Reverse Auctions Panel Presentation to the Joint Board on Universal Service
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February 20, 2007

The proponents of Reverse Auctions for universal service converge on no single policy dimension – not the number of auction winners, the geographical size or boundaries to be auctioned, not the duration of the auction licenses, not the auction method, and not the scope of the service to be auctioned. The only thing they seem to agree about is that there are significant potential savings in moving from the current USF system to a reverse auction mechanism.

Yet, the only purported evidence of these savings is offered by Professor Thomas Hazlett. I will focus on his analysis, as it raises numerous troublesome issues for reverse auctions and presents a misleading picture of a "wasteful" USF. My analysis consists of three sections: 1) problematic satellite cost data; 2) misleading coverage data; and 3) concluding implications for reverse auctions.

I. Satellite Cost Data – Unrealistically Low

Professor Hazlett provides the following table showing potential savings by moving from current USF to a satellite-based telephone service for reaching high-cost households. He says it illustrates the savings that can be achieved through auctions.

Table 1: Professor Hazlett's Table 6 of Potential USF Reductions

TABLE 6
HCF SAVINGS FROM SATELLITE PHONE SUBSIDIES TO UNSERVED HOUSEHOLDS

Unserved Households	Subsidy Cost	Dollar Savings	% of Current HCF
1 million	$664 million	$3.070 billion	82
2 million	$1.328 billion	$2.406 billion	64
3 million	$1.992 billion	$1.742 billion	47
4 million	$2.656 billion	$1.078 billion	29
5 million	$3.320 billion	$414 million	11

There are a number of assumptions required for this table. As Professor Hazlett points out, he uses posted retail prices from satellite telephony providers, thus omitting potential discounts available through mass purchases. On the other hand, he makes no attempt to determine whether the satellite capacity is available, at current costs, to serve the increased number of subscribers represented in the table. Globalstar currently has

250,000 active users and Professor Hazlett's table represents an increased user base between 400% and 2000%.[1]

He makes no attempt to determine how long these satellite costs are sustainable for. The current satellites are nearing the end of their expected 7.5 year lifetime and new satellites are expected to begin launching in 2009 which would have a 15 year lifetime. However, expectations have not always been fulfilled in this industry – Globalstar's current operations are based on the fact that $3.3 billion worth of satellite investment was purchased for $43 million after bankruptcy. The future economics of this technology are unclear.[2] Any reverse auction mechanism will need to deal with uncertainties about future capacity, cost, and availability. In the event that an auction winner defaults on its service delivery, some fallback mechanism must be in place.[3]

In addition, the following adjustments must be made to Professor Hazlett's estimated cost savings:

1. He uses a $664/household cost for the satellite replacement. This is based on the published $864 Globalstar price (which appears to be accurate and includes the fixed phone receiver rental plus 600 minutes of domestic usage), net of $200/year that subscribers currently pay towards their local service. But, is 600 minutes (even with the extra 300 minute bonus) an adequate replacement for current wireline service? The FCC estimates *daily* wireline usage at 56 dial equivalent minutes (DEMs) per day of local usage and 15 DEMs per day of toll usage.[4] DEMs are the correct usage measurement, and not conversation minutes (which are half of the DEM figure) since satellite minutes count as usage whether they are originating or terminating minutes. At this average usage figure, subscribers would require 20,440 minutes of annual usage. Globalstar offers a 16,800 annual minutes plan (with additional bonus minutes, the total is 25,000 minutes/year) for $3300/year. This increases the satellite cost by $2700 per year, virtually eliminating the savings estimated by Professor Hazlett.

2. Consideration of long-distance calling would reduce the savings even further. With the 16,800 minute plan, the average cost per minute is $0.13. The FCC reports that average domestic interstate rates fell to $0.06 per minute in 2004. So, the long distance

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[1] See "Globalstar signs contract for new satellite construction," Globalstar New Release, December 5, 2006 for some data on Globalstar's current and planned satellite capacity.

[2] Further evidence concerning future satellite uncertainties comes from Globalstar's recent announcement that it might be unable to support two-way communications as early as 2008 ("Globalstar warns of satellite problems," TR Daily, Feb. 6, 2007). If Globalstar had won a reverse auction, it is unclear how its subscribers would be assured of continuous service in the event of technical or financial issues that cloud its future.

[3] This would seem to argue for multiple auction winners, since the failure of any one provider would leave other providers to take over carrier of last resort responsibilities. However, as discussed below, service quality considerations argue for a single auction winner, since it will be easier to monitor whether quality is adequate.

[4] FCC Trends, August 2003, which includes the 2001 DEM data – the last DEM data universally collected by the FCC. While some changes in usage have occurred over the past 5 years, these data are sufficient for the purposes of determining whether the Globalstar 600 minute plan is sufficient for the average universal service subscriber.

options available to Globalstar users entail higher long distance costs than currently paid by high-cost wireline subscribers.

