

A Revenue Opportunity for Digital Translators

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Introduction

TV translators are the best way to provide free over-the-air services to the rural audience and households located in areas with geographic barriers. Without TV Translators, a significant part of the American viewing audience would not have free access to over-the-air TV. Just to give an idea, approximately 4 million households are served exclusively by TV translators [1].

Because of the TV translators, many rural communities have been enjoying the free over-the-air analog TV service during the last 50 years [2]. However, the current transition to Digital TV (DTV) may take a long time due to higher cost of ownership for both DTV Translator operators and the rural views. Unless a sound business model is developed to address DTV translator system installation and services, the transition to digital may take longer to provide free over-the-air DTV services to the rural viewers.

It is for this reason that a revenue solution for DTV translators is proposed. This paper is a business model example that will help both digital TV translators and the rural viewers to benefit from the various advantages that free over-the-air DTV translator has to offer.

A Proposal Business Model

It is proposed that, TV translator operators are to provide set-top boxes for rural communities. In return, the set-top box subscribers would make a voluntary monthly contribution towards the operator. With this business plan, TV translators could pay-off the overall cost of equipment in digital service and additional subscribers would bring additional revenue.

To lessen the pressure of cost for both parties, we suggest a 10-dollar monthly contribution to be asked from each subscriber.

We recommend translators to upgrade its operations' site with digital equipment capable of receiving the digital signals. Once received, these signals should be retransmitted into another channel that can be received by the rural viewers that possess the low cost set-top box [3], a UHF antenna, and an analog TV.

The Figure 1 picture exemplifies the way the system works:

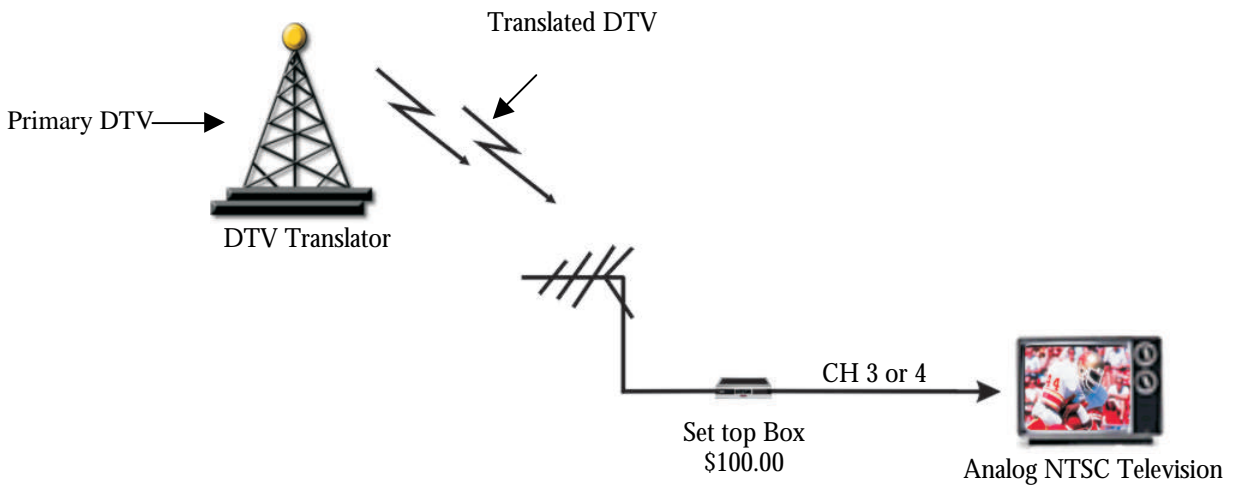


Figure 1: A DTV Translator Business Model

The retransmitted channels can only be received by an analog television set if the viewer possesses a set-top box. The role that the set-top box plays in this path is very important and a description of the DTV translator equipment will be provided in the next section.

Since there is no talks on government to subsidize for digital to analog set-top boxes, it is proposed that TV translator operators are to buy the set-top boxes and redistribute them to rural TV viewers. However, by providing a new TV service that offers a package of local TV channels, TV translators would be able to ask contribution money from the viewers. In Minnesota, a similar service has 30,000 viewers who actually make the voluntary contributions (personal phone conversation, June 17, 2004).

Although initial investment on equipment may be a little high, TV translators will be able to profit in the long run. A cost study provided in this paper shows that about 2,200 voluntarily contributing viewers are needed to break even in 12 months. As a consequence, rural viewers will be able to receive a better service at a lower cost than if they were to buy a HDTV set or subscribe to pay satellite or cable TV services.

