

# Self-powered Radios in Mongolia

29 Nov 2005

Frontier

gettyimages®

# Making Old Technologies The Better Ones



This report is solely for the use of the 2005 WU Global Social Entrepreneurship Competition. This material was written by Frontier, and submitted for the case competition. The Frontier team consists of four students of the KAIST Graduate School of Management, Seoul, Korea ; Kang Young Eun, Kwan Oh Chan , Lee Eun Ju, and Batjargal Purevdorj . Please contact the following address; yekang@kgs.m.kaist.ac.kr mobile phone:82 16 478 1602.

## **Executive Summary**

### **Market Needs**

Mongolia, one of the most sparsely inhabited nations on earth, is characterized by its unpredictable, extreme weather conditions and the large percentage of its population leading nomadic lives. For the rural population, the only means of obtaining information about natural disasters in order to protect their livestock is through radios. The problem lies in the fact that only 35% of these herders have access to working radios. Furthermore, these radios operate on batteries, which are expensive and hard to find in Mongolia. Radios are also needed by the various aid-organizations that provide educational programs to the rural parts of Mongolia.

### **Business Description**

Frontier seeks to “Make old technologies the better ones.” By rekindling the importance of the common technologies of radios and self-generators, Frontier will connect the untouched parts of the world in an environmentally-safe, inexpensive, and durable. The *ELCH-05* is a self-powered AM radio that can be used without electricity or battery. It uses the power generated by rotating the hand crank on the side of the radio to charge the internal rechargeable Ni-MH battery pack.

### **The Management Team**

Frontier’s management team has been selected carefully to make the visions of our company a reality. Each of the members shares values that encourage environmentally friendly and socially beneficiary business ethics.

### **Business System**

The design and development of the *ELCH-05* will take place at the Korea Advanced Institute of science and Technology (KAIST), also known as the “MIT of Korea.” Component parts are to be shipped from the best suppliers straight to the manufacturing factory that is to be set up in Ulaanbaatar, Mongolia. All the manufacturing will be competed in Mongolia, providing the company with cost reductions and at the same time contributing towards the development of the Mongolian economy.

**Financial Plan**

Financial projections for Frontier are encouraging. Estimated capital needed amounts to \$106,000. SROI calculations show that there are also very significant social benefits related to this business.

**Business Strategy**

Strong alliances made with the government of Mongolia and NGOs will ensure a strong foothold in the market.. Frontier will also gain a deep understanding of the market through its chief sales, marketing, and alliance officer. Moreover, Frontier will have all the first-mover advantages.

**Risk Analysis**

The risks involved in this business have been categorized into two: systematic and unsystematic risks. Risks involve uncontrollable external environments factors such as changes in government legislation and entrance of potential competition.

## **Table of Contents**

<b>1. Market Needs</b>	<b>6</b>
1.1 Market Needs in Mongolia	6
1.2 Customer Benefits	6
<b>2. Business Description</b>	<b>7</b>
2.1 Vision and Mission Statement	7
2.2 Product Description	7
2.3 The Management Team	7
<b>3. Business System</b>	<b>8</b>
3.1 Design and Development of product	8
3.2 Inbound	8
3.3 Operation	9
3.4 Marketing and Sales Plan	9
<b>4. Financial Plan</b>	<b>10</b>
4.1 Five-year financial summary	10
4.2 Uses of Funds	10
4.3 SROI	11
<b>5. Business Strategy</b>	<b>12</b>
5.1 Strategic alliance (Distribution strategy)	12
5.2 Competitive strategy	14
5.3 Future Growth, business opportunities	14
<b>6. Implementation Plan</b>	<b>15</b>
<b>7. Risk Analysis</b>	<b>15</b>
7.1 Systematic risk	15
7.2 Non-systematic risk	15

