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Buildings and Bandwidth: Lessons for Spectrum Policy from Federal Property Management

Dorothy Robyn

Former Commissioner

General Services Administration, Public Buildings Service

Abstract

As the demand for commercial wireless services continues to grow at a steep rate, there is mounting pressure on the federal government to reduce its spectrum holdings. Several recent proposals for reforming the management of federally used spectrum are inspired by institutions or approaches used for the management of federal property, including creation of a General Services Administration (GSA) for spectrum and the use of the Department of Defense's (DoD) Base Realignment and Closure (BRAC) process to clear federal spectrum. Based in part on her recent experience as the senior federal property manager at GSA and DoD, the author critiques these and other proposals for institutional reform of federal spectrum management. She also looks at the relevance for federal spectrum policy of the economic tools used to incentivize federal agencies to economize in their use of federal building space and to dispose of underutilized property. A major lesson for spectrum policy is that the ability to retain proceeds from the disposal of property is a key motivator for federal agencies if the incentive is properly structured. Key statutory authorities used to promote federal property disposal, including long-term outleasing and property exchange (barter), also seem applicable to federal spectrum management, as do public-private ventures as a way to address agencies' need for the capital to upgrade older radio systems with newer, more spectrum-efficient systems.

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I. Introduction

As the demand for commercial wireless services continues to grow at a steep rate, there is mounting pressure on the federal government to reduce its spectrum holdings. The federal government uses a significant amount of spectrum to meet its own mission needs for wireless services.¹ The largest federal user by far is the Department of Defense (DoD), followed by the Federal Aviation Administration (FAA), the Department of Homeland Security (including Coast Guard) and the Department of Justice.²

Those who argue for a reduction of federal spectrum—a disparate set of firms, trade associations, think tanks and public interest groups that disagree with one another on many other aspects of spectrum policy—maintain that the federal government uses spectrum inefficiently. The quantitative evidence for this is controversial (it is hard to define much less measure spectrum efficiency), and the critics largely ignore the fact that federal demand for wireless services is increasing for many of the same

reasons that commercial demand is growing.³ The critics may also overstate the absence of incentives for efficiency: federal agencies have relinquished a large amount of spectrum in the last two decades and that, combined with their growing demand for wireless services, has increased the pressure for efficient usage. Moreover, technical improvements that enhance mission performance—e.g., the compression of a signal to make it harder to jam or intercept—can improve spectrum efficiency, which is why some of the key technologies on which the wireless industry is based have come out of the military.

Nevertheless, it is fair to say that the incentives for efficient use of spectrum facing federal agencies are not as strong as those facing commercial firms. Wireless carriers pay billions of dollars to acquire spectrum and then invest billions more to upgrade their networks: efficient usage gives them a competitive advantage because they can provide more or better services in a fixed amount of spectrum. By contrast, federal agencies are endowed with spectrum that was given to them for free; they cannot sell or lease it; and their acquisition of spectrum-using systems does not consider the opportunity cost of the spectrum. A key problem is the lack of up-front funding to upgrade older radio systems with

¹ Of the most highly valued frequencies—those between 225 and 3700 MHz—federal agencies have exclusive use of about 18 percent, and nonfederal users have exclusive licenses to about 33 percent. The remainder is allocated to shared use. According to the General Accountability Office (GAO), depending on the estimate used, the fraction of this spectrum used exclusively or predominantly by federal agencies ranges from 39 to 57 percent. GAO. 2012. “Spectrum Management: Incentives, Opportunities, and Testing Needed to Enhance Spectrum Sharing.” GAO-13-7 (November), p. 6. <http://www.gao.gov/products/GAO-13-7>.

² GAO (2012), p. 6.

³ For example, U.S. operations in Iraq and Afghanistan required more than 40 times the bandwidth used in the 1990 Gulf War. Center for Strategic and International Studies (CSIS). 2003. “Spectrum Management for the 21st Century,” a Report of the CSIS Commission on Spectrum Management (October), p. vi.

newer, more spectrum-efficient systems.

A great many reports and white papers have been written in the last few years about how to reallocate spectrum resources from federal to commercial use.⁴ The major focus has been on ways to reduce directly the amount of “federal spectrum” (spectrum used exclusively or primarily by federal agencies), particularly through the use of economic incentives and/or technology that facilitates sharing. A secondary focus has been on institutional reforms to improve the management of federal spectrum, which is the responsibility of the Department of Commerce’s National Telecommunications and Information Administration (NTIA).

As a one-time spectrum policy analyst who spent the last five years managing real property at DoD and the General Services Administration (GSA), I have been struck by the degree to which recent proposals for spectrum policy reform look to institutions or approaches used to manage federal real property (buildings, land and structures).⁵ Several proposals call for the creation of a “GSA for spectrum,” to impose more discipline on federal users, in part through the imposition of spectrum fees comparable to the

⁴ For an excellent summary, see IDA Science and Technology Policy Institute. 2014. “A Review of Approaches to Sharing or Relinquishing Agency-Assigned Spectrum” (January). <https://www.ida.org/upload/stpi/pdfs/p5102final.pdf>.

⁵ Baumol, William J. and Dorothy Robyn. 2006. *Toward an Evolutionary Regime for Spectrum Governance*. Brookings Press.

market-based rents that GSA charges federal agencies. Another proposal calls for the application of a BRAC-type approach, referring to DoD’s Base Realignment and Closure process, to free up federal spectrum for commercial use.

This paper critiques some of the existing proposals and offers additional ideas. In Section II, I look at proposals for institutional reform. In addition to examining proposals inspired by two institutions with which I have firsthand experience (GSA and BRAC), I look at proposals to transfer NTIA’s spectrum management functions to the Federal Communications Commission (FCC) and to privatize those functions. In Section III, I look at the potential for economic incentives to promote more efficient use of federal spectrum. I comment on the much-discussed proposals for spectrum fees based on my GSA/DoD perspective and identify other tools for and lessons from federal property management that may have application to spectrum. Section IV provides a brief conclusion.

