engineering permits.

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[1] WYDOT microwave system upgrades will be compatible with a proposed statewide safety mobile communications project that would allow interoperability between public safety agencies at all levels of government that express an interest. Although this project, also described as a "trunked radio system," is broader in scope than WYDOT and SALECS, the Transportation and Highways Committee has charged WYDOT with developing a request for proposals to move forward. Funding is pending for the planning effort.

The Systems Evolved Independently, Over Time

WPTV built towers, as well as leased or traded for space.

Both WPTV and WPR have established infrastructures that enable them to broadcast their signals so residents throughout the state can receive non-commercial educational and public affairs programming. To do this, over time, WPTV built its own towers as well as leased or traded for space on privately owned facilities. WPTV and CWC officials said that WPTV expanded its service in response to requests from potential viewers, as permitted by engineering and funding.

With legislative funding, WPR was able to extend its service.

Similarly, WPR gradually developed the infrastructure to extend its signal, but part of this extension has come at legislative direction. In 1996 and 1997, the Legislature funded WPR to set up several new transmitters to extend service to northern Wyoming and other specific communities. WPR has also expanded its service to some areas when communities have raised the funds to do so.

Each System is Independently Governed

WPTV and WPR are parts of CWC and the University of Wyoming, respectively.

In practice, officials from all three entities reported that they rely upon in-house technical expertise to guide infrastructure decisions. Technically, the three wireless systems are parts of independently governed entities. As discussed in Chapter 1, the CWC Board of Trustees governs WPTV. Similarly, WPR is a program in the School of Outreach, a University of Wyoming college, and therefore is ultimately governed by the U.W. Board of Trustees.

The Transportation Commission governs the WYDOT system.

WYDOT is also independently governed by the Transportation Commission, which has broad statutory powers to construct, maintain, and supervise the state's public highways (W.S. 24-2-102). The Transportation Commission approves the budget for the portion of WYDOT that is funded with highway fuel taxes, which includes the public safety communications system. Additionally, the WYDOT director has specific statutory authority to control the operation and maintenance of the department's microwave system (W.S. 9-2-1026.1(b)(i)). (See Appendix A for statutes.)

WYDOT Maintains Its Own Public Safety System

WYDOT operates a closed public safety communication system.

In contrast to WPTV and WPR, WYDOT does not maintain its wireless system to reach the public. Rather, it serves only law enforcement and highway maintenance purposes. WYDOT officials consider maintaining the reliability of public safety communications of paramount importance in operating this system.

WYDOT policy does not encourage partnerships that could affect private competition.

Over the years, WYDOT has determined that the best way to maintain the integrity and reliability of public safety communications is to maintain its own system. Officials noted that WYDOT would not risk public safety by sharing with private businesses. Further, WYDOT officials are reluctant to enter into partnerships that could affect private competition. In their view, this could happen by WYDOT carrying any broadcast signal that would otherwise lease tower space from private owners. The WYDOT director said that allowing the transmission of public broadcasts on WYDOT infrastructure potentially could open the system to private users. In his opinion, a legal analysis would be necessary to resolve that issue.

A&I Does Not Have Coordinating Authority

A&I IT Division is structured to serve other agencies, not coordinate them.

Seemingly, statute (W.S. 9-2-1026.1) assigns the Information Technology (IT) Division within A&I a coordinating role for state telecommunications. However, neither WPTV, WPR, WYDOT, nor A&I said it has had interaction with regard to planning and implementing the three infrastructures. A&I officials noted that the IT Division is structured and funded to provide services to agencies, not to coordinate them. The IT administrator says the division can only provide assistance to those agencies that seek it, and that it has no authority to require agencies to interact with either each other or A&I.

Savings From WPTV Sharing Infrastructure May Be Small

WPTV and WPR have not built separate systems: they mostly lease.

By not sharing infrastructure, the three entities potentially incur greater costs to the state than if they were more consolidated. However, the savings from more sharing between WPTV and WPR would likely not be significant. The two have not duplicated costs by building separate systems because they both

lease significant portions of their existing infrastructure. Further, it is not likely they could reduce annual maintenance costs unless they were organizationally consolidated. Most of WPTV's estimated $100,000 in annual maintenance costs provide salaries for engineering staff, whereas WPR relies upon U.W. engineers and thus does not bear the full costs of its maintenance.

WYDOT receives payment from agencies using its system through SALECS.

The WYDOT system also serves SALECS, and potentially the whole state if the statewide public safety mobile communications project is developed. Currently, agencies that use SALECS for their law enforcement functions pay for system use. Similarly, WYDOT officials noted that it would assess costs to WPTV, if it were to use any portion of the WYDOT infrastructure.

Conclusion: Wireless telecommunication system infrastructure sharing requires high-level leadership.

WPTV lacks the authority to convene other independently governed systems.

To ensure that future development of state wireless infrastructure is coordinated, policy makers must look for leadership somewhere other than WPTV. WPTV does not have the authority or governmental status to formally bring together other independently governed entities. Nor do its affiliations with CWC and the Community College Commission give it the standing to initiate efforts to integrate infrastructure. Until such time as there is a high-level initiative to coordinate state operated telecommunications, WPTV management should continue on its own to seek opportunities to share state-supported infrastructure.