# How would *you* change the world?

## 1. Market Needs

### 1.1 Market Needs in Mongolia

Mongolia, one of the most sparsely inhabited nations on earth, is a country in desperate need of radios. According to national statistics, more than 41.4% of the total population of 2.7 million resides in rural areas, where 80% lead nomadic lifestyles that are totally dependent on livestock husbandry. For these herders, updates on the extremely unpredictable Mongolian weather are essential for their survival. For example, in 2000 to 2002, a shocking number of 11.2 million animals were lost due to natural disasters and extreme weather conditions. Sadly, this kind of tragic loss could have been minimized had communication to these herders been possible. In these rural areas, receiving such updated information is solely possible through short-wave radios. However, fewer than 35% of these herders have access to working radios. Moreover, these radios operate on batteries that are expensive and hard to find in Mongolia. Hence, solving the problem of power supply for portable radios will greatly mitigate the main problems of using radios. Furthermore, it will encourage wider use of radios; currently, herder families who do have radios tend to use them sparingly in order to reserve battery power for emergencies such as weather forecasts.

( Appendix I, II )

### 1.2 Customer Benefits

Our company will enhance the lives of the Mongolian rural population by introducing the *ELCH-05*: a self-powered battery-less AM/FM radio. Through our intimate business relations with current aid-organizations and NGOs such as UNESCO, our company envisions a future where the people of Mongolia can have easy access to information. The key benefits that our business offers are outlined in the diagram below.

## 2. Business Description

### 2.1 Vision and Mission Statement

Corporate Vision: Making old technologies the better ones

Mission Statement: *Frontier* will provide self-charging radios designed to give Mongolian nomadic families access to information and education in an inexpensive but sustainable manner.

### 2.2 Product Description

Frontier's product, the *ELCH-05*, is an AM radio that can be used without electricity or battery. It is a self-powered unit that uses the power generated by rotating the hand crank on the side of the radio to charge the internal rechargeable Ni-MH battery pack. In order to minimize its need for power, this product embodies only the very essential features of a radio. At the same time, its features for high quality reception have been emphasized so that it can be used anywhere in the world. Two minutes of cranking will provide up to 5 hours of radio play.

### 2.3 The Management Team

The roles of each member are in line with qualifications and interests, bolstering the feasibility of our plans. The following figure shows the position, qualifications, and roles of each member. The current management team can be distinctly characterized by their engineering backgrounds and shares values towards social development.

<b>Chief Executive Officer</b> Kang Young Eun	Responsibility	Corporate strategy, corporate culture, and Human Resource Management
	Qualification	Leadership, multicultural background
<b>Chief Operating Officer</b> Kwan Oh Chan	Responsibility	Purchasing, In-bound logistics and operation management
	Qualification	Knowledge of both management and engineering
<b>Chief Sales, Marketing, and Alliance Officer</b> Batjargal Purevdorj	Responsibility	Marketing and sales planning, and alliance management
	Qualification	Fluent in both Mongolian and Korean language
<b>Chief Strategic Planning and Development Officer</b> Lee Eun Ju	Responsibility	Searching for new business opportunities, and strategic planning
	Qualification	Knowledge of strategic planning
<b>Chief Financial Officer</b> Kim Hee Dong	Responsibility	Financial planning, record-keeping, and financial risk management
	Qualification	Strong financial analysis skill
<b>Chief R&amp;D Officer To be hired</b>	Responsibility	developing our product ELCH-05, product test, skill training
	Qualification	Headhunting Engineers from elite Engineering schools such as KAIST

### 3. Business System

#### 3.1 Design and Development of product

The components of the *ELCH-05* can be largely divided into three parts: the radio system, the speakers, and the self-generator. Although the technologies for manufacturing radio systems are widespread and simple, additional research and development is required in order to manufacture the *ELCH-05* since it requires a cheap but durable reception system. The speakers that are to be used in manufacturing the *ELCH-05* should be meet the budget of the product. The third main component of our product, the self generator, has two parts: the hand crank used to generate power, and the Nickel Metal-Hydride (Ni-MH) rechargeable battery that is the power source. Apart from these main components, supplementary materials include various electric lines, the circuit board, and the external radio case. The radio case will require a significant initial investment (about \$10,000) to produce the mold; however, once the mold has been made, each radio case can be manufactured with only US \$0.20. The costs and features of the parts needed in the beginning stages of the R&D processes are shown in the table below.