II. Reform of Federal Spectrum Management

NTIA has received a great deal of criticism from the disparate set of organizations that believe that “the federal government hoards spectrum.” The gist of the criticism is that NTIA lacks the authority and expertise to discipline the demands of federal spectrum users, in particular, DoD. A related criticism is that, because NTIA is both an advocate for federal spectrum users and a kind of regulator, its role is confused.

The various governance reform proposals are similar in their desire to have federal spectrum managed by an entity that can enforce more discipline. However, the proposals—ranging from unified control of spectrum by an independent agency (the FCC) to outright privatization—are more striking for their differences. The fact that these proposals go in such different directions (an activity conducive to regulation by an independent agency would generally not also be a candidate for privatization and vice versa) suggests a lack of clear thinking about the nature of federal spectrum management.

In this section, I briefly summarize the institutional history of federal spectrum management. Next I highlight the insights of Ronald Coase, the Nobel Laureate whose “other” spectrum report, on the management of federal spectrum and proposals to reform it, is still relevant 50 years after it was written.⁶ Finally, I review the major contemporary proposals for reform of federal spectrum management.

⁶ Coase, Ronald, William Meckling and Jora Minasian (Coase et al.). 1995. “Problems of Radio Frequency Allocation.” RAND Corporation. <http://www.rand.org/pubs/drafts/DRU1219.html> RAND suppressed the 200-page report for over 30 years out of fear of its political implications. Coase’s first report on spectrum, an analysis of FCC regulation, concluded that well-defined property rights in spectrum would go a long way toward solving the problem of radio signal interference. Coase. 1959. “The Federal Communications Commission.” *Journal of Law and Economics* (JLE) 2, no. 1. Coase was awarded the Nobel Prize in Economic Sciences in 1991 for an article that was directly inspired by his study of the FCC. Coase. 1960. “The Problem of Social Cost.” *JLE* 3, no. 1.

Short History of the Management of Federal Spectrum

NTIA was created in 1978 to serve as the President’s telecommunications advisor.⁷ Among other responsibilities, NTIA exercises the President’s power to authorize the use of spectrum for “government owned stations,” as codified in Section 305 of the Communications Act of 1934. In that capacity, NTIA oversees the Interdepartment Radio Advisory Committee (IRAC), the group of federal agency representatives that has coordinated federal frequency assignments for more than 90 years.

The IRAC was established following the first national Radio Conference convened by then-Secretary of Commerce Herbert Hoover in 1922. The IRAC’s major function was to assign radio frequencies to federal agencies and to coordinate federal spectrum use for broadcasting and radio communications. The watchword was coordination as opposed to control. The Committee’s 1925 Statement of Policy emphasized the autonomy of the individual federal departments it represented. The Statement of Policy also stressed that the IRAC’s role was advisory, and it explicitly rejected centralization of control (“Centralized control of Government Radio Communications ... is not at present either practicable or desirable.”)⁸

The IRAC functioned relatively autonomously until 1951, when

⁷ NTIA now describes itself as the President’s telecommunications and information policy advisor.

⁸ Coase et al. (1995), pp. 29-30.

President Truman created the position of Telecommunications Advisor to the President, with oversight of the IRAC, and expanded the IRAC's responsibilities to include formulating and recommending policies and plans related to the federal government's management and usage of spectrum. For the next 27 years, the IRAC reported to different agencies in the White House, including the White House Office of Telecommunications Policy (OTP) created by President Nixon.⁹ NTIA was created when President Carter merged the OTP with the Department of Commerce's Office of Telecommunications, which had supported OTP.

The "Other" Coase Report

The debate about how to reform federal spectrum management goes back more than half a century. In 1962,

⁹ President Eisenhower eliminated the position of Telecommunications Advisor and transferred the functions to the Director of the Office of Defense Mobilization (ODM), a powerful White House agency whose first director (under President Truman) was former General Electric President Charles ("Engine Charlie") Wilson. In 1961, President Kennedy replaced ODM's successor agency, the Office of Civil and Defense Mobilization, with the Office of Emergency Planning and delegated his Section 305 authorities to the Director of Emergency Planning, who in turn delegated them to his Director of Telecommunications Management. In 1969, President Nixon transferred those authorities to the director of his newly created Office of Telecommunications Policy (OTP). The first head of OTP was the legendary Clay Whitehead, and Supreme Court Justice Anton Scalia served as OTP general counsel. Coase et al., pp. 24-32. GAO. "Interdepartment Radio Advisory Committee." GAO-04-1028 (September), pp. 4-5.

Coase, Meckling and Minasian (Coase et al.) did a detailed report on the IRAC for the RAND Corporation at the request of the nascent National Aeronautics and Space Administration (NASA). Their analysis is instructive for two reasons. One, the IRAC was the target of criticism then, just as NTIA is now, and the complaints were remarkably similar to those voiced today. Two, although the RAND report, like Coase's earlier report on the FCC, ultimately argued for allocating spectrum rights using prices as opposed to administrative controls, Coase et al. were far more sympathetic to the IRAC's decentralized, consensus-based approach to decision-making than to the FCC's highly procedural approach or to proposals calling for greater top-down control from within the executive branch.

Coase et al. described at length the criticisms of the IRAC, based largely on two studies done in the 1950s at the request of the White House. The RAND authors distilled the views of the critics, many of whom favored having the IRAC report to an independent agency ("Board") in the executive branch, down to three objections. One, the IRAC is a committee of users, and as such is "inevitably inferior as an organization for the allocation of resources to a Board (not representative of users) doing the same job." Two, the IRAC is "inefficient and unbusinesslike." Three, "the present arrangements result in too great an allocation of radio frequencies for the use of government departments and too small an allocation ... for private users...."¹⁰

¹⁰ Coase et al. (1995), p. 65.