Description of the Equipment

The DTV signal presents on/off like coverage. When the signal is present, a perfect DTV signal is decoded by consumer set-top-box. But, when the signal power level is marginal, the picture may break-up, stutter, or become a dark picture. Under such condition where signal coverage is poor, the DTV Translator can provide additional signal coverage and provide higher quality of DTV signals in the rural areas.

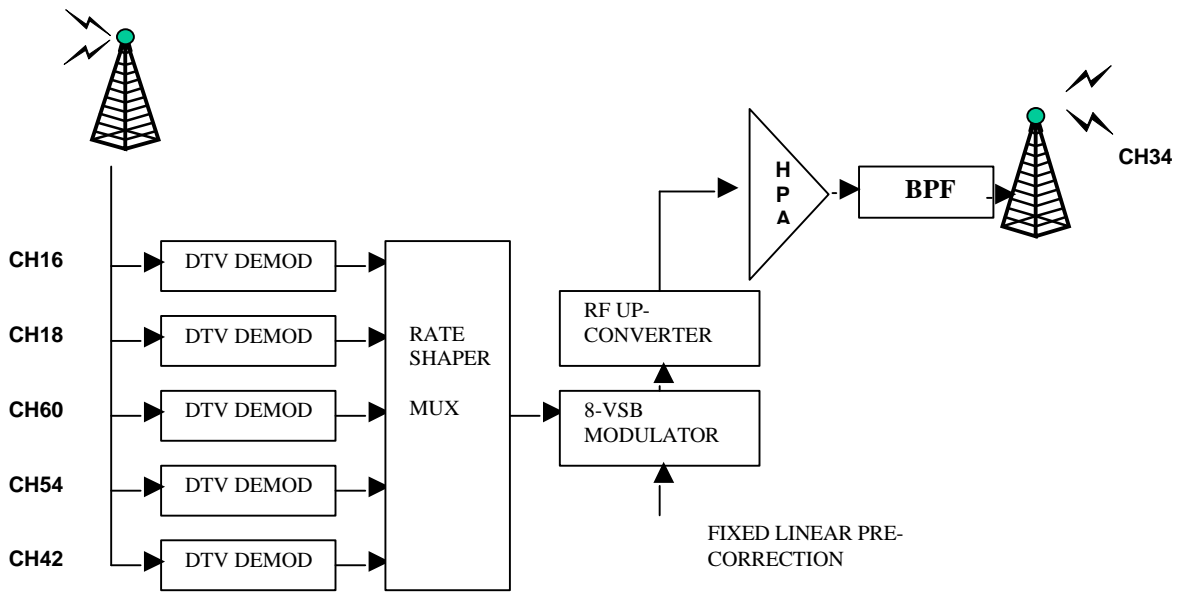


Figure 2 A DTV Translator Equipment (a 5 channel example)

As seen in Figure 2, the DTV Translator System consists of the following equipment: a DTV signal receiving antenna, five 8VSB demodulators, a rate-shaper and multiplexer, an 8VSB modulator, an RF up-converter, an RF High Power Amplifier, a band-pass filter, and a transmitting antenna.

The 5 channel DTV Translator system performs the 8VSB off-air receptions and demodulations of the input signals. Each of the demodulated signals is processed with Reed-Solomon error correction decoding; trellis decoding, equalization and digital matched filtering to clean up channel multipath and noise errors. An MPEG2 transport stream is generated and SMPTE-310M, DVB-ASI signals are generated as outputs.

After the demodulation of the signals is performed, a Rate-Shaper and Multiplexer equipment reduces the data rate and combines the MPEG2 Transport Stream into one 19.39MBPS Transport Stream suitable to fit into one 6MHZ RF channel bandwidth.

Once the single Transport Stream is created from the Rate Shaper and Multiplexer, an 8-VSB Modulator modulates the MPEG2 transport stream into an 8-VSB signal using a fixed linear pre-correction technique. The linear pre-corrector corrects degradations caused by filters and other linear distortions. Using a Vector Signal Analyzer test equipment, the unit will accept the equalizer tap values and pre-correct the linear distortions. The unit complies with the ATSC A53 specification for generation of an 8-VSB terrestrial signal. Typically, the DTV Translator unit is housed in a 1-RU rack equipment from a vendor, [4], or in a 2-RU rack equipment from another vendor with other features, although without the pre-correction feature, [5].

An Example of Existing Service

The business model proposed is very innovative since it proposes TV translators to provide TV services with the financial support from contributions by the viewers. To show that this proposal is very attainable, a similar existing service will be briefly described.