	Necessary components	Estimated cost of good (US \$)
Radio	BJT, Register, Cap, Diode, PCB	0.5
Speaker	Speaker components	1
Self generator	Rechargeable battery, Crank	3
Radio case	The radio case itself	0.3
Others	Electrical lines	0.2

A R&D team of two engineers and an industrial designer from KAIST will be assigned to work on developing the *ELCH-05*. The total length of the research period is estimated to be six months.

#### 3.2 Inbound

Frontier plans to obtain the necessary components of the radio through suppliers who will meet our strict requirements. Obtaining components is projected to be easy since radio has now become a commodity in many parts of the world. The lists of suppliers are available in public resources such as the American Electronic Resource. Supplies will be flown in to the Buyant-Ukhaa airport located in Ulaanbaatar.

### **3.3 Operation**

*ELCH-05* will be manufactured in Ulaanbaatar, the capital of Mongolia. This location is optimal as this is the hub of all businesses of Mongolia, and equipped with the necessary infrastructure to run a business and factory. Furthermore, locating the factory in Ulaanbaatar will provide easy access to the Buyant-Ukhaa International Airport. By manufacturing in Mongolia, we expect minimized costs in many ways. First we will be able to minimize delivery costs. Secondly, by using the inexpensive labor force of the Mongolian people will be beneficial not only to the development of the Mongolian economy but will reduce fixed costs at the same time. Also it will help keep stronger relations with the Mongolian government. It is projected that leasing a factory in Mongolia will not be a difficult task. Currently in Ulaanbaatar, there are many abandoned factories that were left behind after the collapse of communism in 1990. Hence the cost to lease such factories is relatively low in Mongolia compared to other nations.

### **3.4 Marketing and Sales Plan**

The marketing and sales plan of our company focuses upon actions that will occur during the short term to create barriers to entry, to ensure sources of revenue, and to secure large-scale customers. Most of this will involve long-term relations and cooperation with the NGOs and governments of Mongolia. Since no distribution channels exist to deliver products such as radios to rural residents, the relationships and alliances with NGOs and government will play a critical role in distribution. The CEO, along with the Chief Sales, Marketing, and Alliance Officer will contact the NGOs and governments. Small scaled presentations and sales promotions will probably be made. Hence, it is estimated that the marketing and sales costs is expected to be very low.

## 4. Financial Plan

### 4.1 Five-year financial summary ( Appendix III )

The financial projections for Frontier are quite encouraging. The number of opportunities for our product can be detected from many countries of the world. With the increasing number of educational projects launched by NGOs, more windows of opportunities for Frontier are opening. The following sections provide a synopsis of the financial outlook for the business.

Financials (unit: 000 dollar)

	2006	2007	2008	2009	2010	2010
Gross Sales	-	461	475	490	505	520
Cost of Goods	-	421	423	424	426	428
Gross Profit	-	39	52	65	79	93
Net Income Taxes After	(53.00)	(37)	19	29	40	51
NPV	8					
IRR	13.27%					

The above profit and loss statement indicates that after 3 years of operations, Frontier will start to make profits. In 2006, Frontier will focus its operations in making alliances with NGOs and the government of Mongolia. In 2007, it will start manufacturing in the Ulaanbaatar factory. If we estimate that operations will continue for 5 years, the NPV will be \$8,000, and the IRR is estimated to be 13.27% (base year: 2005). This success will leverage future business. Detailed financial calculations can be seen in the attached appendix.

### 4.2 Uses of Funds

The estimated capital needed amounts to \$130,000. Frontier plans on obtaining these funds in two periods, described in the table below.