Coase et al. took issue with the critics' first objection: "The argument that a dictatorship is superior to a democracy always has some plausibility; in some circumstances, it is no doubt right; but it is not necessarily always right." They also dismissed the second objection, which they surmised was based on the contrast between the relative informality of the IRAC's proceedings and the highly formal nature of FCC proceedings.¹¹ The authors quoted the critics' description of the IRAC's culture of "trading" (a "complex process of bargaining and accommodation" with "compromise and trading back and forth") and marveled that the critics appeared to view it as a defect rather than an advantage. Coase et al. acknowledged that the third objection "may well be true," but they questioned whether superimposing a Board on the IRAC process would alter the outcome. "Would not a Board in the executive branch of Government be as reluctant as the IRAC to surrender frequencies for non-Governmental use?"¹²

Proposals to Reform Federal Spectrum Management

Much like the proposals that Coase et al. described, the current proposals to

¹¹ According to Coase et al., "When one takes into account the expense of FCC proceedings, the long delays extending often to years before decisions are made, the FCC's susceptibility to political and other pressure, the apparent errors in the decisions it has taken, it would seem the height of folly to adopt the FCC form of organization and procedures as a model for the allocation of frequencies to Government departments, unless one is convinced that the IRAC functions in a way that is not merely inefficient but extraordinarily inefficient." Coase et al. (1995), p. 68.

¹² Coase et al. (1995), pp. 65-69.

reform the management of federal spectrum seek to exert greater top-down or outside control over the process.

1. Transfer NTIA's Spectrum Functions to the FCC

The IRAC reported to the FCC for a brief period in the 1930s, and proposals to transfer the management of federal spectrum to the Commission have been put forward regularly ever since.¹³ Current proponents argue that unified spectrum management would reduce duplication and maximize efficiency, and they hint that it would serve the goal of getting more federal spectrum into commercial use.

Whatever its advantages, an arrangement that would give the FCC unified control of spectrum management is a non-starter. First, it would put an independent agency—an agency outside of the executive branch that does not report to the President—in charge of the radio operations of the U.S. military.¹⁴ Second, because it is far

¹³ See Coase et al. (1995), pp. 59-71. For a recent version of this proposal, see CTIA. 2014. "Response to House Energy and Commerce White Paper on Modernizing U.S. Spectrum Policy." (April 1), pp. 5-9. <http://www.ctia.org/docs/default-source/default-document-library/ctia-response-to-house-white-paper-on-modernizing-spectrum-policy.pdf?sfvrsn=2>.

¹⁴ In most countries, the military manages the spectrum that it uses and a civilian agency manages commercial and non-military government spectrum. The U.S. system is unusual in that all federal spectrum, not just military spectrum, is managed separately from commercial spectrum. It is unthinkable that the President, who is the Commander in Chief, would allow an agency that he or she does not control to manage military spectrum.

more familiar with non-federal uses and users of spectrum, the FCC would find it hard to weigh the competing needs of government and industry.¹⁵

If there is a case for consolidation, it is strongest with respect to spectrum allocation, which represents the fundamental “architecture” of the frequency spectrum. However, NTIA would be the more logical home for that activity, because spectrum allocation requires making tradeoffs between competing groups and interests, a policy function better performed in the executive branch than by an independent agency. The key question is whether the gains from consolidating spectrum allocation in the executive branch would outweigh the increase in transaction costs that would result from separating the FCC’s allocation functions from its ongoing spectrum licensing and enforcement functions.

If one were designing a spectrum management scheme from scratch today, it would make sense to put all of the functions (allocation, licensing and enforcement) for federal and non-federal users in a single, executive branch agency. Given our history, however, consolidation under either the FCC or NTIA, with the possible exception of spectrum allocation, seems unworkable. That need not be a serious handicap, however. In its 2003 report on spectrum management, the Center for Strategic and International

¹⁵ Wiley, Richard E. and Paul E. Misener. 1996. “Whither Goest NTIA? The Fate of a Federal Telecommunications Agency.” *Federal Communications Law Journal*, Vol. 48, Issue 2. <http://www.repository.law.indiana.edu/cgi/viewcontent.cgi?article=1099&context=fclj>.

Studies (CSIS) pointed to the close coordination between the Federal Reserve Board, an independent agency, and the Treasury Department, to implement economic and monetary policies.¹⁶ As CSIS concluded, the United States can use a similar combination of independence and coordination to manage spectrum.

2. *Privatize Federal Spectrum Management*

At the other extreme from unified FCC control of spectrum are proposals to privatize federal spectrum management. In a recent article, the Phoenix Center argues that, having shown itself unable to manage its own spectrum efficiently, the federal government should divest itself of its entire spectrum holdings and lease back what it needs from the private sector.¹⁷ The paper cites a report published by NTIA in 1991 that included a similar suggestion:

...federal users could have a private contractor build and operate a “pooled” system using government spectrum to meet existing federal needs. As an incentive to operate most efficiently, the contractor could sell to the public any excess capacity on its system once

¹⁶ CSIS (2003), p. ix.

¹⁷ Beard, T. Randolph, George S. Ford, Lawrence J. Spiwak and Michael Stern (Beard et al.). 2014. “Market Mechanisms and the Efficient Use and Management of Scarce Spectrum Resources.” Vol. 66, Issue 2 (April), pp. 297-298. http://www.fclj.org/wp-content/uploads/2014/06/66.2.2_Spiwak-Final.pdf.

federal needs were met as its first priority.¹⁸

To be sure, privatization is the implication of Coase's proposal to propertize spectrum and allocate it, like any other scarce resource, using prices. And the federal government can go much farther than it has in that direction. However, federal spectrum management as a whole is an unlikely candidate for privatization.

The basic test for whether a government activity can be privatized is this: can you write a contract? That is, can the functions (or objective) be reduced to an operational description such that a contractor can perform them and the performance of the contractor can be evaluated? If federal spectrum were propertized, the federal government could no doubt specify many of its static requirements in a contract. However, it would be impossible to fully spell out contingent and future requirements. Nor could one reduce to contractual terms the criteria for or approach to resolving potential conflicts among federal users or between federal users and non-federal users.¹⁹ The close link between spectrum and national security and life safety missions makes privatization particularly challenging because of the

¹⁸ NTIA. 1991. "U.S. Spectrum Management Policy: Agenda for the Future." <http://www.ntia.doc.gov/report/1998/us-spectrum-management-policy-agenda-future>.