3. More critically, Globalstar notes that the FAU-200 (the fixed phone unit that rents for $22/month – with a 36 month contract) "is a voice-only product. Data services, call forwarding and roaming are currently not available with this product."[5] It further notes that the operating temperature range for these units is -22ºF to +140ºF. There are many high cost regions of the US which experiences temperatures below the minimum of this range, and it is precisely at these coldest times that their telephone service is most critical. For subscribers that desire data service, Globalstar recommends the GSP 2900, priced at $2495 plus $199 for the data kit. While Globalstar lists a $87/month rental price for this unit, it must be realized that this requires a 36 month contract (essentially an interest-free loan for purchasing the product). Rental prices without fixed contracts are considerably higher.[6] How do we compare this with current universal service, which does not require a fixed contract? These considerations fall under "quality of service."

4. Quality of service is multidimensional. Even with the data-enabled satellite phone, the advertised speed is 9.6kbps. While broadband is not currently part of the universal service definition, most wireline phones exceed 9.6kbps data speeds. The RUS requires its borrowers to provide data speeds of at least 200kbps, with possible increases as technology changes. Current satellite technology cannot meet this standard.

5. Another quality dimension concerns call completion rates and dropped calls. In one study of satellite telephone systems, Globalstar was the clear winner, with an 84% first attempt call completion rate and a 37% dropped call rate under rural conditions.[7] The audio quality was rated to be comparable to the best digital cellular service. Current universal service policy calls for "comparable services at comparable rates" in high cost areas – this will need to be carefully defined *before* reverse auctions can take place.

If the definition of "quality" is fuzzy, then some auction bidders may bid lower than others by providing a different type of quality (e.g., wireless providers may offer mobility in exchange for lower quality service at particular residential locations). Their bids will then distort the support available to providers that may be offering higher quality service in other dimensions (e.g., wireline broadband providers ubiquitously servicing precise residential locations). Both services may attract consumers, so the market signals would be that the quality is sufficient to justify the price. However, there is no assurance that the reverse auction winning bid amounts will be sufficient for both of these dimensions.[8]

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[5] www.globalstar.com

[6] I could only find a monthly price of $169 for rental of the $749 handheld phone, from a local distributor.

[7] "Satellite Telephone Service Quality of Service Comparison: Iridium vs. Globalstar," Frost & Sullivan, July 25, 2002.

[8] The CTIA position that winners "take more" would make this worse: higher bidders would be penalized for requiring more support. Further, CTIA would have quality standards relaxed for wireless providers if wireline service areas are the basis for the auctions. This presents the situation where wireless providers may bid lower than wireline providers because they are relieved of the obligation to cover the wireline provider's service territory. These lower bids would then cause the wireline provider to receive less support

The result of these quality adjustments is that the "dollar savings" estimated by Professor Hazlett completely disappear if we require satellite phones to deliver anything resembling the quality of service provided by today's wireline networks. This is not to downplay this amazing technology – for application in areas where no other service is available, this service can be invaluable. But, as a replacement for today's wireline service, it comes up short.

Another way to view the limited potential "savings" associated with Professor Hazlett's satellite phone substitution approach is to examine how many study areas actually have per loop costs that are larger than the satellite alternative. I show this inTtable 2 below:

Table 2: Number of study areas and loops exceeding satellite cost benchmarks

	Cost > $864/yr (Hazlett base case)	Cost > $1944/yr. (including 16,800 annual minutes rather than 600)	Cost > $4644/yr. (16,800 annual minutes plus the additional cost of data-able access)
# study areas	179	23	3
# loops (national)	456,029	21,296	1,623

The few study areas with higher costs than these satellite benchmarks would still be receiving a different quality of service than currently. Evidently, there are few savings available by substituting satellite phones for wireline networks (unless we wish to redefine universal service). This underscores Professor Hazlett's mischaracterization of current USF as "cost-plus." As I have pointed out elsewhere, a more appropriate characterization is one of "cost-minus."[9] USF does not reimburse all of the costs incurred by rural ILECs. Rather, it is partial cost reimbursement, and subject to a number of oversight mechanisms. While current USF policy does not provide ideal cost-minimizing incentives, it does not eliminate incentives to reduce costs.

II. Alternative Technologies Coverage Data – Unrealistically High

A key assumption behind the table is that 95% of the population can be served by existing cable and wireless technology. 99% is given as the coverage of residential locations by cable TV providers. The FCC cites this figure (from NCTA), noting that it is controversial.[10] Aside from the accuracy of this figure, not all homes passed by cable can

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despite the fact that they would bear the carrier of last resort obligation to ubiquitously serve customer locations.

[9] "Cost-Minus Regulation: responding to Professor Hazlett on USF incentives," NTCA *ex parte*, WC Docket No. 05-337, filed Dec. 13, 2006.

