Controlling Universal Service Funding and Promoting Competition Through Reverse Auctions

By: James Stegeman, Dr. Steve Parsons, Robert Frieden, and Mike Wilson[1]

---

[1] James Stegeman is President of CostQuest Associates. He is recognized globally as an expert on universal service. He helped design and create the universal service models used in Australia, New Zealand, and Hong Kong. In the U.S. he helped create the CPM (used in California) and the BCPM (used in a number of states). He also was involved in the creation of the FCC's synthesis model and is frequently used to provide advice on the model.

Dr. Steve Parsons is a telecommunications consultant who has worked on USF, interconnection, costs, pricing, unbundling, and other public policy topics for over 25 years. He has a Ph.D. in economics and is an adjunct faculty member at Washington University in St. Louis where he teaches the Economics of Technology as well Telecommunications Regulation and Public Policy in the specialty Masters Programs in the School of Engineering.

Rob Frieden is a Professor of Telecommunications and Law at Penn State University. Professor Frieden has written extensively on telecommunications and Internet policy including articles on reforming the universal service fund and identifying best practices in information and communications technology development.

Mike Wilson is a telecommunications consultant with CostQuest Associates and Vice President of its wireless focused affiliate, CQAmobile. He has worked within the wireless industry for 13 years. His primary focus is on USF compliance and assessment for competitive carriers. He has provided testimony on USF, local number portability, and intercarrier compensation for state proceedings.

Table of Contents

I. Introduction ..... - 3 -
II. Legal and Jurisdictional Issues ..... - 4 -
A. The FCC Can Lawfully Require Competitive Bidding For Universal Service Funding. ..... - 4 -
B. Both the FCC and the Federal-State Joint Board Have Endorsed Competitive Bidding. ..... - 5 -
III. Lessons from the Academic Literature and Experience with Reverse Auctions ..... - 7 -
A. Auctions Theory is Well Developed ..... - 7 -
B. Universal Service Reverse Auctions: The International Experience ..... - 8 -
C. Lessons for the United States ..... - 13 -
IV. Key Aspects of Creating a Fair, Efficient, and Balanced Universal Service Auction Process in the United States ..... - 14 -
A. Identifying the Appropriate Size and Basis of Geography ..... - 15 -
B. Winner Gets More ..... - 19 -
C. Eligibility and Obligations ..... - 22 -
D. Lessons from Spectrum Auctions ..... - 25 -
E. Length of Term ..... - 29 -
F. Transition Plan ..... - 30 -
G. Other Issues ..... - 30 -

I. Introduction

Reverse auctions for Universal Service Funding (USF) (often called subsidy auctions in other parts of the world) can be, and have been, used to determine the level and distribution of USF in other countries. Against the legal and competitive backdrop of the U.S. telecommunication and information services marketplace, this paper discusses the feasibility of utilizing reverse auctions to determine appropriate levels of high-cost universal service support. This paper briefly reviews the legal issues, the relevant economic literature and the worldwide use of auctions. With this background, this paper describes reasonable parameters to consider and/or use in implementing a reverse auction to determine high-cost universal service support amounts in the U.S. With appropriate safeguards, competitively-neutral reverse auctions have the potential to drive down the cost of universal service while achieving important public policy objectives.

As will be demonstrated within this paper, auction theory, combined with experience in standard and reverse auctions in other countries can be used to create a check-list of items for a well designed reverse auction for universal service subsidy:

1) Transparency and Accountability -- Bidding criteria and processes should be as clearly defined as possible. Bidder eligibility and obligations (for example: carrier of last resort and service quality obligations) must be clearly defined as should the supported services. Incumbent and competitive eligible telecommunications carriers (ETCs) must be held accountable for achieving measurable universal service objectives.
2) Competitive and Technological Neutrality -- Reverse auctions should be open to all incumbent and competitive ETCs, regardless of regulatory status or technology (*i.e.*, there is no need for exceptions or separate auctions for different technology platforms). Indeed, part of the advantage of a combined technology auction is a more competitive bidding process; a separate auction for each technology would obviously have fewer bidders.
3) Let Consumers Define Supported Services -- Required service characteristics should be based on current customer preferences (*e.g.*, do not require wireless competitive ETCs (CETCs) to provide "wireline" service characteristics that consumers may not want).

4) No "Winner Takes All" Auctions -- "Winner takes all" auctions are inconsistent with achieving universal service in the modern competitive telecommunications environment in the U.S. and, therefore, mechanisms to encourage active bidding will be necessary. "Winner takes more" auctions provide a balance between creating incentives to submit low bids with avoiding the creation of artificial competitive advantages for the winner.

5) Auction Design -- Auctions should be designed to minimize opportunities for bidder collusion or price signaling, or for any party to game the process to their own advantage.

II. Legal and Jurisdictional Issues

A. The Commission Can Lawfully Require Competitive Bidding For Universal Service Funding.

Although not the focus of our research, a brief review of legal and jurisdictional background is useful before discussing feasibility and appropriateness of using reverse auctions for determining funding for universal service.

Congress granted the FCC flexibility to determine how best to achieve universal service principles and objectives established in the Telecommunications Act of 1996,[2] which amended the Communications Act to promote competition and to specify the universal service mission.[3]

---

[2] PL 104-104 , 110 Stat. 56 (codified at 47 U.S.C. §§ 100 *et seq.*).

[3] Section 254 of the Communications Act, as amended, 47 U.S.C. § 254 (2006), authorizes the FCC, in consultation with a Federal-State Joint Board, to preserve and advance universal service, based on seven principles: (1) Quality and rates: Quality services should be available at just, reasonable, and affordable rates. (2) Access to advanced services: Access to advanced telecommunications and information services should be provided in all regions of the Nation. (3) Access in rural and high cost areas: Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas. (4) Equitable and nondiscriminatory contributions: All providers of telecommunications services should make an equitable and nondiscriminatory contribution to the preservation and advancement of universal service. (5) Specific and predictable support mechanisms: There should be specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service. (6) Access to advanced telecommunications services for schools, health care, and libraries: Elementary and secondary schools and classrooms, health care providers, and libraries should have access to advanced telecommunications services as described in subsection (h). (7) Additional principles: Such other

Unlike other communications laws,[4] Section 254 of the Telecommunications Act contains no prohibition on the use of competitive bidding. Indeed the Commission has a duty to pursue the universal service mission in a manner that removes implicit subsidies, operates with specificity and supports competition:[5] The FCC must see to it that *both* universal service and local competition are realized; one cannot be sacrificed in favor of the other. The Commission therefore is responsible for making the changes necessary to its universal service program to ensure that it survives in the new world of competition. [6]

B. Both the FCC and the Federal-State Joint Board Have Endorsed Competitive Bidding.

The FCC and the Joint Board [7] have previously supported the use of competitive bidding as a means for achieving universal service goals consistent with Section 254 while also conserving funding and fostering greater efficiency:

> The Joint Board identified many advantages arising from the use of a competitive bidding system. We agree with the Joint Board and the commenters that a compelling reason to use competitive bidding is its potential as a market-based approach to determining universal service support, if any, for any given area. The Joint Board and some commenters also noted that by encouraging more efficient carriers to submit bids reflecting their lower costs, another advantage of a properly structured competitive bidding system would be its ability to reduce the amount of support needed for universal service. In that

---

principles as the Joint Board and the Commission determine are necessary and appropriate for the protection of the public interest, convenience, and necessity and are consistent with this Act. 47 U.S.C. § 254(b)(1)-(7).

[4] *See, e.g.*, Open-market Reorganization for the Betterment of International Telecommunications Act ("ORBIT Act") 47 U.S.C.§ 765(f) (2006) ("Notwithstanding any other provision of law, the Commission shall not have the authority to assign by competitive bidding orbital locations or spectrum used for the provision of international or global satellite communications services."); *Northpoint Technology, Ltd. and Compass Systems, Inc. v. Federal Communications Commission*, 412 F.3d 145 (D.C. Cir. 2005) (invalidating the FCC's decision to use competitive bidding for access to Direct Broadcast Satellite service licenses).