¹⁹ The FCC's role in resolving conflicts among different interests over non-federal spectrum is well understood because of the transparency of the FCC process. NTIA and the IRAC confront similar conflicts over federal spectrum; they are just less visible.

need to make tradeoffs between spectrum efficiency and reliability.

In short, federal spectrum management is not entirely a business enterprise. Some of the core functions require a degree of policy judgment, negotiating skill and political savvy that no contract can capture.²⁰

The major advantage of privatization would be the ability to tap private capital—e.g., to upgrade older radio systems with newer, more spectrum efficient technology. As I discuss in Section III, it should be possible for a federal agency to access private capital without completely privatizing federal spectrum management, although federal budget rules admittedly make that difficult.

3. Apply the BRAC Process to Federal Spectrum

BRAC (Base Realignment and Closure) refers to a process designed to give Members of Congress the political cover needed to support a desired action (military base closures) that would impose severe economic pain on a subset of communities. Congress first authorized the use of the process, which Rep. Dick Armey is credited with devising, for the 1988 BRAC round; it has since authorized four additional rounds (1991, 1993, 1995 and 2005).

²⁰ For an analysis of a federal activity that meets the criteria for privatization, see: Robyn, Dorothy. 2008. "Air Support: Creating a Safer and More Reliable Air Traffic Control System," Hamilton Project, Brookings Institution (July). <http://www.brookings.edu/research/papers/2008/07/air-traffic-robyn>.

Two elements of the BRAC process are key to its success. One is the independent commission, which reviews a set of recommendations that DoD puts forward following an elaborate internal review. The Commission can take individual bases off of DoD's list. It can also add bases to the list, although that requires extra procedural steps and is far less common. The other key element is the requirement that Congress accept or reject the Commission's recommendations in their entirety. (Approval is tacit if there is no joint action to reject.) By making it impossible for them to cherry-pick bases for removal from the list, the process gives Members plausible deniability as to the outcome.

Proposals to BRAC the spectrum have been around for almost as long as BRAC. George Mason University's Mercatus Center recently revived the idea, and several bills have been introduced that would authorize a BRAC-style process.²¹ The application of the BRAC approach to spectrum is off the mark, however.

The BRAC process works because two conditions are met: one, all the players agree that an action that will impose losses on the few is good for the many;

²¹ Skorup, Brent. 2013. "Reclaiming Federal Spectrum: Proposals and Recommendations." Mercatus Center, No. 13-10 (May). [http://mercatus.org/sites/default/files/Skorup_FederalSpectrum_v1\[1\].pdf](http://mercatus.org/sites/default/files/Skorup_FederalSpectrum_v1[1].pdf). Under the proposed legislation, the Secretary of Commerce would identify the initial list of "closure" candidates and a Federal Spectrum Reallocation Commission would review them. See <http://hdl.loc.gov/loc.uscongress/legislation.113s2155>.

and, two, the action is not related to policy, ideology or any other substantive issue that divides Congress—i.e., local politics is the only impediment. By contrast, with spectrum, there is no agreement between the Executive Branch and Congress that a reduction in federal spectrum is desirable. And Congress (i.e., local politics) is not the impediment. Thus, the expedited congressional approval process serves no purpose.

In the future, Congress might become an impediment to what some groups define as spectrum reform. But if that were to occur, it would likely reflect the substantive objections of certain congressional committees (e.g., Armed Services), in which case spectrum policy would be like many other contentious issues, and Congress would never authorize a BRAC-like process in the first place.

There may be value in having a group of outside experts to help identify spectrum bands that the executive branch could analyze as candidates for "realignment or closure." This is different from the "appellate" role served by the BRAC commission, which reviews and tweaks judgments made by the agency (DoD), but it may respond to a need for expertise in finding potential opportunities.²² However, unlike in

²² Spectrum reformers face an information problem: where are the opportunities for "closure or realignment?" By contrast, BRAC is the solution to what economists call a "public good" problem. A round of base closures, like clean air or national security, is something that benefits everyone and that no one can be excluded from enjoying. The challenge with public goods is to pay for them. The BRAC

BRAC, the recommendations of the Spectrum Commission could not be conditionally binding, because that would preempt agencies' decisions on a complex matter closely tied to their missions.

4. *Create a GSA for Spectrum*

GSA was created in 1949 to help perform and manage the federal government's basic business functions. The Public Buildings Service (PBS), one of GSA's two business lines (the other is the Federal Acquisition Service), specializes in real property management, including building design and construction, building operation and maintenance, leasing, and property disposal. The centralized provision of these functions by PBS is designed both to reduce the overhead associated with having redundant agency operations and to use the federal government's buying power to get a better price for goods and services.

In the last few years, several prominent reports have proposed the creation of a "GSA for spectrum."²³ Proponents see

process provides a politically acceptable way to pay for (i.e., impose the cost of) this particular public good.

²³ Lenard, Thomas M., Lawrence J. White and James L. Riso. 2010. "Increasing Spectrum for Broadband: What are the Options." Technology Policy Institute, pp. 26-27. http://www.techpolicyinstitute.org/files/increasing_spectrum_for_broadband1.pdf. See also Hundt, Reed and Blair Levin. 2012. *The Politics of Abundance: How Technology Can Fix the Budget, Revive the American Dream, and Establish Obama's Legacy*. Odyssey Editions. Although Lenard, White and Riso call for a "Government Spectrum Ownership Corporation (GSOC)" modeled after GSA, their proposal does not countenance a true government corporation, since GSA is not a government

GSA as a model for a federal spectrum management agency for two reasons. One is GSA's (referring to PBS) practice of charging federal agencies a commercial-equivalent rent for the space they occupy in federal buildings, which presumably incentivizes agencies to economize on the use of space. Two, they see GSA as an executive branch agency that has the statutory authority and subject-matter expertise to impose discipline on other federal agencies.

PBS Traits to be Emulated

PBS is a wonderful agency that rarely gets the recognition it deserves (no one loves their landlord). I was privileged to lead it for 18 months, from September 2012 to March 2014. NTIA would do well to emulate some of PBS's key traits and practices. (Although I focus here on management traits and practices, there is unavoidable overlap with the economic tools discussed in Section III.) At the same time, PBS's reach and resources are more limited than people in the spectrum community may realize, and the reasons for that are themselves relevant to the spectrum debate.