[10] FCC, "Annual Assessment of the State of Competition in the Market for the Delivery of Video Programming," 12th Annual Report, 2006. More detailed consideration of definitional issues concerning "homes passed" can be found in *Advanced Telecommunications in Rural America*, NTIA, April 2000. Depending on whether the measures use occupied homes, housing units, TV households, or all households, NTIA finds that the availability of cable may range anywhere from 81% to 97%. More importantly, NTIA

receive telephone service through their cable system. According to the FCC, 86.3% of homes are passed by a cable system with 36 or more channels (this may provide some indication as to whether the system has the capacity to handle telephone service). Only 80% of cable systems offer high speed internet service, and at the end of 2004, cable telephone service (either through traditional circuit switched technology or VOIP) was available to 38% of the homes passed by cable. Thus, Professor Hazlett's assumption that 95% or more of homes do not need universal service because they are passed by cable service appears too high—perhaps markedly so.

Professor Hazlett assumes that wireless coverage exceeds 95%, based on data from ITU, the World Bank, and CTIA. This, too, appears high. The data does not indicate the ability to get an adequate signal at actual residential locations. It is likely that the actual coverage is considerably lower, given the myriad concerns associated with the placing of cellphone towers in residential areas. There are even websites devoted to documenting actual coverage of wireless networks (e.g., www.deadcellzones.com; www.cellreception.com). Definitional issues may account for the unreasonably high data cited by Professor Hazlett. For example, the ITU defines "coverage" as "if users had a mobile phone and a subscription, they would be able to use the service." This question is not location-specific. The user may be able to use the phone while commuting from home to work, but not in their home itself. Thus, actual coverage of residential *locations* by wireless providers cannot readily be determined. To the extent that coverage is less extensive than assumed by Professor Hazlett, his table of "savings" would need to be extended to larger number of households and would show lower potential savings, *ceteris paribus*.

Definitional issues concerning "coverage" would be critical for the design of reverse auctions (unless one adopts the CTIA position that wireless providers be relieved of coverage obligations).[11] Differing technological platforms complicate finding a single definition that will serve all competitive platforms, as well as serving rural America.

III. Implications for Reverse Auctions

The problem with reverse auctions is that it is difficult to distinguish between different technological options for provision of universal service. The service is multidimensional and great care will be needed to ensure that bidders are bidding for the same thing. This problem is exacerbated by considerations of political economy. There will be significant

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notes that broadband capability is far less widespread, particularly in rural areas, indicating that "Cable television service providers are generally unwilling to extend their cables into rural areas where the subscriber density is less than 10 per mile." (footnote 63)

[11] The CTIA position should be viewed in context – they advocate relaxing coverage obligations if wireline service territories are used to define the geography to be auctioned. As they point out, a more neutral geography is available, such as counties. However, they mention that using counties could run the risk of leaving uncovered areas since it may be difficult for any provider to arrange service to the entirety of some counties. The implication is that wireline service territories are probably the only practical geographical units to be auctioned – in that case, they call for relief of coverage obligation in order to "level the playing field." In reality, this tilts the playing field in favor of wireless providers by supporting them regardless of need, while reducing support to carriers bearing the true last resort obligations.

pressure to define the auction rules so that all current technologies and providers have an opportunity to "win." This is already evident by the submissions to the Joint Board. Parties lobby for favored definitions of coverage (*e.g.*, 90% of the potential population), quality (*e.g.*, voice grade service), time periods (*e.g.*, not to exceed 2 years), etc.

The many dimensions of universal service will require considerable foresight by regulators. Vagueness in any of these dimensions can jeopardize the goals of universal service. The only way to ensure that the most inexpensive provider or technology wins the bid is to make sure that the bids cover the same minimum requirements. Given that significant investments are required to provide service in high cost areas this means that regulators must forecast these requirements well into the future. This undermines many of the advantages of auctions – their ability to utilize the market to determine quality of service and permit the market to adapt to changing technological circumstances.

The literature on economic incentives stresses the difference between situations with single or multiple objectives. When multiple objectives are present then incentives for any single objective should not be too strong. Cost reduction is but one objective, and reverse auctions place a strong incentive on this dimension to the exclusion of the many other public policy objectives embodied in universal service. This is why spectrum auctions work comparatively well – the sole purpose of the auction is to permit the market to determine the use for spectrum resources, and the single dimension of the bid amount is sufficient for this purpose.[12]

The nature and variety of these issues sheds light on why reverse auctions for universal service have met with some success in greenfield environments but not where there is existing infrastructure. When support will be awarded for new investment, different interests may lobby for terms most favorable to themselves, but will only gain support upon investment of significant new resources. Under more built-out circumstances, different technologies have different investment patterns,[13] so auction support may be awarded that requires little additional investment, if the contract terms are appropriately defined. Thus, firms will expend additional effort at securing auction terms more favorable to their existing investments, a form of inefficient rent-seeking.

The ability of reverse auctions to reduce costs without sacrificing ubiquity and quality of service remains speculative. The current "evidence" on cost reduction is illusory, and quality of service dimensions are fraught with practical and political quagmires which are likely to undermine the potential benefits of auction mechanisms.

[12] A few of the other dimensions do arise in spectrum auctions, such as build out requirements, financial commitments and solvency, and special considerations for designated entities. The problems that have arisen in these cases foreshadow the much greater problems that are likely to accompany reverse auctions for universal service.

[13] For example, wireline telephone networks have sunk investments to reach almost all households, while mobile network operators have less sunk investment, and typically build along major roadways.