[5] Section 254(b)(5) directs the establishment of specific, predictable, and sufficient Federal and State mechanisms to preserve and advance universal service. "Consistent with the explicit statutory principles, our immediate implementation of section 254 is shaped by our commitment to achieve four critical goals. First, we must implement all of the universal service objectives established by the Act, including those for low-income individuals, consumers in rural, insular, and high cost areas, schools, libraries, and rural health care providers. Second, we must maintain rates for basic residential service at affordable levels. We believe that the rates for this service are generally at affordable levels today. Third, we must ensure affordable basic service continues to be available to all users through an explicit universal service funding mechanism. . . . Fourth, we must bring the benefits of competition to as many consumers as possible." Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Report and Order, 12 FCC Rcd. 8776,8780-81 (1997) [hereinafter cited as Universal Service Report and Order].

[6] *See, Alenco Communications, Inc. v. FCC*, 201 F.3d 608, 615 (5th Cir. 2000)(endorsing FCC universal service policies despite their potential for reducing local exchange carrier profits).

[7] *See* Federal-State Joint Board on Universal Service, CC Docket No. 96- 45, Recommended Decision, 12 FCC Rcd 87 (1996).

> regard, the bidding process should also capture the efficiency gains from new technologies or improved productivity, converting them into cost savings for universal service. [8]

The Commission already has implemented competitive bidding in a number of instances including access to e-rate funding by schools and libraries and support for eligible health care providers.[9] The FCC has ample flexibility in shaping regulatory models, including ones that determine carriers' costs.[10] Accordingly, the FCC, in consultation with the Joint-Board,[11] can lawfully implement a model that allows carriers to determine their costs and bid on the opportunity to access a subsidy designed to compensate for providing service to consumers below cost. Competitive bidding can, if appropriately designed, promote the development of "specific, predictable and sufficient Federal and State mechanisms to preserve and advance universal service."[12] Additionally, competitive bidding can ensure that universal service support rules are competitively and technologically neutral.[13]

---

[8] Universal Service Report and Order, 12 FCC Rcd. at 8948.

[9] "Competitive bidding is the most efficient means for ensuring that schools and libraries are informed about all of the choices available to them. In addition, we agree with the Joint Board that the lowest corresponding price, defined for each telecommunications carrier bidding to serve a school or library as the lowest price that carrier charges to similarly situated non-residential customers in its geographic service area for similar services, shall constitute the ceiling for that carrier's competitively bid pre-discount price for interstate rates. We would expect state commissions to require the same for intrastate rates. In areas in which there is only one bidder, that bidder's lowest corresponding price would constitute the pre-discount price." Universal Service Report and Order, 12 FCC Rcd. at 8794.

[10] *See, e.g.*, *Texas Office of Public Utility Counsel v. FCC*, 183 F.3d 393, 418 (5th Cir. 1999) (affirming a revised cost of service model that used forward looking costs instead of carriers' actual costs when calculating the amount of universal service subsidies).

[11] The FCC and statue public utility commissions share jurisdiction on decision making on how to promote universal service and authorizing carriers' access to universal service funding. Section 214(e)(2) of the Communications Act of 1934, as amended, 47 U.S.C. § 214(e)(2) authorizes a state public utility commission "upon its own motion or upon request designate a common carrier that meets the requirements of paragraph (1) as an eligible telecommunications carrier for a service area designated by the State commission. Upon request and consistent with the public interest, convenience, and necessity, the State commission may, in the case of an area served by a rural telephone company, and shall, in the case of all other areas, designate more than one common carrier as an eligible telecommunications carrier for a service area designated by the State commission, so long as each additional requesting carrier meets the requirements of paragraph (1). Before designating an additional eligible telecommunications carrier for an area served by a rural telephone company, the State commission shall find that the designation is in the public interest." *See* Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Notice of Proposed Rulemaking, 19 FCC Rcd. 10,800 (2004).

[12] 47 U.S.C. § 254(b)(5).

[13] "So long as there is sufficient and competitively-neutral funding to enable all customers to receive basic telecommunications services, the FCC has satisfied the Act and is not further required to ensure sufficient funding of every local telephone provider as well." *Alenco v. FCC*, 201 F.3d at 620. *See also* Universal Service Report and Order, 12 FCC Rcd at 8801-02 (adopting the principle that federal support mechanisms should be competitively neutral, neither unfairly advantaging nor disadvantaging particular service providers or technologies). "The 1996 Act requires that universal service funds be available on a technology neutral and telecommunications provider

III. Lessons from the Academic Literature and Experience with Reverse Auctions

A. Auctions Theory is Well Developed

Auction theory in economics is well developed.[14] Much of the auctions theory literature is based on game theory. While game theory is notorious for having results driven by the formal assumptions about the game, the literature broadly supports auctions as a valid mechanism for allocating resources (both for buyers and sellers of goods and services).[15] When the bidding process is reasonably competitive (*e.g.*, with a sufficient number of bidders and little or no opportunity for collusion or price signaling), auctions provide an important mechanism in which the economic agent best suited to the task wins. In a standard auction, the highest bidder is generally the economic agent placing the highest value on the item up for auction.

Not only is auction theory well developed, standard auctions are commonly used in many industries including telecommunications. Indeed, Nobel Laureate Sir Ronald Coase proposed in 1959 the use of auctions to allocate spectrum.[16] With the Omnibus Budget Reconciliation Act of 1993, Congress provided the FCC with the authority to employ auctions for spectrum and the FCC now has significant experience in designing and performing auctions.[17]

A "reverse auction" is commonly employed in industry and government.[18] Virtually any instance in which a business or a government agency puts a needed service or product "out for bid" (a procurement bid) it is performing a reverse auction. With a reverse auction, the winner is typically the bidder with the lowest bid (rather than the highest bid). When the bidding process is reasonably competitive a reverse auction provides an important mechanism in which the

---

neutral basis." Informal Questions And Answers On Universal Service Benefits For Rural Health Care Providers, Public Notice, 1997 WL 289232.

[14] *See generally* Paul Klemperer, "Auction Theory: A Guide to the Literature," 13(3) *Journal of Economic Surveys* 227 (1999); Paul Milgrom and Robert Weber, "A Theory of Auctions and Competitive Bidding," 50(5) *Econometrica* 1089 (1982).

[15] Game theory results are often not robust with regards to specific assumptions in the game.

[16] Ronald Coase, "The Federal Communications Commission," 2 *Journal of Law and Economics* 1 (1959).

[17] Ominbus Budget Reconciliation Act of 1993, Pub. L. 103-66, 107 Stat. 312 (1993).

[18] The existence of on-line auctions such as those on eBay has increased awareness of standard auctions and has probably increased the number of standard auctions that exist by more than an order of magnitude. However, in terms of commercial value, reverse auctions by industry and governments still likely overshadows the commercial value of all standard auctions.

economic agent best suited to the task wins; this generally means the winner is the provider with the lowest cost that also satisfies the qualifications of the bid.

The concept of using a reverse auction to determine the service provider for a utility service is not new; the concept of using a reverse auction to allow competition for the field, rather than within the field, dates at least to Chadwick in 1859.[19] Over the last decade academic treatment of reverse auctions for public utility service in general and for telecommunications universal service in particular (or subsidy auctions) has grown.[20] Reverse auctions have been applied to subsidy applications as diverse as wheat and telecommunications.[21]

B. Universal Service Reverse Auctions: The International Experience

1. Lessons Learned

While a reverse auction for high-cost universal service support would be new in the United States, it has been utilized in several other countries.[22] Such auctions have been employed for voice telecommunications and/or Internet infrastructure and services development in Australia,[23]

---

[19] Edwin Chadwick, Results of Different Principles of Legislation and Administration in Europe of Competition for the Field as Compared with Competition within the field, 22 *Journal of the Statistical Society of London* 381 (1859).

[20] *See, e.g.*, Harold Demsetz, "Why Regulate Utilities?", 11 *Journal of Law and Economics* 55 (1968) (reviving interest in the concept of competition for the field); Thomas J. DiLorenzo, "The Myth of Natural Monopoly," 9(2) *The Review of Austrian Economics* 43 (1996) (suggesting that public utilities are generally not natural monopolies and describing the concept of competition for the field); Paul Milgrom, Lecture at the Royal Swedish Academy of Sciences: Procuring Universal Service: Putting Auction Theory to Work (December 9, 1996) (© 1997 by the Nobel Foundation); Andrew Dymond and Sonja Oestmann, Rural Telecommunications Development in a Liberalising Environment: An Update on Universal Access Funds, Intelecon Research & Consultancy Ltd (2002); Organization of Economic Cooperation and Development, "Leveraging Telecommunications Policies for Pro-Poor Growth Universal access Funds with Minimum-Subsidy Auction," 27-29, (2004), http://www.oecd.org/dataoecd/57/56/33920168.pdf [hereinafter OECD Report]; Combinatorial Auctions, (P. Crampton et. al ed) (MIT Press), 2006. Part V describes auctions for airspace systems resources and bus routes.