Round 1 for \$77,000	R&D and startup costs
To be completed by August 2006	„ New facilities
	„ Marketing and Sales costs
Round 2 for \$53,000	Costs related to manufacturing
To be completed by November 2006	„ Manufacturing costs related costs

### 4.3 SROI ( Appendix IV )

#### **Social Benefit of Saving Livestock**

The social benefit of saving livestock is calculated to be \$220,020 per year (multiply the expected value of each livestock by the number of livestock saved)

#### **Social Benefit of Elementary Education**

The social benefit of this would be \$ 1,665,000.

#### **Financial Benefit**

Converting the total sales from 2007 to 2011, to present value will give \$ 8,000. Depreciating facilities of the factory over 10 years, the price for these facilities becomes \$ 26,500. Hence total financial profit becomes \$ 34,500.

#### **Investments**

**The total capital Frontier needs is \$130,000.**

#### **SROI Calculation**

SROI is defined as the sum of social and financial benefits divided by total investment. Based on this definition and the estimates, our SROI is calculated as **17.89**

## 5. Business Strategy

### 5.1 Strategic alliance ( Appendix V )

In order to successfully distribute *ELCH-05* to the rural residents of Mongolia, Frontier plans to create strategic alliances with NGOs and government organizations of Mongolia. As mentioned previously, the many educational projects that have been launched by various NGOs in Mongolia involve the use of radios as the main source of communication. However, less than 30% of the rural population have access to them and, furthermore, these radios run on batteries. It is almost impossible to convince the herders to use the scarce supply of batteries for any other occasions apart from emergencies (weather forecasts in times of natural disaster are considered emergencies to this population). With the self-powered *ELCH-05*, the rural population will be able to use radios for long periods of time and for other purposes, such as education or entertainment. Although most of the NGOs realize the desperate need of such radios, they have faced difficulties in obtaining such devices due to unavailability of such radios in Mongolia. In-depth inquiries and market research has revealed to our company the enthusiastic interest of the NGOs. The Mongolian government also has shown special interest as the task of communicating information to its nomadic population is becoming more and more difficult. Currently, the dissemination of information to herders is almost impossible because of the lack of telephones, radios, and TVs in herder communities. In order to give more than half of the Mongolian access to warning and alarms to natural disasters, devices such as the *ELCH-05* are essential. Therefore, Frontier seeks to provide a win-win situation by making strategic alliances with NGOs and the Mongolian government. These institutions will facilitate our task in identifying and providing our end users with our product; at the same time Frontier will help these institutions by providing them with means to help them achieve their goals without much additional cost.

### **Non-Government Organizations (NGOs)**

- UNESCO- ICT in Education Unit

The Gobi Women's Project, launched in 1996, provides non-formal distance education through radio to some 15,000 nomadic women. UNESCO will provide these women with ELCH-05 so that more women can be reached through this program. Giving these women access to unlimited usage of radios will play a key role in developing and enhancing the educational programs prepared by this project, as battery supply will no longer be a burden.

- The Mongolian Women's NGOs Coalition. This coalition constitutes 31 of Mongolian women's NGOs. The projects that are launched by this group
- The Mongolian Youth Development Centre. For 80% of rural children, education stops after primary school. For these children, radio is a critical to their further education. Radio is also the best method of providing education content for people without any educational opportunities.

### **Government.**

As mentioned above, the losses resulting from natural disasters in Mongolia are immense. By reaching the rural population through the ELCH-05, warnings and alarms of natural disasters can be communicated in advanced and preventive measures can be taken to minimize damage.. Specifically, Frontier will engage in future talks with the following government institutions to supply our ELCH-05s.

- National Emergency Management Agency
- Ministry of Education, Culture and Science

## **5.2 Competitive strategy**

### **Current competitors:**

The many self powered radios out on the market have been produced for emergencies or for environmentally friendly purposes. Many of them are made for leisure purposes such as for outdoor camping, or for emergency purposes. They have many additional features such as built-in sirens, compasses, thermometers, and digital clocks. The price of these products ranges from US \$35 to \$40.