PBS is a good model for NTIA to emulate for at least three reasons. First, PBS has valuable assets that it treats the way a business would. PBS introduced the practice of charging rent in the 1970s; the rent goes into the Public Buildings Fund to pay for the upkeep of buildings and a small amount of new construction. Although severe budget constraints mean that PBS is

corporation and since the authors envision that revenues from GSOC spectrum fees would go back to the U.S. Treasury, which would not be the case with a government corporation.

underinvesting relative to industry benchmarks, the agency uses portfolio management techniques to decide which buildings to dispose of, and it prioritizes investments based on their rate of return. Recent investments have as one goal to increase building utilization through use of open office designs (see discussion below of the real property analog to spectrum “sharing”).

Second, PBS has a passion for property disposal: GSA was created at a time when disposal of assets from World War II was a major issue, and property disposal (personal as well as real property) was a separate business line (“Service”) in GSA for many years. The culture is still deep. Federal property disposal is a complex process that faces environmental and other legal hurdles and that by law must serve multiple constituencies, including state and local governments and the homeless. PBS is skilled at navigating the process on behalf of all federal agencies, and it uses GSA’s online auction process (gsaauctions.gov) to sell everything from warehouses to lighthouses.

Third, PBS plays a dual role in its dealings with federal agencies—cop and trusted partner. PBS’s function is quasi-regulatory; it has an unofficial dotted-line relationship to the Office of Management and Budget (OMB) and oversees day-to-day implementation of Presidential initiatives such as “Freeze the Footprint.”²⁴ At the same time, PBS views agencies as clients and opts for carrots over sticks where possible. It is

²⁴See memo from OMB at <http://www.whitehouse.gov/blog/2013/03/14/freezing-footprint>.

hard to strike the right balance between trusted partner and cop, and the history of PBS might resemble a pendulum that swung slowly from one side (cop) to the other (partner) before it settled in the middle. It is a challenging problem but one that is not unique to PBS.²⁵

Limits on PBS Reach and Resources

Despite its deep expertise and experience, PBS’s reach is circumscribed. Its portfolio (general office space and multi-agency federal buildings, as well as federal courthouses, agency headquarters and other monumental buildings) represents only about 12 percent of the total federal inventory (34 percent of the civilian inventory) by square footage. Most federal buildings are on military bases, which DoD controls.²⁶ Likewise, specialized space, such as Veterans Administration hospitals, Department of Energy laboratories and Coast Guard stations, is controlled by the respective agency. Another limit on PBS’s reach takes the form of delegated authority. Agencies sometimes want to operate and maintain the GSA buildings they occupy (e.g., a headquarters facility), and many agencies pushed for and received the authority to do their own leasing of

²⁵ Corporate real estate offices (e.g., AT&T facilities) have the same challenge. Insurance companies play a dual role as well—helping policyholders collect on claims but also challenging some claims to ensure their validity.

²⁶ The Pentagon was a GSA property prior to the late 1980s, when the building needed a multi-billion dollar renovation that GSA did not have the funds to undertake. DoD used GSA’s lack of resources as grounds to wrest control of the building.

commercial space. Finally, some of PBS's bigger tenant agencies have created large internal real estate organizations ("shadow GSAs") to exercise these delegations and to monitor and challenge PBS's performance.

To be sure, some of these practices run counter to good management, and the large shadow organizations in particular represent exactly what GSA's creators sought to avoid. To some extent, however, these practices reflect the genuine value of specialization and control: agencies want to "own" assets that they see as key to their missions, particularly when the assets are specialized.

In short, a GSA for Spectrum would not provide the level of centralized management control that some envision. The factors that limit GSA's reach (agencies' desire to control specialized and mission-critical assets) are even more dominant when it comes to spectrum than they are for real property. That said, the similarities between spectrum and real property are striking, and there is much about PBS that NTIA could emulate.

5. Strengthen White House and OMB Oversight

Policy advocates invariably call for the White House to play a bigger role in supporting their issue, and spectrum policy reformers are no exception. Most of their recommendations focus, appropriately, on process--e.g., the creation of an interagency coordinating committee on spectrum management or a White House Spectrum Management Team. Although a few

proposals urge the White House to play a more direct role managing federal spectrum, the White House cannot run operations; a guiding principle for White House staff is: "Steer but Don't Row."

A number of recommendations recognize the importance of OMB as a way to institutionalize change. OMB is key to GSA's efforts to manage real property effectively. Individual leases and construction projects get scrutiny by the budget side of OMB. In addition, property management is a priority item on the President's management agenda (President Bush added it to his agenda in 2004 and it has stayed), which means it receives attention from the Deputy Director of OMB for Management and her agency counterparts.

OMB's Circular A-11, which instructs agencies to take into account the value of spectrum when they invest in new systems, is a potentially powerful tool.²⁷ But OMB cannot be a front-line spectrum auditor. Moreover, it is important to understand that OMB has a different relationship with DoD, given its sheer size and complexity, than it does with other agencies. When OMB sneezes, most federal agencies get a cold. By contrast, when it comes to DoD, OMB just manages the budget top line.

III. Economic Incentives

Proposals on ways to reduce directly the amount of federal spectrum focus

²⁷ OMB Circular No. A-11 (2014), Section 31.12. http://www.whitehouse.gov/sites/default/files/omb/assets/a11_current_year/s31.pdf.

on two different approaches—economic incentives and technology that facilitates spectrum sharing among federal and non-federal users. Although the relative merits of these two approaches is the subject of a lively debate, in reality there is considerable overlap, in that many of the economic incentives facilitate sharing.

Although this section focuses on incentives, not sharing, I note that spectrum sharing has a direct analog in the real property world, where office buildings are going the way of Uber, BikeShare and AirBnB. The shift to collaborative workspace reflects advances in technology and a related rise in the amount of space in a traditional work environment that is vacant at any given time. GSA is leading by example in its own headquarters building in downtown Washington, DC, where by doubling the number of occupants, it was able to vacate leases in the suburbs and save more than \$20 million a year. Moreover, GSA is using some of its economic tools to facilitate the shift to collaborative workspace.