[21] USDA, Grains: World Markets and Trade, Part One, December 13, 1996, *available at* http://www.fas.usda.gov/grain/circular/1996/96-12/dec96gfd1.html (briefly describing the system of bidding for grain subsidies in Brazil). Below, we discuss the widespread use of reverse auctions in telecommunications.

[22] *See generally*, Hank Intven & Curt Howard "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide," slide 6, EBRD, IDRC, JICA, Keio University ICT Seminar, Tokyo, (August 25, 2004); Dennis Weller, "Auctions for Universal Service Obligations," ITS, Stockholm, (June 1998), http://faculty-gsb.stanford.edu/wilson/archive/E542/classfiles/gte_colr_auctions.pdf ; Siddhartha Raja, Stanford University "Funding Universal Service: A Case for Subsidy Auctions," 13 (2003), http://www.geocities.com /sidheartraja/documents/Paper-FINAL.pdf.

[23] *See generally*, International Telecommunications Union (ITU) "What Rules for Universal Service in an IP-Enabled NGN Environment?" Background Paper for ITU Workshop, Geneva, (March 23-24, 2006) (reporting that Australia employed a pilot reverse auction) [hereinafter ITU (2006)].

Brazil, Chile, Colombia, the Dominican Republic,[24] El Salvador, Guatemala,[25] Guyana,[26] India,[27] Nepal,[28] Nigeria,[29] Peru, and Uganda.[30] In most instances these reverse auctions were successful, and in some instances stunningly so, in achieving their universal service objectives.[31] The successes were largely in three dimensions: 1) Increases in universal service coverage and stimulation of infrastructure investment; 2) Savings demonstrated by the relatively small portion of total available subsidies that were actually paid out; and 3) Relatively small administrative costs.

Gains in Universal Service and Infrastructure Investment. After Chile established an auction for payphone subsidies to un-served villages, "the proportion of Chile's population living in places without access to basic voice communication decreased from 15 percent to 1 percent by 2002 [from 1994]."[32] In addition, each dollar of subsidy payment led to over six dollars of investment by companies.[33] In Peru, the provision of rural payphones grew to 6,620 from a pre-auction level of 1,525, however the subsidy to private investment multiplier at 2-to-1 was lower

---

[24] For information on the Telecommunications Development Fund (Fondo Desarrollo Telecomunicaciones, FDT) http://www.indotel.gov.do/(zaq5gg55xaylb255ojsc1s45)/fdt.aspx (Spanish). Results of rural telephony and teleducation projects: http://www.indotel.gov.do/(zaq5gg55xaylb255ojsc1s45)/fdt_proj_article.aspx?article=128 and http://www.indotel.gov.do/(zaq5gg55xaylb255ojsc1s45)/fdt_proj_article.aspx?article=67 (Spanish)

[25] *See generally*, Vivian Foster and Caridad Araujo, "Does Infrastructure Reform Work for the Poor? A case Study from Guatemala," 10-12, World Bank, Policy Research Papers, No3185, (December 2001), http://wbln0018.worldbank.org/lac/lacinfoclient.nsf/0/aea29539eef42c0e85256b57008006bb/$FILE/InfrastructureReformPoor_Guatemala.pdf.

[26] *See generally*, "Reform of the Telecommunications Sector in Guyana: Consultation Paper on Issues for Reform of the Telecommunications Sector," 3 (August 2001) http://www.itpag.org.gy/downloads/telecomsreform.pdf#search=%22Guyana%20auction%20telecom%22 ("Payments out of the program [universal access program] would be based on a competitive bidding process."). We have not been able to independently determine that the subsidy auction was in fact established

[27] *See*, Roger Noll and Scott Wallsten, "Telecommunications Policy in India," (preliminary draft manuscript, June 1, 2004).

[28] *See* Hank Intven et al, "Output-based aid in Nepal: Expanding telecommunications service to rural areas" OBA Approaches (December 2004) http://www.gpoba.org/docs/NepalTelecomOBApproaches.pdf.

[29] The Federal Republic of Nigeria, Nigerian Communications Commission, published a request for proposal for Universal Service Access Telecommunications Services on May 8, 2006. This process is apparently not an auction per se, but it is intended to induce competitive bids for universal service subsidies. We have not determined the current status of this process. *See* http://www.ncc.gov.ng/Headlines/RFP-%20UA%20Pilot%20Project%20Phase2.pdf#search=%22Nigeria%20telephone%20subsidy%20bid%22.

[30] *See generally*, OECD Report.

[31] *See generally*, Andrew Dymond and Sonja Oestmann, Rural Telecommunications Development in a Liberalising Environment: An Update on Universal Access Funds (July 2002) (Intelecon Research & Consultancy Ltd).

[32] Björn Wellenius, *Closing the gap in access to rural communication: Chile 1995-2002*, 4(3*) Info* 29, (June 2002) (also available as World Bank Discussion Paper no. 430, Feb. 2002).

[33] WPD430 at 10.

than in Chile.[34] In Guatemala 1,600 public telephones were installed via minimum subsidy auctions using "70% of the proceeds of the spectrum auctions" where "each US $1 leveraged between US$2-4 of private investment."[35]

Proportion of the total subsidy paid out. In most instances, identification of locations for possible subsidy payments was based, at least in part, on information about possible consumer needs. For the targeted locations, a maximum subsidy value was typically determined by one of two kinds of approaches: 1) An estimate of the value of service less expected commercial revenues; or 2) An estimate of costs less expected commercial revenues. In Chile, for example, a calculation of likely societal net present value less likely commercial revenues was performed for each location.[36] In Uganda, alternately, revenue estimates were compared to cost estimates rather than societal value estimates.[37]

In Peru, initial auctions for payphone subsidies led to a combined bid of only US$11 million out of a possible US$50 million (22%).[38] Subsequent auctions had higher percentage bids (as a percentage of the maximum), rising to 68% in 1998/99 and to 95% in 2000.[39] In total, over all auctions, US$50 million was distributed out of a possible US$120 million (42%). In Colombia, for the 1999 auction of 6,865 locations, US$31.84 million was actually granted of US$70.60 million available (45%).[40] For Internet infrastructure in Chile, after switching to auction allocation, the subsidy dropped from US$28,000 to run five centers for one year to US$14,000 to run six centers for five years.[41] In the Dominican Republic, the ratio of subsidy granted to maximum subsidy was much closer to one: US$3.4 million was granted out of a maximum US$3.8 million (89%).[42] It appears that Guatemala did not establish maximum subsidies.

---

34 Geoffrey Cannock, "Expanding Rural Telephony: Output-based Contracts for Pay Phones in Peru." *Contracting for Public Aid: Output Based Aid and Its Applications*, 16-19 (Penelope Brook and Suzanne Smith eds. World Bank 2001); Francisco J. Proenza, "The Road to Broadband Development in Developing Countries is Through Competition Driven by Wireless and VoIP," (October 7-8 2005) (unpublished manuscript presented at the workshop: Wireless Communications and Development – A Global Perspective) http://arnic.info/workshop05.php.

35 Foster and Araujo at 10.

36 Wellenius, WPD430, at 6.

37 OECD Report at 50.

38 OECD Report at 41.

39 Dymond at 3.

40 *Id.* at 3.

41 Proenza at 17.

42 Dymond at 3.

In Australia a pilot program for a reverse auction was described as: "less positive experience in Australia [vis-à-vis South America]. Here trials in the use of competitive tendering resulted in no competitive entry."[43] It appears that one of the objectives in Australia (besides a reduced reliance on cost modeling) was to create competitive entry where the incumbent Telstra already had facilities. However, rural Australia is far less densely populated than most rural areas in the United States, or for that matter than other countries in the world.[44] In fact, Australia is one of the lowest density countries in the world, with the U.S. having an average density that is 10 times higher than Australia.[45] Additionally, the pilot program was initiated in 2000; given the dramatic changes in the telecommunications marketplace this may have been premature in timing in order to induce competitive entry in areas as low in density as the remote regions of Australia.