### **( Appendix VI )**

### **Our strategy:**

The *ELCH-05* will be developed for the people in developing countries where price, supply of electricity, and of battery are critical problems. Hence unnecessary features have all been eliminated from the design to minimize the costs involved. Additionally, through partnerships and alliances with international NGOs and governmental institutions, prices for our radios will become affordable, or even free of charge.

**Potential competitor:** Copycat businesses could emerge as technologies used in making our product is neither patented, nor very difficult to reproduce.

**Our strategy:** Strong alliances made with the government of Mongolia and NGOs will ensure us with strong foothold in the market. Frontier will also gain a deep understanding of the market through its chief sales, marketing, and alliance officer. Moreover, Frontier will have all the first-mover advantages.

## **5.3 Future Growth, business opportunities, and global expansion**

With initial success in Mongolia, and as we begin to step into the maturity stage, we will expand to other countries that have similar needs. Our extraordinary opportunities for expansion come in three areas: Our alliances with NGOs – for example, UNESCO's ICT in education unit projects have been launched in other countries such as Sri Lanka and Nepal where information access can be obtained mainly through radios. Global expansion will help our business in spreading the large fixed costs involved in making the mold for the radio case, and increase our profits on the whole.

## 6. Implementation Plan

By May 2006:

- Recruiting and setting up the business

June 2006 – November 2006

- Make contacts with the NGOs and the Mongolian government & Finish R&D of product
- Product test
- Finalize contracts with suppliers

November 2006 – January 2007

- Lease the factory in Mongolia.
- Start manufacturing
- February 2007
- Make initial sales

## 7. Risk Analysis

### 7.1 Systematic risk

- Although very unlikely to happen in the near future, the development of other communication infrastructures in the rural parts of Mongolia, such as infrastructures for mobile telephones, might decrease the demand of self-powered radios. However, telephones do not replace all the functions, such as education, of radios.
- The risk of entering Mongolia as a foreign company could become riskier if hostile government legislations are enforced in the future. To mitigate this, we will accelerate our collaboration with Mongolian partners.
- Sudden increases in tax The above risks are predicted to be very unlikely.

### 7.2 Non-systematic risk

These risks are specific to the company and can be mitigated to a certain extent.

Potential Risk	Mitigation Strategy
<p>If the relationships with our alliances do not go as planned, it could seriously hinder the distribution</p>	<p>Rather than use the channels of distribution of our alliances, Frontier could develop its own means of distribution. Products could be distributed through the dealers of various unofficial street markets in the country without much additional cost.</p>
<p>Difficulties in leasing a suitable factory in Mongolia could hinder plans in manufacturing.</p>	<p>Move to countries such as Nepal or Sri Lanka, where Frontier plans on expanding its business. Start manufacturing there, or consider Mongolia's neighboring country, China.</p>
<p>Attempts by competitors to copy the product and clear the market by instigating a price competition.</p>	<p>Strengthen alliances and partnerships with institutions such as NGOs and the Mongolian government. Increase market share by emphasizing Frontier's vision in helping the rural population of Mongolia to enhance their lives through access of information, education, and entertainment in an environmentally friendly way.</p>

# Self-powered Radios in Mongolia (Appendix)

29 Nov 2005

Frontier

# Appendix I. Environment of Mongolia

## 1. Nomadic Life of Mongolia

Mongolia, a country five times the size of France. has a population of only 2.7 million. The average population density is 1.4 persons per sq. km which makes Mongolia one of the most sparsely inhabited nations on earth. More than 255 thousand private households live in rural areas. Almost 80% of them are totally dependent on livestock husbandry and keep nomadic lifestyles. The output of livestock production traditionally has been an important part of Mongolia's heritage, and still accounts for more than 80% of total agricultural output today. To date, 20.5 percent of GDP is produced by the agricultural sector, of which 80.0 percent is accounted for by live-stock husbandry. Additionally, 40.2 percent of total labor force of the country is engaged in the agricultural sector and form around one forth of export income.

