

Output-Based Aid in Mongolia Expanding telecommunications services to rural areas

By Andrew Dymond, Sonja Oestmann, and Scott McConnell

Access to telecommunications services has been extremely limited in the remote and sparsely populated areas of Mongolia. Several factors have conspired against achieving universal access on a purely commercial basis—the country’s vast and challenging geography, the nomadic lifestyle of the rural population, government ownership and incumbent control of the long-distance transmission network. As first steps in rolling out a universal access program, two pilot projects are bringing phone service to remote herder communities and both mobile phone and Internet services to rural villages. To support the delivery of these services, one-time subsidies were competitively awarded to licensed telecommunications operators in Mongolia. These are output-based subsidies: the winning bidders take on the investment risks of expanding their networks, receiving subsidy payments largely only after meeting service targets. The operators are obligated to continue offering the services for the duration of their 5-year service agreements without further subsidy.

Mongolia has the lowest population density in the world. Its population of 2.7 million is spread over a vast territory—featuring wide plains, high mountain ranges, and the Gobi desert. Its rural inhabitants, numbering just over 1 million, are spread very thinly. About a third of these live in 330 *soum* (district) centers. The rest are herders. Largely nomadic, they move with their herds between different summer and winter locations.

The country’s per capita GDP, though only around \$950, has doubled over the past four years thanks mainly to rapid growth in mining and tourism and the impact on the rural economy of better winter weather conditions. But significant urban-rural inequality has emerged, and many rural areas have seen their population decline by 10 percent or more in the past few years.

The telecommunications market was effectively liberalized by the early entry, in the 1990s, of two private mobile operators. These operators—one using the Global System for Mobile (GSM) standard and the other Code Division Multiple Access (CDMA) technology—account for more than 80 percent of all customer connections and more than two-thirds of sector



revenue. The mobile operators are growing much more rapidly than the partially privatized incumbent operator, Mongolia Telecom, which is facing market challenges in both voice and Internet sectors.

A third mobile operator won a license in 2006 and started offering services the same year, and a fourth was licensed in 2007. The incumbent operator offers wireless local loop service in many localities and is expected to secure a fifth mobile license in 2008. The plans of the mobile operators suggest that by the end of 2007 almost 200 of the country’s 330 *soum* centers will have at

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least one mobile service and 150 of them will have two. Most will offer the possibility of broadband access.

Toward universal access

When Mongolia conceived its universal access program in 2004, public telecommunications service in most rural areas was inadequate and unreliable. Service was available only at Mongolia Telecom offices in the soum centers and only during business hours. Until recently there was no service at all outside the soum centers.

Setting targets

The universal access program set specific targets, such as having at least one mobile or wireless operator in each soum center, offering broadband wireless Internet service in some soum centers, and, having at least public access telephone service in the country's 1,500 remote herder communities, or baghs.

To finance network expansion into rural areas, the country's Communications Law of 2001 had called for a universal service obligation fund. Later legislation stipulated that operators will contribute to the fund through a 2 percent levy on their taxable income starting in 2007. This fund was set up with the assistance of the World Bank through grants from the Public-Private Infrastructure Advisory Facility (PPIAF) and the Global Partnership on Output-Based Aid (GPOBA). The World Bank also provided seed financing of \$5.5 million for the initial universal access subsidy projects.

Designing pilots

Two pilot projects, supported by a \$259,400 GPOBA grant, were designed as the first steps in rolling out the universal access program:

- ◆ *Herder public access telephone network*—to provide public access telephones for herder communities in 27 baghs, spread among 6 soums in 2 provinces (*aimags*), Arkhangai and Bayankhongor.
- ◆ *Soum center wireless network*—to provide wireless voice and data services to one soum center in Tariat soum in Arkhangai, that had previously had only limited service. Besides providing mobile voice and Internet services to the public, including a commercial cybercafe, the operator's responsibilities include providing subsidized Internet access to the school for three years, with a declining subsidy.

The expected subsidies

The herder network pilot was estimated to require an average one-time subsidy of \$5,100–6,200 per herder

community served, with per capita subsidies ranging between \$5.28 and \$14.45, depending on location. This estimate was expected to provide the operator with a commercially sustainable rate of return after the one-time subsidy. The soum center wireless pilot was expected to require a total subsidy of \$63,000–73,400, or \$47.90–55.82 per inhabitant (table 2). The projections for both pilots were within the range of subsidies granted in similar output-based subsidy competitions in other countries (Chile, Peru, Uganda).

Cost-benefit studies using consumer surplus calculations showed that both pilots would yield positive economic returns on the subsidies. Economic analysis for the Internet service and school subsidies did not show immediate economic returns, but it is very rare in such cases to be able to demonstrate direct impacts in rural emerging markets. Instead, the investments represent “market seeding” to have economic benefits in the long run—with evidence of such benefits beginning to emerge in countries as diverse as Hungary, India, Peru, and Uganda—often as a result of “seeding” by OBA or other forms of assistance.

The bidding

Mongolia's Communications Regulatory Commission conducted separate minimum subsidy auctions for the two pilots. Each request for proposals specified the maximum allowable subsidy and included a draft service agreement. These agreements set out the schedule of subsidy awards: 20 percent on contract signature, 60 percent on meeting progressive targets, and the last 20 percent after nine months of successful operation. In addition, the agreements required the winning bidders to provide a performance guarantee, to remain in place until the 36th month of satisfactory operation.

Bidders were required to submit evidence of corporate and financial stability, experience in operating rural networks, and experience in operating in Mongolia. Eligible bidders would be evaluated first on the technical and operating compliance of their bids and

Table 1. Expected subsidies for herder network pilot

	Total
Total population of the 6 targeted soums	24,824
Herder population	19,942
Estimated subsidy per herder (US\$)	7.69
Maximum allowable subsidy per herder (US\$)	10.91

Source: Intelcon.