India provides an example of a largely failed auction system, in part because of the geographic scope of service areas. "In 19 of 20 circles [each circle approximately corresponding to a state] only one firm bid for the subsidies, the incumbent BSNL … Not surprisingly, given the thin market, BSNL bid exactly the … maximum subsidy DoT [Department of Telecommunications] was prepared to provide."[46] The key lesson learned from India was that a reverse auction works best with competition for the available subsidy. The lack of competitive bidding may have been driven, in part, by the selection of a fairly large geographic area for auction.

Administrative Costs. It is likely that there are economies of scale in designing and administering an auction. This would seem to predict non-trivial costs for countries smaller than the U.S. Surprisingly, though, the administration costs are relatively small (for instance, Peru's costs were around 2% of the subsidy administered).[47] In the United States, administration costs

---

43 ITU Universal Service at 14.

44 *See, e.g.*, http://www.ecommerce.or.th/APEC-Workshop2002/ppt/slide/scheetz.pdf

45 *See, e.g.*, http://www.un.org/esa/population/publications/WPP2004/POP-R2004-DATA_Web.xls

46 Noll and Wallsten, at 26-27 (discussing some of the shortcomings of the auction, including "bidding was open only to basic service operators already operating in the services area").

47 Cannock at 20.

as a percent of total disbursements for the Universal Service Administrative Company ("USAC") are about 1.3%.[48]

2. Differences from the United States

Though much can be observed from auction experiences abroad, one must also take notice of the several dimensions in which the telecommunications situation and the universal service programs in the countries listed above are distinctly different from that in the U.S. These distinctions may affect the manner in which a reverse auction could be employed by the FCC or a state commission.

1) Teledensity, telephone penetration, and per capita GDP are much lower than in the U.S. In some countries (such as Uganda and Nepal) per capita income and teledensity differ by as much as two orders of magnitude, with differences of approximately one order of magnitude for income for Dominican Republic, El Salvador, Guatemala, Guyana, and Nepal. Because of this, the very nature of the concept of advancing universal service is different than in the U.S. In Uganda, the target level of service was over 3,000 persons per pay telephone. Peru and Chile are the two countries with the teledensity and income levels most like the U.S.[49]

2) The primary focus of the subsidy auctions has been to encourage infrastructure investment where none previously existed. Often the subsidies are one-time in nature (or exist over a relatively short time), although the concessions exist for much longer (*e.g.*, 10 or 20 years). In contrast, the subsidy system in the United States involves a mix of reimbursement for both past and future investments, generally for areas already served by at least one carrier.[50] For example, the high-cost universal service mechanisms in the U.S. primarily compensate incumbent landline carriers for investments in areas they already serve. Competitive ETCs, on the other hand, often

---

[48] 2005 Annual Report, Universal Service Administrative Company, http://www.usac.org/_res/documents/about/pdf/annual-report-2005.*pdf (*USAC reported $85,359,000 in administrative expenses resulting in 1.29% or total distributions. This includes expenses and disbursements from High Cost, Low Income, Schools and Libraries, and Rural Health Care).

[49] We have excluded Australia in this comparison since it employed only a pilot auction.

[50] Indeed, Section 254(b)(5) of the Act states that "[t]here should be specific, predictable, and sufficient Federal and State mechanisms to *preserve and advance* universal service." 47 U.S.C. § 254(b)(5) (emphasis added).

are required to use support for investment in new facilities to expand coverage areas to consumers in high-cost areas.[51]

3) In some of the foreign subsidy auctions other factors are bundled with the subsidy provision. In many instances, the winning bidder obtains a license concession[52] when none would otherwise have readily been available (in some instances this led to zero bids).[53]

4) The telecommunications authorities in these countries have greater control over telecommunications policy in general than does the FCC or any single state commission. Although state/federal bifurcation of regulatory authority in the U.S. normally constrains federal telecommunications policy, the FCC has authority under section 254 of the Act to ensure that state rate designs and regulations are consistent with national universal service policies.[54]

5) Risks are higher and universal service faces other problems. Property rights are not as well protected in some of the other countries, and issues such as lack of electric power make progress in other countries more difficult.[55]

C. Lessons for the United States

Despite the legal and economic differences from the U.S., there are some important lessons for the U.S. that can be derived from the experiences in other countries.

1) Subsidy auctions provide an opportunity to better incorporate market information and market forces into universal service. As a result, there is likely to be a significant opportunity to reduce subsidy payments below existing levels if a reasonable auction structure is employed. In this process, it is important to design the process to be transparent and competitively neutral. In other countries, one interesting result was

---

[51] *See* Federal-State Joint Board on Universal Service, Report and Order, FCC 05-46, 20 F.C.C. Rcd. 6371 (rel. March 17, 2005) (hereinafter March 17, 2005 Report and Order).

[52] In essence, the winning bidder obtained a license allowing entry and provision of service when such a license might not otherwise have been obtained.

[53] Wellenius, WPD430, at 17. Under such circumstances, it appears that competitive entry would otherwise have occurred (*i.e.*, even in the absence of the auction process) if a license concession would have been grated and entry allowed.

[54] *See* Comments of AT&T Corp., WC Docket No. 05-337, at 11-12 (filed Oct. 10, 2006

[55] See Raja at 13 ("One of the most important [problems] was … that along with the phones, they would also need to provide for electrical power supplies, and training on how to use the telephone itself.").

that market forces meant that the technology of choice (*i.e.*, the winning technology) was often wireless rather than landline.[56]

2) One important outgrowth of the reliance on market forces is the reduced reliance on (or elimination of the need for) cost information. Some countries did not use cost estimates in any way, while others utilized costs only in establishing the maximum subsidy payment.

3) Auctions should be designed to minimize opportunities to collude, signal, or game the process. Some analysts believe that sequential auctions over time, with the same market participants, tended to cause the bids to be higher in later auctions as participants learn to game the process; therefore bids tend to be a higher proportion of the maximum subsidy bid (*e.g.*, in Peru bids rose from 22% of the maximum in the initial rounds to 95% of the maximum in the last round).[57]

4) There may be advantages in performing a pilot auction in order to refine the auction process. Several countries utilized a pilot auction followed by one or more significant auctions. A pilot may be particularly useful for the relatively small proportion of the population in currently unserved or underserved areas of the U.S.[58]

IV. Key Aspects of Creating a Fair, Efficient, and Balanced Universal Service Auction Process in the United States

In concurrence with consideration of lessons from foreign auctions, there are several key issues to evaluate in order to create a fair, efficient, and balanced universal service auction process in the U.S. Among the most important of these issues are: 1) The choice of the level of geography for the auction; 2) Whether to employ a winner takes more (rather than winner takes all, or everybody wins) approach; 3) Whether to continue to tie the receipt of payments to a carrier of last resort ("COLR") obligation; and 4) Whether to allow consortium bidding, but to recognize the likely reduced incentives for lower bids under consortiums and/or combinatoric bids. We

---

[56] *See id.* ("The technology of choice for the network deployed was a combination of VSATs and wireless local loops"); Proenza October 2005, with a section heading entitled: "Technology Neutral Contests Favor Wireless for Rural Areas" (this includes VSAT and WiFi).

[57] While not specifically addressed in any of the literature, part of this effect may be due to auctioning off lower valued (smaller population or more costly to serve) areas in later rounds.

[58] The disadvantage of limiting a pilot to such areas is that the results will be less analogous to auctions for areas where infrastructure does exist. However, foreign experience may be relevant to creating infrastructure investment where none currently exists.

also consider the issues of: minimum service levels, service features, minimum levels of payments, non bids areas, possible lessons (and differences) from spectrum auctions, length of term, and other issues.

A. Identifying the Appropriate Size and Basis of Geography

The choice of geographic area by which to provide universal service funding, via subsidy auction or any other method, is critical. Ideally, the geographic area chosen should be competitively and technologically neutral; however, practical aspects of dealing with independent (i.e., non-carrier based) levels of geography may require the use of a non-neutral unit of geography (e.g., the land-line wire center). Any competitive or technology bias in the unit of geography should be considered (as a form of a *quid pro quo*) when dealing with required coverage, transition periods, and/or service standards; it is critical to avoid compounding a technology bias in the selection of geography with a bias towards that same technology in other dimensions of the auction-USF process.