## 2. Weather Conditions

Mongolia's weather is characterized by extreme variability and short-term unpredictability especially in winter, and the multiyear averages conceal wide variations in precipitation, dates of frosts, and occurrences of blizzards. January and February averages of -20° C are common, with winter nights of -40°



the only way to get daily weather news.

C occurring most years. Summer extremes reach as high as 38° C in the southern Gobi region. Such weather poses severe challenges to human and livestock survival. In 2000-2002, as a result of natural disasters, drought and *Zud*, (harsh winter condition), loss of animals reached 11.2 million, followed by sharp declines in the livestock husbandry production. For private households living in rural areas, the radio is

### **3. Radio Broadcasting**

Radio broadcasting started in 1934 with national broadcasting launched in 1967. The plan for radio was to cover 75 percent of Mongolia's territory by reliable radio broadcasting. All equipment and infrastructure had been exported by USSR manufactories. They had been doing well for years, but the manufactories went bankrupt after communism collapsed in the early 1990s. The Mongolian government has managed to maintain the radio broadcasting infrastructure on its limited budget. However, the supply of the radios to rural areas of Mongolia stopped. Today, there is still no new supply of radios available on the market. The number of the radios rural households has been decreasing for 10 years. Furthermore, these radios are portable radios that need disposable batteries. But due to the scarcity and unaffordable prices of batteries, radios are turned on only in cases of emergencies.

## **Appendix II. Market Analysis**

### **1. Conditions of Mongolia**

10 years have passed since the supply of radios in Mongolia dried up. Although it is true that in Ulaanbaatar, the capital of Mongolia, some houses are equipped with cable TV, internet and all other technologies, in the rural areas the only kind of technology is the VEF 206 Radio that was manufactured in the 70s. What's even more shocking is that less than 30% of the rural population still own these radios and half of them are out of order or without of batteries.

In 2004, there were 255.2 thousand rural households and the total national population increase was 1.45%. Research show that in 2003, there were 150,000 radios in Mongolia. However this research included the radios that were in urban cities, hence the actual number of radios existing the rural areas is probably very small.

### **2. The need for self-powered radios**

Warnings and alarms for all types of natural disaster are transmitted through radio over the entire territory of the country. Warning and alarm systems can be effective in big cities and settlement areas, but due to scarce population density and inadequate communication systems, people in the countryside sometimes

cannot be informed in time. Hence, dissemination of information to herders is the least reliable link in the warning chain. It is estimated that only about 35 % have working radio. A supply of batteries or access to electrical power is also needed.

**3. Market Size Calculation**

This estimate is made on the assumption that a nomadic family in rural area whose living is dependent on herding is willing to purchase the self-generating radio. An in-depth interview with a Mongolian validates our assumption that given a price of \$10, most nomadic families will buy one, since information on climate and possible natural disasters are so crucial on their living. Given these assumptions, total market size of our product is estimated about 210,000. The rationale is as follows.

Total number of population in Mongolia	2,700,000
Percentage of people living in rural areas	41.40%
Total number of people in rural areas	1,117,800
Percentage of people herding livestock in rural areas	90%
Total number of herders in Mongolia	1,000,640
Average number of people in one family	4.26
<b>Total demand of the self-generating radio in Mongolia</b>	<b>234,200</b>

## Appendix III. Financials and Assumptions

1. 5-Year Forecasted Income Statements (Unit: thousand dollars)
2. Assumptions The following details our calculations to obtain revenue, operating expenses and net income

### 1. Forecast

	2006	2007	2008	2009	2010	2011
Possible revenue	-	480	494	509	525	540
Defect rate	-	4%	4%	4%	4%	4%
Projected revenue	-	461	475	490	505	520
Manufacturing costs	-	326	326	326	326	326
Operating expenses	-	50	52	53	55	56
Rent	-	45	45	45	45	45
EBIT		39	52	65	79	93
Taxes (20%)		8	10	13	16	19
Principal repayment		7	9	9	9	9
Interests		9	11	11	11	11
Net Income After Taxes	(53.00)	(37)	19	29	40	51
NPV		8				
IRR		13.27%				

### 2. Revenues

Sales Assumptions	2006	2007	2008	2009	2010	2011
Income tax rate		20%	20%	20%	20%	20%
Sales price	-	\$10	\$10	\$10	\$10	\$10
Market size (in units)	-	48,000	48,000	48,000	48,000	48,000
Projected revenues	-	\$480,000	\$480,000	\$480,000	\$480,000	\$480,000

### **3. Expenses**

Frontier's expenses are divided into three categories: Manufacturing, Rent, Logistics, and General and Administrative (G&A).