Cooperative TV in Minnesota (CTV), [6], is an analog TV translator service that provides both local and scrambled channel services to subscribers. A small contribution fee of \$4 per month is asked for the basic local channel. However, once CTV changes its operations to digital, it plans to increase the contribution fee up to \$10 per month. The \$10 per month voluntary contribution fee covers the basic local channel services. This is much less expensive than subscribing to either satellite or cable services and buying a new HDTV set. Besides that, the financial burden on translators is substantially decreased since most receive financial support from grants and donations to invest in the acquisition of equipments.

In addition, the DTV translator signal allows resistance to channel multi-path problems that plagues analog TV reception. Therefore, viewers will be able to enjoy and experience the free digital TV over-the-air services.

SWOT Analysis for the Proposed Business Model

The current market condition is very attractive to this proposed plan. A SWOT Analysis (Strength, Weakness, Opportunities, and Threats) of this model will better illustrate its advantages and disadvantages.

<p style="text-align: center;">Strengths</p> <p>Cost advantage from competitors (satellite/cable) Niche market: rural viewers Free over-the-air delivery of TV signals Pre-established transmission site Business already in operation</p>	<p style="text-align: center;">Weaknesses</p> <p>* Purchase of new digital equipment</p>
<p style="text-align: center;">Opportunities</p> <p>Additional Revenue * Transition to digital TV</p>	<p style="text-align: center;">Threats</p> <p>DIRECTV and other satellite services Cable Television (CATV)</p>

Financial Projections of the Proposed Business Model

The implementation of this business model will incur in the increase of some costs in the short term but will return profits in the long run.

The proposed Business Model is to go digital and provide free over-the-air DTV services and set-top boxes to viewers that would be willing to pay a contribution fee because of the better picture and sound quality than analog.

When making these financial projections, the following assumptions were made as far as:

- Sources of Revenue
- Components of Variable Costs
- Components of Fixed Costs

The two *sources of revenue* taken into consideration were a \$10 monthly voluntary contribution fee plus a one time \$5 installation fee. This would total a \$125 per year source of revenue coming from a single voluntarily contributing subscriber.

Next, the component of the *variable costs* is mainly the cost of buying Set-top boxes. Since translators will be buying the set-top boxes, [3] for \$100, the variable cost per viewer would be \$100. It is also possible that the views may be willing to rent the boxes at \$5/month fees, but this was not assumed in the calculations.

The final step is the computation for the *fixed costs*. Fixed costs include: lease on digital equipment, increase in manager pay, additional technicians needed, and miscellaneous expenses. The projected annual fixed costs is \$55,586.

The estimated figures used in the projections will also allow the computation of the Break Even Point.

Break-Even Analysis

Table 1 shows the various outcomes resulting from the different number of viewers. The respective profits and losses are the most important numbers to be looked.

Number of Voluntarily Contributing Viewers	STB Costs	Fixed Costs	Total Costs	Sales Income	Profit/Loss
250	\$ 25,000	\$ 55,586	\$ 80,586	\$ 31,250	\$ (44,336)
750	\$ 75,000	\$ 55,586	\$ 130,586	\$ 93,750	\$ (36,836)
1,000	\$ 100,000	\$ 55,586	\$ 155,586	\$ 125,000	\$ (30,586)
2,224	\$ 222,344	\$ 55,586	\$ 277,930	\$ 277,930	\$ 0
5,000	\$ 500,000	\$ 55,586	\$ 555,586	\$ 625,000	\$ 69,414
10,000	\$ 1,000,000	\$ 55,586	\$ 1,055,586	\$ 1,250,000	\$ 194,414
10,340	\$ 1,034,000	\$ 55,586	\$ 1,089,586	\$ 1,292,500	\$ 202,914
15,000	\$ 1,500,000	\$ 55,586	\$ 1,555,586	\$ 1,875,000	\$ 319,414
20,000	\$ 2,000,000	\$ 55,586	\$ 2,055,586	\$ 2,500,000	\$ 444,414
25,000	\$ 2,500,000	\$ 55,586	\$ 2,555,586	\$ 3,125,000	\$ 569,414
30,000	\$ 3,000,000	\$ 55,586	\$ 3,055,586	\$ 3,750,000	\$ 694,414

Table 1: Break Even Analysis

In Table 1, it is possible to see that at least 2,224 voluntary contributing viewers are needed per DTV translator equipment system in order to break even at the end of the first year. If a translator wants to buy two 5 channels DTV translator system (worth \$50,000 each), then the number of subscribers needed to break even will double (e.g.: 4,448 voluntarily paying subscribers).