1. Size of Geography for Subsidy Auctions

Theoretically, the smallest geographic area possible should be used for determining universal service subsidy payments. While implicit cross-subsidization will, as a practical matter, exist with any geographic averaging, smaller geographic areas better satisfy the statutory requirement of making subsidies explicit (rather than implicit).[59] The larger the geographic area, the greater the likelihood of implicit cross-subsidies between lower and higher cost areas.[60] One implication of reducing or eliminating implicit cross-subsidies is that without caps or other constraints on total support amounts (*e.g.*, affordability or cost benchmarks), the use of a smaller geographic area, for any given method of determining a subsidy, would cause the total calculated

[59] Section 254(e) of the Communications Act, as amended, provides that federal universal service support "should be explicit and sufficient to achieve the purposes of this section." 47 U.S.C. § 254(e).

[60] The seminal article providing a precise definition of cross-subsidy is Gerald R Faulhaber, "Cross Subsidization: Pricing in Public Enterprises," 65 *American Economic Review* 966 (1975. For a discussion of cross-subsidies specifically in telecommunications, *see generally*, Steve G. Parsons, "Cross-Subsidization in Telecommunications," 13 *Journal of Regulatory Economics* (1998). *See also*, Steve G. Parsons, "Laffont and Tirole's Competition in Telecommunications: A View From the U.S." 9 *International Journal of the Economics of Business* 419, 431 (2002) (noting that "the FCC has made slow and limited progress in meeting the Telecommunications Act's objective of making universal service support explicit.").

explicit subsidy to increase.[61] Indeed, some analysts of the subsidy auctions in foreign countries have suggested bundling geographic areas together to create implicit subsidies to minimize payments. However, such implicit subsidies violate the explicitness required by the Telecommunications Act in the U.S.[62]

The size of the existing geographic units (states for non-rural carrier funding, and ILEC study areas for rural carrier funding) have a critical effect on the political and practical palatability of a subsidy auction. Consider first the non-rural incumbent LEC funding. While it targets support to wire centers, funding qualification is based upon the use of the state as the geographic entity at which wire center costs are averaged, compared to other states, and the need for funding determined. As such, it assumes that state commissions will create explicit intrastate mechanisms to eliminate implicit geographic subsidies between higher- and lower-cost wire centers served by non-rural ILECs within the state.[63] This averaging has the effect of keeping the size of the federal fund, currently estimated at $291 million for 2005,[64] low. If funding were to change (without a move to auctions, or without any other change in revenue benchmarks or other offsetting adjustments) to carrier funding (rather than an aggregation of carrier wire centers within the state), we estimate the non-rural funding for ILECs would nearly double. If, instead, funding were to change to the wire center (*i.e.*, all high-cost wire centers would receive support – even those located on lower average cost states), we estimate the non-rural funding for ILECs would grow to over $2 billion, a nearly seven-fold increase to the current fund size.[65]

There is however, a critical universal service funding spillover effect. As the federal funding level requirements increase as the size of the geographic area to determine funding decreases,

---

[61] Consider the following simple example. The current ILEC study area is comprised of two wire centers, A and B. Average customer revenues are $20 for each area, A has a monthly cost of $15 while B has a monthly cost of $35, with an average of $25. A and B each have 1,000 customers. A calculation of the required universal service subsidy for the entire service area is 2000*$5 = $1000/month. However, the required subsidy at the wire center level is $0 for A and 1000*$15 = $1,500/month, an increase of 50%.

[62] *See* 47 U.S.C. §§ 254(b)(5) (requiring "specific" support mechanisms); 254(e) (requiring "explicit" support mechanisms).

[63] In part because many states have not created their own high-cost support mechanisms, such implicit subsidies continue.

[64] Universal Service Administrative Company 2005 Annual Report at 39, http://www.usac.org/_res/documents/about/pdf/annual-report-2005.pdf (reflects funding for both the ILECs and CETCs in the non-rural areas).

[65] These estimates assume that current benchmarks are utilized to determine support eligibility.

there should, in theory, be a corresponding decrease in the amount of funding required within a state (at least in those states where an explicit mechanism was created) due to the further elimination of implicit subsidies. In other words, as any federal system moves to a lower level of geography, it reduces implicit subsidies states would need to make explicit.[66]

For rural incumbent LEC funding, the increase in the proportion of required funding is likely to be of much smaller magnitudes for changes to smaller units of geography for at least three reasons. First, rural incumbent LEC funding already generally occurs at the individual company study area (rather than at the state level), so that high-cost carriers in low-average-cost states can be eligible for support. Second, a number of rural incumbent LECs maintain numerous study areas in a given state and therefore already receive support for smaller geographic areas.[67] Third, although some rural incumbent LECs have several million access lines, most rural incumbent LECs are smaller companies that have a smaller number of wire centers for which there could exist implicit cross-subsidies. Still, with no other change to funding standards or approach, there would be some increase in the required level of funding if a change were made to move from the rural incumbent LEC study area to the wire center. This effect (to increase the calculated required funding) may be partially or totally offset by moving to reverse auctions or forward-looking cost-based support mechanisms.

2. <u>Basis of the Geographic Area for Subsidy Auctions</u>

In order to be competitively neutral, the proposed geographic structure should NOT be based on any particular carrier area (whether wireless or landline); it should be based on an independent basis such as zip code, census tract, census block group, county, or metropolitan or rural statistical area (MSA, RSA).[68] Such a geographic area should also be relatively static.[69] An

---

[66] Of course, this observation is premised on no other methodological changes – such as with cost inputs and benchmarks -- that could lower federal support.

[67] High-cost loop support and local switching support are based on a rural incumbent LEC's embedded costs averaged at the "study area" level. *See* 47 C.F.R. §§ 36.601-36.631. CenturyTel, for example, operates in 18 study areas in Wisconsin. *See* Universal Service Administrative Company, Federal Universal Service Support Mechanisms Fund Size Projections for the Third Quarter of 2004, at Appendix HC01 (filed Apr. 30, 2004).

[68] An interesting option may be to allow states to combine census blocks in some contiguous fashion to develop independent (not necessarily reflecting land-line or wireless) "service areas" — a process like creating voting districts.

[69] One disadvantage of zip codes is that they are more likely than other boundaries to change over time.

additional advantage of these boundaries is that they are public in nature, although perhaps not relevant to provider operations.

While an independent geographic unit is theoretically appealing in order to satisfy the principle of competitive neutrality, each of these units has practical disadvantages. None of the independent geographic units necessarily corresponds to landline or wireless service areas.[70] The smaller levels of independent geography, such as census tracts and census block groups, are large in number. The larger geographic units, such as MSAs/RSAs, will lead to problems of lack of complete coverage for many potential bidders. Many smaller telecommunication providers will not provide coverage to an entire state, county, MSA, or zip code. In such instances, the provider could only practically bid via: 1) planned expansion (as competitive ETCs have done to provide service throughout an incumbent's service area); 2) a consortium bid; or 3) the use of UNEs (which rural LECs are often not required to make available to competitors).

As a practical matter, there are three choices of non-independent, provider-oriented geography: 1) ILEC service area (as exists today); 2) ILEC wire centers (WCs); and 3) wireless carrier service areas. Each of these has its own advantages and disadvantages.

Carrier service areas are often not as small as would be optimal to make subsidies explicit. Moreover, carrier service areas may be too geographically broad to allow a competitor to have sufficient coverage to qualify as a bidder (other than through a consortium). This will be especially true for mobile wireless carriers and non-rural incumbent carriers, whose service footprints cover large portions of a state and may have little correspondence with footprints of other carriers. While "redefinition" of serving areas to rectify these problems is possible, in practice it is our understanding that this process has proven both difficult to achieve and tedious.

Incumbent wire centers provide an alternative and are much smaller in size than the entire service footprint of a carrier. Wire centers also have the advantage of being less likely to face

[70] Indeed, this is what makes them independent.

the problem of insufficient coverage.[71] However, since they are determined by the ILEC's facilities, wire centers are not competitively neutral (*i.e.*, they are biased in favor of landline technology). Additionally, wire centers are large in number and have the potential to increase the size of the universal service fund (vis-à-vis the same funding approach at a larger geographic level). However, given the potential for auctions to reduce subsidy payments, it is certainly possible that an auction process at the wire center level could generate a smaller fund than the current system at the ILEC service area. Finally, wire center boundaries also are not in the public domain. If funding were to change to the wire center level, it will be necessary to require incumbents to provide wire center boundaries in some standardized, electronic form.