Spectrum Fees

Spectrum is an unpriced input for federal agencies, in contrast to most other goods and services they use. If NTIA charged agencies spectrum fees, analogous to GSA rents, it would incentivize them to use spectrum more efficiently. Under most versions of this proposal, the fees would go back to Treasury, in which case a system of fees would be budget neutral.

A great deal has been written about the compelling logic behind this proposal as

well as the daunting implementation problems.²⁸ Let me add three points based on my GSA/DoD perspective.

First, federal spectrum is not unique in being an unpriced input. Federal agencies use federal land at no cost. DoD occupies 28 million acres, much of it “withdrawn” from the Bureau of Land Management’s inventory. Although some of that land has a relatively low opportunity cost, some of it is quite valuable.

Second, the transaction costs required to implement spectrum fees would be exceedingly high. GSA devotes considerable resources to determining its rent charges, which are based on commercially equivalent space and vary by building. Even though there is good data on commercial real estate transactions and accepted methods for rent estimation, it is not uncommon for federal tenants to challenge their rent assessment, and issues such as the appropriate way to measure and charge for atrium (vertical) space have been debated in congressional hearings and analyzed in reports by the Government Accountability Office that GSA sharply contested.

Spectrum fees would be even more difficult and contentious to implement.

²⁸ For an analysis of the benefits of spectrum fees, see Bazelon, Coleman and Giulia McHenry. 2014. “Spectrum Sharing: Taxonomy and Economics,” The Brattle Group. http://www.brattle.com/system/publications/pdfs/000/004/983/original/Spectrum_Sharing_-_Taxonomy_and_Economics_Bazelon_McHenry_020614.pdf?1391797552.

For a discussion of the impediments to effective use of fees, see Beard et al. (2014).

There are many more frequency assignments than there are federal buildings and leases. Unlike GSA space assignments, many spectrum frequencies are shared (geographic and time-of-day sharing) by a number of users. And although economists disagree about how difficult it would be to calculate the opportunity cost of individual spectrum assignments, there is unquestionably far more room for agencies to contest the methodology.

Third, although I do not discount their incentive effect, the major reason to adopt fees would be to generate the revenue for capital investment. Federal agencies use spectrum inefficiently in good part because they cannot afford the up-front cost of the upgrades to older, spectrum-intensive radio systems. A dedicated Federal Spectrum Fund, analogous to the Federal Buildings Fund, could help address that need.

That vision of fees would not be budget neutral, however, which would make it even more challenging than budget-neutral fees to get approved. Moreover, there is a risk that Congress would divert some of the money for unrelated activities.²⁹

Even if the fees were budget-neutral, in the current budget environment, policymakers are very unlikely to support a reform that raised the cost of an input for which agency demand is

²⁹ The Federal Buildings Fund and other user fee-based funds have experienced diversion in recent years. The BRAC Fund has not faced this problem because it has a privileged budget status that allows receipts to be spent without an annual appropriation.

inelastic, at least in the short run, and for which there is no competition on the supply side.

One partial step toward fees would be the use of shadow prices. OMB is moving in that direction with its Circular A-11 instruction to agencies to make spectrum part of their investment calculus. With actual prices—which there is sufficient data to estimate for all of the federal bands—that exercise would be far more meaningful.

Another partial step, building on A-11, would be to begin to formalize the consideration of spectrum costs in the acquisition process. For example, the Joint Strike Fighter has 30 different features that require spectrum to function. One could require contractors to build the cost of the spectrum for those features they control into the price of the weapon system, so that it becomes part of any competition on price and performance.

Making that kind of change to the acquisition process is challenging and can take years to fully implement (it is similar to the Obama Administration's effort to get DoD's acquisition process to take energy consumption into account in designing a weapon system). In the short run, possibly on a pilot basis, DoD could make spectrum efficiency a competitive discriminator—i.e., a factor that it would use qualitatively to evaluate bids. Currently, contractors have no incentive to propose an approach that will reduce spectrum usage, or substitute less valuable spectrum for more valuable spectrum, if it will increase non-spectrum costs.

Lessons from Real Property Disposal

In addition to spectrum fees, the spectrum reform debate has focused on ways to get the federal government to relinquish spectrum rights that the FCC could then auction off. For example, legislation introduced by Reps. Brett Guthrie and Doris Matsui would let agencies keep one percent of the revenue generated from the sale of spectrum they relinquish.

GSA and DoD have a similar challenge in getting agencies (the Military Services, in DoD's case) to dispose of real property. Their experience points to three broad lessons.

One lesson is that the ability to retain the proceeds from the disposal of property is a key motivator for federal agencies. (Agencies that have this authority generally can keep 100 percent of the proceeds.) Some participants in the spectrum policy debate have argued that federal agencies are not motivated by the opportunity to generate revenue, because appropriators will simply take it out of their hide the next year. That has emphatically not been my experience.

Consider the BRAC Fund. In 1987, when the Office of the Secretary of Defense (OSD) wanted to motivate the Services to undertake another round of base closures, it held out the prospect that they could retain the proceeds from the sale of excessed property. At the time, GSA was responsible for all federal property disposal, and the proceeds went into a land conservation fund. At DoD's urging (and despite opposition

from GSA), Congress delegated GSA's disposal authority to DoD for base closure property and created a BRAC Fund into which the proceeds would go, to be used for real property upkeep. The ability to retain proceeds from the sale of property was key to getting Service participation in the early BRAC rounds and it continues to be a strong motivator.³⁰

A corollary to the first lesson, based on DoD's experience with Enhanced Use Leases (EULs), is that agencies are sensitive to which organization within the agency gets to keep the revenue. An EUL is a long-term lease of underutilized property for which the developer pays the agency rent in the form of cash or in-kind services. Initially, DoD's statutory EUL authority specified that "the Department" could keep 100 percent of the revenue. An EUL requires a significant commitment of time and effort by the staff of an individual military installation, and the installations at first showed little interest in using the new authority. However, after the statute was changed to allow 50 percent of the revenue to stay with the installation, "the projects flowed," in the words of one observer.