- **Manufacturing.** All expenses related to the development of Frontier's products and logistics are included in this category. Frontier will need to acquire electronic components, rechargeable batteries and materials for cases from a variety of sources. Its total cost per unit is estimated based on our primary research on the product.
- **Rent.** This category includes all expenses related to renting a factory in Mongolia for manufacturing. In Mongolia, real estate costs for leasing a 500m<sup>2</sup> factory are about \$ 1,500 per month.
- **G&A.** This category includes all other organizational and overhead expenses.

## **Appendix IV. SROI**

### **1. Social Benefit of Saving Livestock**

#### **Statistics**

- From the records collected by the Mongolian government from 1991 to 2000, it is estimated that 65,300 livestock died annually due to natural disasters, such as blizzards and heavy snowfall.
- Livestock in Mongolia can be divided into three categories according to their prices.
- Horses are priced at about \$100, and constitute 10% of total number of livestock. The second group is cows, priced at about \$50, and constitutes 20% of total livestock.
- Sheep constitute the rest of the livestock and are priced at about \$20 for each, in the market.
- If weather forecast information is given to herders, it will help them protect their livestock before possible natural disasters, and decrease the number of livestock killed due to disasters by more than 10%.

## **Social Benefit Calculations**

Given these assumptions, the social benefit of saving livestock is calculated to be \$220,020 (multiply the expected value of each livestock by the number of livestock saved)

## **2. Social Benefit of Elementary Education**

### **Assumptions**

- Currently, about 400,000 children are enrolled in the elementary education program by the Mongolian government. For this program, the government spends \$ 7,400,000 annually. From these facts, \$ 18.5 is a natural estimate of education cost per child.
- 200,000 households leading nomadic lifestyles do not receive any kind of education benefits from the government. We estimate that there are 1.5 children per household that need elementary education. Hence the total number of children who do not receive educational benefits is predicted to be about 300,000

### **Social Benefit Calculation**

Through the propagation of radios, it is estimated that elementary educational programs could reach 300,000 children. The social benefits of this kind of education is \$ 5,550,000 ( $\$8.5/\text{number of children} * 300,000\text{number of children}$ ). However, in addition to radios, it is predicted that supplementary material such as text books or costs incurred in developing education programs will exist. If we were to say that the bare minimum contribution a radio has towards providing educational programs through the radio is 30%, the social benefit of this would be \$ 1,665,000.

## **3. Financial Benefit**

Converting the total sales from 2007 to 2011, to present value will give \$ 8,000. Depreciating facilities of the factory over 10 years, the price for these facilities becomes \$ 26,500. Hence total financial profit becomes \$ 34,500.

#### 4. Investments

The total capital Frontier needs is \$130,000.

#### 5. SROI Calculation

SROI is defined as the sum of social and financial benefits divided by total investment. Based on this definition and the estimates, our SROI is calculated as 17.89.