If a carrier or technology-biased geography is chosen (such as landline wire centers or wireless license areas), adjustments could be made to provide some *quid pro quo* for the competing carriers. For example, in order to receive funding, coverage requirements could be relaxed or phased in for competing carriers. Alternatively, the level of geography could favor one technology while service definitions favored another technology. It is important to avoid choosing a geography that is biased in favor of a technology, and then compounding the bias by establishing service characteristics favoring that same technology.

B. Winner Gets More

In designing a reverse auction mechanism for distributing high-cost universal service support in the U.S., it is important to balance creating incentives to submit low bids with avoiding the creation of artificial competitive advantages for the winner. As we discuss below, this balanced approached can be achieved by employing a "Winner-Takes-More" system; higher bids are in essence penalized with a lower percentage of payment. Before we discuss the "winner takes more" concept in greater detail, we first discuss and eliminate two other possible auction designs: (1) "Winner Takes All"; and (2) "Everybody Wins".

Standard auctions for assets (including spectrum auctions) are virtually always winner takes all. The primary reason for this is that the efficient use of resources is contingent on the clear and

[71] Certainly, some remote wire centers will not have sufficient coverage by another provider, but this should occur for a far smaller proportion of wire centers than for ILEC service areas.

unique assignment of property rights for each asset. Assignment of the property rights for an asset to multiple parties is often difficult to specify contractually, especially dynamically, and is likely to be less efficient than unique assignment. However, a subsidy auction does not provide for the sale of an asset; rather it provides for the rights of participants to receive a subsidy payment. Therefore, a subsidy auction does not meet the classic requirements for the claims of superiority of winner takes all.

The original economic literature on reverse auctions for public utilities contemplated a method of competition for the field, rather than competition in the field. This literature presumed natural monopoly and either a lack of economic viability for entry or preclusion of entry. The original literature contemplated a contract that would include reassurances of cost recovery and protection from competition to the party making significant new capital investments in infrastructure.

The advantage of such a winner take all system is that it creates strong incentives to submit low bids. However, the assurances of universal service funding exclusivity that a winner takes all auction provides are inconsistent with the provisions of the Telecommunications Act that require the removal of entry barriers to local telecommunications markets and the extent of competition now existing in significant portions of the United States. A winner takes all bidding system creates an artificial competitive advantage to the winner. This would have the effect of artificially dampening the competitive process, and likely reducing the number or geographic scope of competitors.[72] We therefore believe a winner take all program is contrary to sound public policy and contrary to the Telecommunications Act.

Consider for a moment an alternate "everybody wins" approach where every bidder is able to receive the same "winning" level of subsidy support as long as it meets the qualifications for bidding. In this case, there is virtually no auction-related incentive for firms to bid low; in

[72] *See, e.g.*, Peter Pitsch, "Reforming Universal Service: Competitive Bidding or Consumer Choice?", Cato Institute Briefing Paper No. 29, (May 7, 1997) (primarily objecting to subsidy auctions on the grounds that a winner takes all auction "requires giving a 'bonus' to the winner that could undermine local competition in high-cost areas to the detriment of customers.").

essence the low bidder "wins" nothing.[73]

The importance of, as well as the structure of, the rewards for lower bids or penalties for higher bids should depend in part on the specifics of the auction. Such incentives are important for sealed bid auctions, or for sequential (round) auctions if the increments are small (without jump bidding) and for auctions in which it is easier to remain a qualified bidder. Such penalties can take several forms. Consider the following possibilities (where "Payment" = the payment to a specific carrier for a specific geographic area; Win = the winning bid; Bid = the bid by that particular carrier, and Share = the percentage of numbers/lines served in the geographic area):

1) Payment = Win – (Win-Bid)/Bid. Here the penalty is a percentage reduction in the payment.[74] Consider a hypothetical example. The winning bid is $8; the winning bidder receives $8/line or number served. For another bidder, bidding $10, the winning bid is 20% below their bid; this leads to a payment for that bidder 20% below the winning bid (or .8*$8 = $6.40).[75]
2) Payment = Win – ((Win-Bid)/Bid)*Share. Here the penalty is a percentage reduction in the payment but also weighted by the share of customers of the winning bidder. For example, imagine the winning bid is $8 and the winning bidder serves a 50% share of the numbers in the auction area. An alternate bidder bidding $10 would be penalized by ($2/$10)*.5 or 10%; with a bid payment of $7.20.

The purpose of the market share adjustment value is to reduce gamesmanship opportunities available to providers with only a small share of the market. The adjustment value reduces the ability of carriers with small market share to substantially reduce the subsidy payments to its competitors. It may be appropriate to eliminate the share adjustment once the share reaches some value (such as 20%) and standardize the adjustment according to that value.[76] Obviously,

---

[73] We recognize the argument that the most efficient carrier in a market may nonetheless drive down bidding amounts with knowledge that it its cost of business gives it competitive advantages beyond universal service. *See* Comments of Alltel, WC Docket No. 05-337 (filed Oct. 10, 2006). However, this argument appears to assume complete knowledge about competitor cost structures. In addition, we do not believe such incentives alone are sufficient to make an "everybody wins" auction an attractive option.

[74] A percentage reduction is likely to be superior to a pure dollar reduction.

[75] By using the other bidder's value (rather than the winning bid) in the denominator, while payments are monotonically decreasing with bids, the payment would never be negative.

[76] With a 20% value, the penalty multiplier becomes (actual share/20%) for any value of actual share less than 20%; for any value greater than 20% the share multiplier becomes 1.0 and share is effectively removed from the

if a share adjustment is utilized, the payment calculations should be periodically revised to account for changes in share.

If a sequential round auction with small increments (and no jump bidding) is utilized, it may be important to have a discrete penalty for the second place bidder. Without such a penalty, once the bidding has collapsed to only two bidders, there is little incentive for either bidder to proceed. In such a case, consider a discrete penalty equal to at least two bidding increments. A sealed bid auction should not require such a discrete penalty.

It may also be important to establish a minimum payment in order to avoid creating too strong an advantage to those providers that were eligible to bid at the time of the auction. This payment should apply to all qualified carriers, regardless of whether they were eligible to bid during the original auction. The minimum payment should obviously be below the winning bid, but not so low as discourage later entrants from providing service. It is difficult to determine the actual value of the minimum bid, but a value between 60% and 75% of the winning bid seems reasonable. An additional benefit of a minimum payment is that it mitigates the market distorting effects of a mechanism that does not give equal per line support to all competitors.

An additional advantage of "winner takes more" (compared to "winner takes all") is that problems related to transition from the old funding mechanism and the possible sale of infrastructure are greatly diminished. With "winner takes more", it is far less likely that an actively bidding market incumbent would wish to abandon a territory or sell infrastructure. This advantage is more pronounced with the use of smaller geographic units of auction.

While other mechanisms could be utilized, the key is to find a balance between creating incentives for low bids, avoiding low subscriber base providers from gaming the process to disadvantage larger providers, and retaining incentives for additional providers.

C. Eligibility and Obligations

---

formula. With a 20% standardization, if the winning bidder had a 10% share of lines/numbers in the auction area, the winning bid was $8, and the alternate "losing" bid was $10, the "losing" bidder would receive a penalty of ($2/$10) multiplied times the share adjustment which in this case is .5; therefore the alternate bid of $10 receives a payment of ($2/$10)*.5 or $7.20.

The importance of selecting a neutral level of geography and establishing a balanced approach for the selection of winners cannot be discounted. Equally important is establishing the responsibilities that come with ETC status.

1. Carrier of Last Resort Obligation

By its very nature, universal service is intended to facilitate the provision of telephone service in all areas of the country. Tied to this concept are carrier of last resort obligations. Under the current system, every ETC assumes a COLR-like[77] obligation, and receives funding, via USF, to recover some of the costs associated with a COLR obligation.[78] In order to demonstrate a commitment to a designated area awarded in an auction, carriers, regardless of technology, should also commit to submitting a Service Improvement Plan[79] in accordance with the March 17, 2005 Order. COLR and universal service naturally go hand in hand; that is those who accept universal service funding in an area agree to provide reasonable access to service across the geographic area of funding. This link between COLR and USF should continue under a system of subsidy auctions; however, issues will arise depending on the level of geography of bidding vis-à-vis the geographic coverage of the providers. For example, if bidding occurs at the county level, there will be some counties for which there is not a single provider that has geographic coverage for all customers in a county (although a consortium may provide full coverage). In such a case, it would be difficult without a transition period for any single provider to immediately accept the COLR responsibility for the entire county – just as newly designated ETCs today are given a period of time to offer facilities-based services throughout a designated service area. Also, as noted above, relaxed coverage requirements and transition periods may be

---

[77] *See* March 17, 2005 Order at para. 22 (requiring an ETC applicant to demonstrate capability and commitment to provide service throughout its designated service area to all customers upon a reasonable request for service).