The following Figure 3 shows the break-even graph based on the results from Table 1:

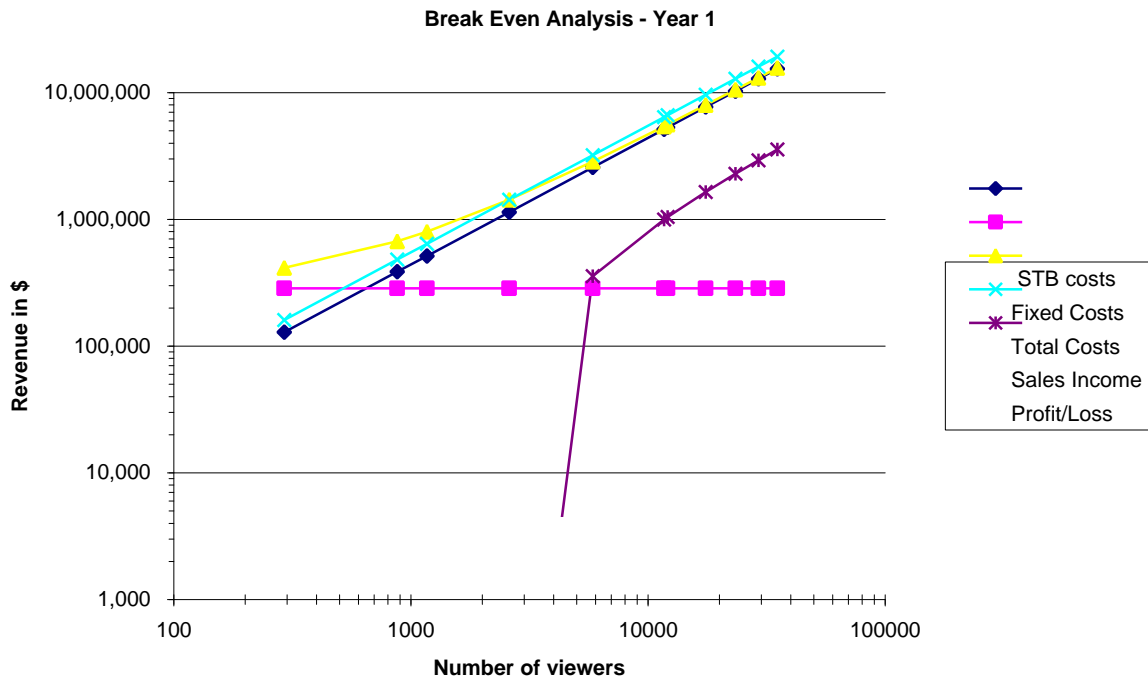


Figure 3: Break Even Analysis

The good news is that the break-even number can be lowered if financial aid and grants are received. As it was mentioned before, many broadcast stations pay for the installation and operating costs of translators (fixed cost amount will decrease in the calculation of the break-even number). There are many federal and local grants available to help the DTV Translator operators.

If this scenario happens, the amount of fixed costs decrease and the following table will show the changes in the number of viewers needed to break even at the end of the first year of operation for a single 5 channel DTV translator system; as shown in Table 2.

Amount of Grant	Break-Even Number of Voluntarily Contributing Viewers
\$10,000	1,824
\$20,000	1,424
\$30,000	1,024
\$40,000	624
\$50,000	224

Table 2: Break-Even Analysis with Grants for a Single DTV Translator

Conclusions

The participation of TV translators during this digital transition is very important. Going digital and implementing the proposed business model may be an advantageous solution both in financial and social terms.

The proposed plan is eventually a win-win solution to both the digital TV translator operators and the rural viewers. The digital TV translator operators will benefit from this new source of revenue that allows continual improvement of the quality of TV service offered. The rural viewers can also enjoy the better sound and quality of pictures while using their own analog TV set.

The main advantage of the proposed plan is that the higher number of subscribers generates higher possible financial gains. As it was shown in Table 2, a grant of \$50,000 allows this proposed business model to break-even at the end of the first year with 224 voluntarily contributing viewers. If the grant is not received, then we need 2,224 voluntarily contributing viewers.

In addition, if a digital translator wants to buy two 5 channels DTV translator system (worth \$50,000 each), then it will need to double the number of voluntarily paying subscribers to break-even in year 1.

The ultimate goal of this proposal is to allow a fair distribution of benefits. Even households in the most remote areas should be able to benefit from such an advantageous digital transition. In this context, the role of digital translators is essential.

The Digital Translators can play an essential role in the lives of the rural community and can at the same time be profitable.

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