Table 2. Expected subsidies for Tariat soum center wireless pilot, by component

Pilot component	Estimated subsidy (US\$)	Maximum allowable subsidy (US\$)	Estimated subsidy per person (US\$)	Maximum subsidy per person (US\$)
Digital voice telephony	31,000	37,500	23.57	28.52
Internet point of presence and ICT	23,000	26,000	17.49	19.77
Subsidy to operator	54,000	63,500	41.06	48.29
School Internet access support	9,000	9,900	6.84	7.53
Total subsidy	63,000	73,400	47.90	55.82

Source: Intelcon.

then, in a second stage, on their required subsidy. The winning bidder would be selected from the compliant bids solely on the basis of the lowest subsidy required. Each tender attracted two bids from operators already active in the target markets. Three of the four were in substantial compliance.

Herder network competition

The winning bid for the herder network pilot, submitted by one of the country's two leading VSAT operators with existing rural services, required a subsidy of \$180,480. This was \$6,000 below the allowed maximum. This bidder also offered to provide services beyond those required by including two additional remote soum center service points. The second bid required the maximum allowable subsidy.

To ensure year-round access to services by the nomadic target group, bidders had been asked to propose configurations for VSAT terminals that would allow portability—a unique requirement, since VSAT terminals are usually stationary. The winning solution proposed installing several separate concreted metal pedestals in each community that would make it possible to move the VSAT terminals between summer and winter grazing areas.

Soum center wireless competition

The winning bidder for Tariat soum center was the country's leading GSM mobile operator. The bid offered a full GSM base station for the voice services and a Wi-Fi network for the Internet, both hubbed to Ulaanbaatar by a VSAT link. Competition was intense, resulting in a winning bid of \$16,455, only about 25 percent of the maximum allowable subsidy. The winning bidder effectively asked for subsidy support only for the Internet and school service components.

The resulting savings were reallocated to an additional tender, one for similar services in Chuluut soum, in the same province. Though Chuluut was considered

to be commercially less attractive, the competition, based on similar tender documents, again attracted two bidders, including the winner of the first tender. This competition was won by the second (CDMA) mobile operator, which requested a \$43,000 subsidy.

This subsidy, though much higher than that awarded for Tariat soum, was also significantly below expectations. Both were won under highly competitive conditions in which the winner made a low offer for a strategic reason: to gain market brand advantage and demonstrate collaboration with the government's universal access program for rural communities. Such market-driven "efficiency bonuses" are not uncommon in initial OBA competitions in the telecommunications sector.

Outputs so far—and lessons

The networks in both original pilots were implemented in September–November 2006 and fully operational before the 2006/07 winter season. Both operators met targets for service availability and technical quality ahead of schedule. The Chuluut soum center network has also been installed, with service formally inaugurated in June 2007.

For the herder network pilot, revenues stayed below expectations in the winter, mostly as a result of technical problems (now resolved) with the solar power supplies and herders' unusual migration patterns. After six months of operation, however, revenues were rising toward a more commercially sustainable level. A user survey showed that the project has cut by more than half the distance herders must travel to reach a phone and more than doubled the frequency with which they use the telephone service.

The Tariat soum wireless operator has reported that two-thirds or more of the community's households have become customers, in line with the forecasts of the universal access demand survey. Moreover, beneficiaries' monthly spending on calls has exceeded the

national average. A large share of regular customers are herders who live well outside the range of the mobile base station and travel regularly with their handsets to use the service.

Take-up and use of the Internet service have been lower than forecasted. But the first operator, while not making a profit from the service, is using the experience to learn about Internet demand. Moreover, the operator expects the business to be seasonal, with demand in some key months going beyond the one or two “anchor customers,” such as the country’s leading rural bank. This experience suggests that the universal access program, will need to be selective with respect to both locality and pace of development. It also points to a need for more training for teachers and students to help them benefit from Internet access.

Key success factors

The pilots are considered to be a success: the bidding competitions resulted in fully compliant bids below the estimated maximum subsidies. The pilots have provided important knowledge about rural demand for better communications services and allowed the testing of technical and commercial solutions that can be adapted to local conditions, including a nomadic population. And the experience appears to have helped accelerate even commercial expansion by all the country’s licensed operators.

Several aspects of the Mongolian experience have led to this success—and also promise success for the entire universal access program:

- ◆ The Communications Regulatory Commission has been strongly committed to the program.

- ◆ Skills transfer and national program ownership were at good levels at the critical times.
- ◆ Tenders were prepared in consultation with operators and stakeholders.
- ◆ Strong competition in the sector—together with the traditional importance of the countryside and the project’s least-subsidy design—has been a key factor in overcoming the higher marginal cost of providing access and connections in remote areas.
- ◆ The GPOBA subsidy enabled the program to be piloted before the operators started to contribute to the universal service obligation fund. That helped demonstrate the fund’s benefits for the operators, increasing its acceptance.

Next steps

In late 2007, the universal access program is already running a major competition to award subsidies for more mobile base stations to be installed in 2008 in the remaining soums that would not otherwise receive coverage. A similar competition for VSAT projects in the most remote areas will be announced in the first quarter of 2008. Development of Internet service provision will proceed more slowly, focusing on soums that have strong voice service markets, “Internet ready” schools, and the best chance of sustaining commercial Internet services after the one-time subsidies. The program will eventually enable broadband Internet to reach the entire country. But the pace of development must be realistic to ensure that money is well invested, that risks are minimized and benefits realized, and that the market is sustainably developed.

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