[78] Federal-State Joint Board on Universal Service, CC Docket No. 96-45, Report and Order, 20 FCC Rcd. 6371 (2005).

[79] 47 C.F.R. § 54.202(a)(1)(A): submit a five-year plan that describes with specificity proposed improvements or upgrades to the applicant's network on a wire center-by-wire center basis throughout its proposed designated service area. Each applicant shall demonstrate how signal quality, coverage or capacity will improve due to the receipt of high-cost support; the projected start date and completion date for each improvement and the estimated amount of investment for each project that is funded by high-cost support; the specific geographic areas where the improvements will be made; and the estimated population that will be served as a result of the improvements. If an applicant believes that service improvements in a particular wire center are not needed, it must explain its basis for this determination and demonstrate how funding will otherwise be used to further the provision of supported services in that area.

warranted on the basis of a level of geography for bidding that are biased in favor of one technology.

2. Bidder Eligibility

In order to ascertain the qualification of a carrier to meet COLR-type obligations and other responsibilities that come with ETC designation, a minimum set of standards needs to be established.

Bidders should demonstrate technical competence sufficient to satisfy the bid. The current eligible telecommunications carrier (ETC) qualification requirements appear to be a reasonable starting position.[80] In order to facilitate the kind of competitive bidding necessary to sustain a competitive auction, the process by which carriers are designated ETCs may need to be streamlined. Such a streamlined process will not only promote more bidding in reverse auctions, but will allow those carriers willing to take on the obligations associated with ETC designation to serve the public in that capacity sooner.

3. Service Definition (Minimums)

As part of the Auction process, the bidders must know what is being bid upon. At a minimum, the service definition should include the following:

Quality of Service and Consumer Protection Rules. A widely accepted standard must be used to frame what consumers will expect from a designated carrier providing universal service in their geographic area. It is reasonable to use the current ETC Rules[81] where a designated carrier or applicant for ETC must:

> "… demonstrate that it will satisfy applicable consumer protection and service quality standards. A commitment by wireless applicants to comply with the Cellular Telecommunications and Internet Association's Consumer Code for Wireless Service will satisfy this requirement. Other commitments will be considered on a case-by-case basis." [82]

As noted above, there may need to be adjustments to quality of service standards if the choice of

---

80 March 17, 2005 Order at 6380-6385.

81 *Id*.

82 March 17, 2005 Order at 6383.

the level of geography is biased in favor of one technology. As such, it is critical that other dimensions of qualification not also be biased in favor of that same technology.

Service Features. The current definition of supported services contained in §54.101 of the FCC's rules[83] provides a good starting point. In the future, it may become necessary to modify this definition. As noted above, it will be critical that a revised definition of supported services not bias wireline or wireless technologies. It also will be important that any revised service definition not compound any bias created due to the choice of geography. Moreover, the definition of supported services should not be so stringent as to effectively deny consumers access to any supported services (*e.g.*, requiring a service that technically cannot be provided in certain areas, thereby denying consumers in those areas access to another service they may nonetheless desire).

Legal Eligibility. Section 214(e) of the Telecommunications Act provides the mechanism by which the FCC and state public utility commissions assess carrier eligibility for universal service funding.

4. Minimum Service Standard Enforcement

Determining what is being auctioned and the responsibilities and obligations of the winner or other bidder eventually receiving funding is critical to a well designed subsidy auction. In order to continue to receive funding, carriers must continue to meet eligibility and service requirements including quality of service and COLR obligations discussed above. Regular reporting to either the FCC or state commissions on service quality, requests for service, and service improvement plans should continue in an auction environment. State commissions that have adopted the common carrier ETC rules established by the FCC should continue to require them for designation and continued compliance. These issues are important to ensuring a successful universal service auction. Consideration also should be given to enacting penalties for non-compliance and if and how auction rights could be terminated.

D. Lessons from Spectrum Auctions

[83] 47 C.F.R. § 54.101.

In addition to *qualification standards* established in FCC spectrum auctions, there is significant experience to be drawn on in *other areas* of designing and running auctions. This experience would be highly valuable in a reverse auction. In particular, experience in minimizing the potential for collusion and price signaling would be valuable. There are, however, critical differences between a spectrum auction and a subsidy reverse auction. The key distinctions include: 1) A spectrum auction is a wireless technology event while a subsidy auction will deal with multiple technologies; 2) By its nature a spectrum auction is intrinsically tied to investments in new capital infrastructure; the link may be weaker for incumbent carriers in a U.S. subsidy auction; 3) There are likely to be fewer, and in some instances far fewer bidders for many subsidy auction locations - this has implications for determining whether the process is sufficiently competitive in any given area and when and how to employ maximum bids. Because of these distinctions, the FCC (or any state commission considering a subsidy auction) may wish to consider alternate auction structures vis-à-vis the process used for spectrum auctions.

1. Consortium Bidding

In the interest of balancing the importance of choosing a neutral level of geography with allowing bidders with varying levels of geographic reach to compete, consortium bidding should be explored.

Consortium bids may make sense in order to account for the possible mismatch of the geography selected for the auction and the footprint of providers. The larger the geographic area that is being auctioned, the greater the possible need of consortium bids. However, consortiums can be difficult to organize for three reasons: (1) Each participant may have an incentive to bid higher than if there were no consortium in order to capture a larger share of the joint subsidy payment[84]

[84] Imagine that Carrier A would be willing to bid as low as $100,000 per year for support for wire center A, and similarly Carrier B would be willing to bid as low as $100,000 per year for support for wire center B. In economics, such an ultimate level is known as a "reservation price". During the bidding, the other leading bidder is large carrier L, making a combined bid for both wire centers A and B of $250,000 per year. If Carrier A suspects that Carrier B's reservation price is as low as $100,000, then Carrier A may attempt to bid at some otherwise higher level (e.g., $140,000) hoping that Carrier B would be forced to bid closer to the reservation price of $100,000 in order to allow both A and B to win the bid. Obviously, the larger the geographic coverage of the combined bid, the greater the "free rider" problem of higher bids by smaller geography providers.

indeed, in auction theory this is called the "threshold problem"[85] and it is similar to the well known principal-agent problem or the free-rider problem;[86] (2) There are bargaining and coordination costs for the consortium; and (3) There may not be a viable consortium with complete coverage of the area. These factors provide additional reasons to tend to choose smaller, rather than larger, geographic areas for a reverse auction.

2. Combinatorial Bidding[87]

The concept of combinatorial bidding has gained increasing attention in recent years.[88] Such a form of an auction can be important when bidders have infrastructure expansion plans that are contingent on the results of an auction. More specifically, combinatorial bidding could be important when winning the auction would trigger new infrastructure investment, and when there are non-trivial economies of scale and scope associated with the geographic area "won". The greater the likelihood of a reverse auction leading to new infrastructure investment and the greater the potential economies of geography (economies of scale and scope across lager geographic areas), the greater the benefits of combinatorial bidding. In circumstances in which no new infrastructure would result due to the auction process itself, then each bidder can bid based on its own achievable economies with its own existing infrastructure. That is the absence of combinatorial bidding does not preclude bidders from realizing and bidding based upon their own economies.

As noted above (in the discussion of the difficulties of creating an effective consortium of bidders), large combinatorial bids, *i.e.*, bids combining a large number of geographic areas is

---

85 See, M. M. Bykowsky, R. J. Cull and J. O. Ledyard, "Mutually Destructive Bidding: The FCC Auction Design Problem", 17 *Journal of Regulatory Economics*, 205, 228 (2000). See also Sven de Vries and Rakesh Vohra "Combinatorial Auctions: A Survey" manuscript December 1, 2000 available at: http://www.ima.umn.edu/talks/workshops/12-3-5.2000/vohra/comauction.pdf

86 See generally, W. Bruce Allen, et. al., Managerial Economics: Theory, Applications, and Cases 671-711 (W.W. Norton pub., 6th ed) (2005). *See also*, the treatment in Wikipedia available at http://en.wikipedia.org/wiki/Principal-agent_problem and http://en.wikipedia.org/wiki/Free_rider_problem.