³⁰ OSD and the Services reached an internal agreement that each Service would keep half of the proceeds from the sale of its property and OSD would allocate the other half to the Services on the basis of need. The Navy participated very little in the first two BRAC rounds, and DoD insiders say it was because the Navy felt that the 50/50 arrangement was unfair, given that the Navy bases most likely to be closed, many of them located on the California coast, were more valuable than those of the Army or Air Force.

The implication of these lessons for spectrum management is that federal agencies might be quicker to part with unneeded bands if they could keep a meaningful share of the disposal proceeds. Although the retained share for federal real property share (100 percent) might not be the right number for spectrum, the current share for agencies that relinquish spectrum (0 percent) is clearly inadequate. The Guthrie-Matsui legislation is a start, but the one-percent share specified in that bill is wholly inadequate.

A second lesson from the GSA and DoD experience is that it matters who exercises the disposal authority. For example, DoD wanted to dispose of its BRAC property directly in part because it wanted to keep the sale proceeds. But DoD also wanted disposal authority because the disposal agent has a significant say in determining the environmental remediation standard—and the resulting remediation costs—for the relevant property.³¹ Given that the financial stakes were high, DoD wanted to be able to control the process itself rather than entrust GSA.

The implication of this lesson is that it might make sense to give NTIA the authority to sell federal spectrum directly, rather than having the FCC perform that function in all cases. There is an unstated assumption in the

³¹ The agency that has the authority to dispose of a piece of property also writes the deed for the transfer of property, and the deed determines the environmental remediation standard for the disposal (for example, will the property be cleaned up to a level suitable for industrial use or to a higher, residential standard). If GSA were to sign a “clean” deed, DoD would bear a higher remediation cost.

spectrum debate that only the FCC can sell spectrum. Presumably that reflects the fact that spectrum buyers need a license, and only the FCC can assign that license. The licensing issue seems like one that NTIA and the FCC could handle through close coordination, however.

The case for giving NTIA auction authority is that the disposal of excess federal spectrum should be a core mission of the agency. If NTIA could sell federal spectrum directly, it would help to create the culture needed to support that core function. It would also help to regularize the process if NTIA had its own auction website and a constant stream of opportunities for potential bidders to explore. Although NTIA lacks the expertise to sell spectrum, it could draw on the FCC’s expertise.

The counter argument is that the sale of federal spectrum necessarily involves the FCC, which must do a great deal of pre-sale planning to ensure compatibility with nonfederal assignments. Thus, it may not make sense to create a separate auction capability outside of the FCC.

A third lesson from GSA and DoD is that property disposal means more just the sale of property. There are a range of statutory authorities that are available depending on the need.

One tool is the long-term “outlease” of property that the federal government does not have an immediate use for but wants to retain over the long term. PBS recently did a 60-year outlease of the Old Post Office in downtown Washington, DC, to the Trump Organization. The Trump Organization,

which was selected through a rigorous competition, is investing \$200 million to turn the historic building into a luxury hotel and will pay the federal government an annual rent.

EULs are another example of this approach. The Military Services have used their EUL authority to accommodate renewable energy projects or commercial development on underutilized property at the edge of their installations, with the in-kind payments (services) used to construct or renovate buildings on the same installation.

A second valuable authority is real property exchange: GSA and certain other agencies have the ability to swap an underutilized federal property either for another property or for construction services. Exchanges have long been common in the real property arena, because they reduce transaction costs. The use of exchanges by public agencies can also be a way to avoid show-stopping risks associated with the budget or property disposal process.

GSA's latest use of its exchange authority is directed at a problem that is directly analogous to federal hoarding of prime spectrum. The Department of Transportation's National Transportation Systems Center (Volpe Center) occupies a large, aging building on 14 acres in the heart of Kendall Square in Cambridge, MA. Kendall Square, located adjacent to the Massachusetts Institute of Technology, has some of the most valuable real estate in the country. GSA is exploring ways to use its exchange authority to convey significant portions of the DOT land to a developer in exchange for

construction services to transform the Volpe Center into a state-of-the-art facility.³²

The implication of this lesson is that NTIA and the spectrum user agencies should be considering forms of disposal other than just the sale of spectrum. Leasing is one.³³ For example, one can imagine DoD leasing 10 megahertz of spectrum to, say, T-Mobile with the proviso that T-Mobile has to quit using it within 100 miles of a certain point within two minutes of being notified to do so. As this example implies, it may make sense for a large user such as DoD to have its own authority to enter into leases (i.e., that authority should not necessarily be reserved to NTIA).

Exchanges are another real property authority that has direct application to spectrum. Much as with the Volpe Center, DoD or the FAA (or NTIA on behalf of the user agency) could convey some portion of a valuable band in exchange for the services required to replace an older system in that band with a newer, more spectrum-efficient system.

³² "GSA Seeks Ideas for First-Of-Its-Kind Redevelopment of Volpe Center," Aug. 26, 20014.

<http://www.gsa.gov/portal/content/196375>. See also GAO. 2014. "Federal Real Property: GSA Should Better Target Its Use of Swap-Construct Exchanges." GAO-14-586 (July). <http://www.gao.gov/products/GAO-14-586>.

³³ Public Knowledge has proposed a concept that incorporates leasing of federal spectrum. See Feld, Harold and Gregory Rose. 2010. "Breaking the Logjam: Creating Sustainable Spectrum Access Through Federal Secondary Markets," Public Knowledge. <https://www.publicknowledge.org/pdf/pk-spectrum-fed-secondary-markets-whitepaper.pdf>.

The argument against giving user agencies the authority to lease and exchange spectrum is that it could have the perverse effect of encouraging hoarding. To elaborate, in order to exercise those authorities, agencies would need to have what amounts to property rights in the spectrum they use, which NTIA frequency assignments do not currently confer. If agencies had property rights, according to this argument, they would hoard spectrum in order to get the revenue from leasing or exchanging it.