<b>Appendix V. Potential Alliance Partners UNESCOICT in Education Unit</b>	<a href="http://www.unescobkk.org">www.unescobkk.org</a> UNESCO Regional Office for Asia and the Pacific P.O. Box 967 Prakanong Post Office Bangkok 10110 Thailand
<p>Over the last few years, UNESCO has dramatically increased the use of information and communication technologies (ICTs) in all sectors of education – and continues to do so. The older technologies of print, radio and television have been used extensively in distance education. <b>Gobi Women's Project</b> Under a joint UNESCO/DANIDA (Danish International Development Fund) sponsored program, 15,000 nomadic women, aged 15 to 45, are currently receiving training through radio to better their conditions. The Gobi Women's Project, launched in 1996, provides non-formal distance education through radio to some 15,000 nomadic women .</p> <p>(<a href="http://www.unesco.org/education/educnews/96_12_12/gobi.htm">www.unesco.org/education/educnews/96_12_12/gobi.htm</a>) The aim is to provide useful instruction on health, commercial skills, family planning, traditional crafts and environmental issues</p>	
<b>The Mongolian women's NGOs Coalition</b>	<a href="http://www.owc.org.mn/mwngoc/english/index.htm">http://www.owc.org.mn/mwngoc/english/index.htm</a> SUKHBAATAR DISTRICT, BAGA-TOIRUU 37-B, ROOM-301 ULAANBAATAR-13, CENTRAL POST OFFICE. Fax/phone: 328798 , phone: 312184
<p>This organization is made up of 31 Mongolian women's NGOs. One of the important tasks of this coalition is decreasing the gap between rural and urban population. It is their main argument that education is the key reason for such disparities. Frontier will make strategic alliances with this coalition and help them achieve their goal to minimize the gap between the rural and urban people. (Source: MONGOLIA NGO REPORT FOR ASIA-PACIFIC NGO FORUM ON BEIJING+10, 30 June-4 July 2004, Bangkok, Thailand )</p>	

**The Mongolian Youth  
Development Centre**

<http://www.owc.org.mn/mydc>

SUHBAATAR DISTRICT, 6th KHOROO, BAGA TOIRUU, 5th  
BUILDING APARTMENT 42.

PO BOX 198, ULAAN BAATAR 210648 ,MONGOLIA

Tel: 976-1-314433, 318744 Fax: 976-1-32663

The Mongolian Youth Development Centre based in Ulaanbaatar was established in 1997. It is a non-governmental and non-profit making organization working to assist Mongolian youth in their development into active members of society, by providing social, educational, cultural and physical activities.

## Appendix VI. Competitors Information

	<b>Price</b>	<b>US\$35</b>
	<b>Feature</b>	110 mmX110 mmX80 mm, 300g □ 1 minute of charging equals 45 minutes of listening □ Maximum 10 hours of continuous use
	<b>Company Info.</b>	United Eco life association, Korea
	<b>Source</b>	Source: <a href="http://www.ecolife.coop/">http://www.ecolife.coop/</a>
	<b>Price</b>	<b>US\$23.64</b> (with Batteryless Dynamo LED Flashlight and Charger)
	<b>Feature</b>	Batteryless FM Radio <i>f</i> for the emergency and environmental friendliness
	<b>Company Info.</b>	Unknown, Singapore
	<b>Source</b>	Source: <a href="http://www.eastgear.com">www.eastgear.com</a>
	<b>Price</b>	<b>US\$39.99</b>

	<b>Feature</b>	Philips AE100017 ; AM/FM Radio ; 1 minute of charging equals 30 minutes of listening ; Maximum charge of 1 hour equals 15 hours of continuous use
	<b>Company Info.</b>	Phillips
	<b>Source</b>	<a href="http://shop.store.yahoo.com/">http://shop.store.yahoo.com/</a>
	<b>Price</b>	<b>US\$39.95</b>
	<b>Feature</b>	Excellent AM/FM/Short Wave radio with built-in flashlight ; Four power sources: wind up, solar, battery or plug-in

	<b>Price</b>	<b>US\$39.95</b>
	<b>Feature</b>	Excellent AM/FM/Short Wave radio with built-in flashlight ; Four power sources: wind up, solar, battery or plug-in ; Includes built-in siren, compass, thermometer & digital clock ; 30 seconds of charging equals 20 minutes of listening
	<b>Company Info.</b>	Unknown, Unknown
	<b>Source</b>	<a href="http://www.kador.com/radio.htm">http://www.kador.com/radio.htm</a>