87 Combinatorial bidding refers to placing a single bid for a combination of geographic areas; the bidder either then wins or loses the bid for that entire geographic area.

88 For technical aspects of combinatorial bidding, *see generally*, Combinatorial Auctions, (P. Crampton et. al ed) (MIT Press), 2006. Part V describes auctions for airspace systems resources and bus routes; Sven de Vries and Rakesh Vohra "Combinatorial Auctions: A Survey" (unpublished manuscript December 1, 2000) http://www.ima.umn.edu/talks/workshops/12-3-5.2000/vohra/comauction.pdf. Combinatoric auctions for radio spectrum rights were proposed as early as 1976. C. Jackson, "Technology for Spectrum Markets" (Ph. D. Thesis submitted to the Department of Electrical Engineering, School of Engineering, MIT, June 1976).

likely to reduce the incentives for providers in small geographic areas to bid low in a reverse auction. This may dampen the incentives for large bidders to bid low as well.

Moreover, the use of "winner takes more", rather than "winner takes all" reduces the importance of combinatorial bidding. With "winner takes more", any active bidder for a given geographic unit will be assured of receiving some level of support and can garner any economies of scale and scope associated with that geographic unit.

3. Competition and Maximum Bid Levels

Two important issues with any auction are: (1) Whether the auction is sufficiently competitive; and (2) Whether collusion or price signaling is occurring. At this point, we will not attempt to fully develop a mechanism for determining whether the auction process is sufficiently competitive. Rather, we do suggest that one mechanism to help ascertain the acceptability of a wining bid is the use of forward-looking cost estimates. That is, the winning bid should be consistent with that which would result from the use of the forward-looking cost estimate. We note that significant advancements in forward-looking cost modeling have occurred over the last decade to make such a methodology a closer proxy for the realizable economic costs of an efficient carrier. If the winning bid is significantly different from the modeled value, we would be concerned that the process is not working effectively. However, it is important that the forward-looking cost estimates are, to the extent practical, reflective of the costs an actual entrant would achieve, and not simply a calculation of the costs of a hypothetically hyper-efficient entrant (the FCC itself has expressed concern in this regard).[89] One addition to this process to help assess bids is the use of a range of input values in developing the forward-looking cost

[89] *See In re Review of the Commission's Rules Regarding the Pricing of Unbundled Network Elements and the Resale of Service by Incumbent Local Exchange Carriers*, WC Docket No. 03-173, Notice of Proposed Rulemaking, at ¶ 50, *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-03-224A1.doc (rel. Sept. 5, 2003) ("In the real world, however, even in extremely competitive markets, firms do not instantaneously replace all of their facilities with every improvement in technology. Thus, even the most efficient carrier's network will reflect a mix of new and older technology at any given time."); *See also Id.* at ¶¶ 4,7 (the hypothetical nature of TELRIC caused the FCC to conclude: "Part of the difficulty that states and interested parties have encountered springs from the excessively hypothetical nature of the TELRIC inquiry. Because of the general nature of our rules, state commissions have wide latitude in applying the "most efficient technology" standard under the current rules. This creates the potential for a TELRIC proceeding to become a "black box" from which a variety of possible rates may emerge. In the absence of more specific guidance, this can make network modeling opaque and make it difficult to understand how actual UNE rates are derived.").

estimate; similar to a monte-carlo exercise[90], this process would provide the reasonable range for the cost to serve an area.

Regardless of the mechanism, it is critical to break the link to a pure embedded-cost-based subsidy mechanism that exists today. Pure embedded cost plus recovery mechanisms provide incentive mechanisms that are simply inferior to those under incentive regulation mechanisms.

4. Non-bid areas (either designated or lack of bidders)

Areas with no bidders or indications of an insufficiently competitive bid are of special concern. One option is to continue the current funding mechanism, with the incumbent retaining the COLR obligation. This of course would have the effect of greatly dampening the incentive for existing ETCs to provide low bids.

At the other extreme is the option of eliminating the subsidy payment to such a jurisdiction. This option obviously creates strong incentives to provide competitive bids but may not pass muster for the FCC to meet its statutory obligation to create a "sufficient" universal service mechanism.

An alternative is to provide funding at forward-looking cost values. This could be done with a transition period, and perhaps with the end point being the forward-looking cost calculations using input values within the reasonable range for all key inputs. This would provide for one measure of sufficient support and would retain some incentive for low bids by participants.

E. Length of term

The optimal length of term of an auction result should be a balance between minimizing risk corresponding to any additional investment required (for which the optimal length is the economic life of the new investments), accounting for dynamic effects and technology changes in the future (the time frame for which is, by nature, unknown), and minimizing the potential for collusion and signaling among the parties (in game theory, repeated games tend to have different results from non-repeated games). Additionally, the administrative costs of the auction must be weighed against the benefits of shorter terms (the more costly the process, the less frequent the

[90] A Monte Carlo process involves stochastic simulations given an underlying probability distribution for key inputs. See, e.g., http://en.wikipedia.org/wiki/Monte_Carlo_method.

auction). Finally, the length of the term should also depend on the initial transition period. A longer transition period implies a shorter period for the full auction results to be in effect. On balance, a reasonable period may be a three year transition and three years of full auction effects to follow. Subsequent periods could be 5 years in length.

F. Transition plan

In order to maintain service to all areas of the country and to provide a sufficient universal service mechanism, a transition period should be considered. In particular, a transition may be necessary when an existing competitive or incumbent ETC does not win the bid. However, it is critical that any transition not distort the critical incentives for low bids by all potential providers. Therefore, any transition should incorporate the incentive structure of the winner takes more approach. For example, imagine a six month grace/implementation period at the end of the auction during which time universal service subsidy payments remain at the level under the old pre-auction system. Further, imagine a three year time period during which the auction payments move linearly from the old subsidy payments per line/number to the new values.[91] Such an approach should preserve the incentives to participants to provide low bids while also allowing all participants time to adjust business plans (*e.g.*, it will provide the winning bidder the time to build out its footprint, if necessary, to assume it's COLR responsibilities) and for state regulators to make any adjustments necessary.

Ideally, a successful and competitive universal service subsidy bidding process in a geographic area would coincide with a modification of the regulatory treatment of the incumbent. Specifically, at a minimum, a non-winning incumbent should receive relaxed regulatory treatment (for example, in the area of end-user rate regulation). Without such actions regulation will continue to distort the competitive process, distort the choices customers make, and distort investment and other business decisions.

G. Other Issues

[91] For example, consider an example where the old subsidy payment was $18, the winning bid is $10 and the "losing" subsidy payment is $8. Therefore, there is a required $8 eventual change required for the winner, and a required $10 eventual change required for the winner. During year one of the transition, the subsidy value for each participant is 25% towards the new value; for the winner this is $18 - .25(8) = $16; for the loser this is $18 - .25($10) = $15.50. The transition for the winner is therefore $16, $14, $12 and by the beginning of year 4 at the $10 value; for the losing bidder the transition is $15.50, $13.00, $10.50 and $8 by the beginning of year 4.

There are number of additional issues that must eventually be considered in order to create a fair, balanced, and effective universal service auction funding system. While we do not address in detail the specifics of each issue, we mention the following issues for completeness.

1. Jurisdictional Conflicts

To be truly functional and effective, the Federal and State funding should be addressed simultaneously and consistently. Consider the case where there is no coordination or where the State defers any change to the future. A new carrier may win the bid for Federal funding, yet at the state level, the existing carrier retains state funding. Such inconsistencies would likely reduce the effectiveness of an auction process.

2. Regulation Differences

Ideally, all bidders would be on an equal footing in their regulatory treatment. Without eliminating the differing regulatory treatment for different carriers, some carriers may have an artificial regulatory advantage in the process over other carriers. In competitive markets, for example, it would be appropriate to eliminate regulatory constraints (such as artificially low tariffed end-user rates) and regulatory benefits (such as artificially high tariffed intercarrier charges) particular to incumbent carriers.