Although one should always consider the potential for unintended consequences, that seems like a risk worth taking. Economists have looked at the issues involved in giving federal agencies property rights in spectrum, and the benefits far outweigh the costs.³⁴

Public-Private Ventures

As mentioned repeatedly, federal agencies use spectrum inefficiently in part because they cannot afford the cost of the upgrades to older radio systems. This problem has a direct parallel in the federal real property arena. Public-private ventures may be a way to address both problems, although they face an uphill battle with OMB.

To elaborate, unlike private firms and most state and local governments, the federal government does not have a capital budget, which means that agencies must fund capital investments up front rather than over time. In

³⁴ Morris, Adele. 2014. *Greasing the Wheels of Federal Spectrum Deals*, Brookings, September 23, 2014.

recent decades, this requirement has become a major deterrent to needed investment in federal real property, and that lack of investment has driven long-term costs even higher.³⁵

Public-private ventures are one important way to address this problem. The best illustration is DoD's Military Housing Privatization Initiative (MHPI), in which the Services were allowed to partner with the private sector to address the lack of adequate housing for military families. In response to a \$2.3 billion contribution by DoD, including a 50-year outlease of the underlying land, developers have invested \$14 billion and generated 200,000 units of new and renovated housing built and maintained to market standards.

Federal property managers at DoD and GSA can point to many other unmet funding requirements that would lend themselves to MHPI-type partnerships. For example, GSA could replicate what it did in its own headquarters—renovating a deteriorating facility in a way that allows for far greater utilization—in many other federal buildings.

Public-private ventures may also be a useful tool for federal spectrum management. With federal property, what makes a public-private venture possible is the ability to leverage a stream of revenue such as agency rents or (in the case of MHPI) family

³⁵ See Robyn, Dorothy. 2014. "Reforming Federal Property Procurement: The Case for Sensible Scoring." <http://www.brookings.edu/blogs/fixgov/posts/2014/04/24-federal-property-procurement-sensible-scoring-robyn>.

housing allowances. With spectrum, there is no parallel revenue stream in the form of spectrum fees. Nevertheless, a “developer” might agree to upgrade a radio system for the FAA in exchange for the right to capture the revenues from leasing out underutilized spectrum in the same band. Alternatively, a communications technology firm might build a new aero-telemetry system for DoD in exchange for being able to have communications devices use the same frequencies on a non-interfering basis.

Public-private ventures would provide some of the same advantages as spectrum overlays, a proven approach in which the FCC grants secondary rights to the winning bidders in an auction of federal spectrum as a way to speed the transition to nonfederal use. According to Tom Hazlett, spectrum overlays have worked well because the for-profit player has a) an incentive to move spectrum to higher valued uses, b) the means (access to the capital markets) to pay off the current users (replacing their radio equipment with newer and better equipment), and c) the knowledge as to where the higher-valued uses are as well as where the efficient substitutes for existing users lie.³⁶

Likewise, public-private ventures could be a tool with which to implement the “shared-use spectrum superhighway” proposed by the President’s Council of Advisors on Science and Technology (PCAST).³⁷ Recognizing that it is

becoming increasingly difficult to clear and reallocate federal spectrum, PCAST’s plan calls for a new spectrum architecture featuring large bands that can accommodate a wide variety of compatible uses (nonfederal as well as federal) and technologies. Toward that end, a public-private venture can provide a way for an incumbent federal user to transact with a real marketplace operator so as to get underutilized federal spectrum into more intensive use.

Unfortunately, most proposed public private ventures run afoul of federal budget rules, because they are seen as a form of off-budget financing of capital investment. Nevertheless, there is growing support for a reexamination of the budget rules.

IV. Conclusion

This brief review of options for reforming federal spectrum management makes clear what spectrum policy reformers should *not* do. They should not fold NTIA’s spectrum functions into the FCC, fully privatize them or subject federal spectrum to a BRAC process.

It is harder to say what *to* do. Although spectrum policy reformers almost all want to see more central control over federal spectrum, Coase et al.’s insights on the limits of central planning in this area (“The attempt to control everything from the center is liable to

³⁶ Email communication with Hazlett, September 10, 2014.

³⁷ President’s Council of Advisors on Science and Technology. 2012. “Report to the President: Realizing the Full Potential of Government-Held

Spectrum to Spur Economic Growth.” (July) http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast_spectrum_report_final_july_20_2012.pdf.

lead to paralysis.”) still ring true.³⁸ Coase et al. also reminded us that the delegation of authority necessarily entails some misallocation of resources.

The implicit criticism of NTIA is that it is not tough enough on DoD, the dominant user of federal spectrum. But that may be unfair. DoD is an admitted “control freak,” because of the nature of its mission, and spectrum is mission-critical. (According a T-Mobile employee who worked with DoD on the transition of a federal band to nonfederal use, “They [the military] have backup plans for their backup plans.”) Even OMB is no match for the military and contents itself with managing DoD’s top line.

Since GSA faces many of the same challenges as NTIA, creation of a GSA for Spectrum would not provide the level of management control that some want. That said, there is much about GSA (PBS) for NTIA to emulate, including its asset management mentality, the focus on property disposal as a core mission, and the balancing act it performs as both cop and trusted partner.

GSA is also a model in terms of its use of economic incentives and tools. Although spectrum fees, modeled after GSA rent charges, would have prohibitively high transaction costs in my view, GSA and DoD have a lot to teach us when it comes to promoting the disposal of excess property. The most powerful lesson is that the ability to retain the proceeds from the disposal of property is a key motivator

for federal agencies if the incentive is properly structured.

The GSA and DoD statutory authorities, including long-term outleases and exchanges of underutilized property, also seem applicable to spectrum. To use these authorities, federal agencies would need to have property rights in the spectrum they use. Although some fear that could encourage hoarding of spectrum, the potential upside seems far greater.

Another borrowed tool, public-private ventures, may be a way to address one of the biggest problems in federal spectrum management—namely, agencies’ inability to afford the up-front cost of replacing older radio systems with newer, more spectrum-efficient systems. Among other benefits, public-private ventures could be a tool with which to implement the “shared-use spectrum superhighway” proposed by PCAST. Although many proposed public private ventures run afoul of federal budget rules, there is growing support for a reexamination of the budget rules.

³⁸ Coase et al. (1995)