BACAANDA FOUNDATION
EI SUEÑO ZAPOTECO A.C.

Intelligent Schools Project

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www.bacaanda.org

Introduction

The Intelligent Schools project aims to transform the education of children in isolated rural communities through the introduction of technology

- The project will bring technology-enabled educational resources to over 700 students in 52 rural (indigenous) schools across a 400-square mile area of southern Oaxaca state in Mexico
- The Foundation is building a wireless internet signal transmission infrastructure that will reach 90% of these schools. Schools not reachable by internet signal will be provided extensive off-line resources through continuously updated iPad tablets
- Due to their isolation, 99% of these students have either never experienced the internet or have extremely limited exposure
- We have built a dedicated team of experts that is working on developing an innovative technology-based curriculum aimed at narrowing the widening gap between rural and public schools
- Our project is already well underway and we would welcome your support!

This project is the most ambitious in the ten-year history of the Foundation

2008

- Bacaanda starts as a private family foundation to support disadvantaged communities in the Huatulco area
- Soon thereafter Bacaanda is registered as a non-profit in the US and Mexico and formal fundraising efforts begin

2009-2012

- Opens dental clinics to service 240 children
- Establishes a terraced fruit plantation with irrigation
- Forms sports teams and rehabs sports facilities
- Creates a workshop for vocational training of artisans
- Conducts dozens of events

2013-2016

- Forms an alliance with CONAFE to support the improvement of the rural schools it operates
- Establishes a new facility to train the CONAFE teachers
- Builds the Derramadero school, the first of ten schools built during this period

2017-2018

- Moves the foundation to larger offices, workshop and showroom in Tangolunda
- With the help of many benefactors, builds or renovates xxx schools, xxx teachers quarters, xxx sports facilities, xxx communal kitchens, xxx computer labs

2019-2022

- Launching the Intelligent Schools project, targeting 54 schools with over 700 students
- Building 3-5 schools per year
- Expanding vocational training programs for CONAFE grads
- Obtaining status as a registered non-profit in Canada

How it Works

The internet signal starts with a transmission infrastructure based at Instituto Mexico, our project partner, that forwards a DSL signal from TelMex to Fonatur's Arrocito tower

Step 1: Transmission Infrastructure

TELMEX

Six 10MB DSL feeds, to be expanded to fiber optic once available

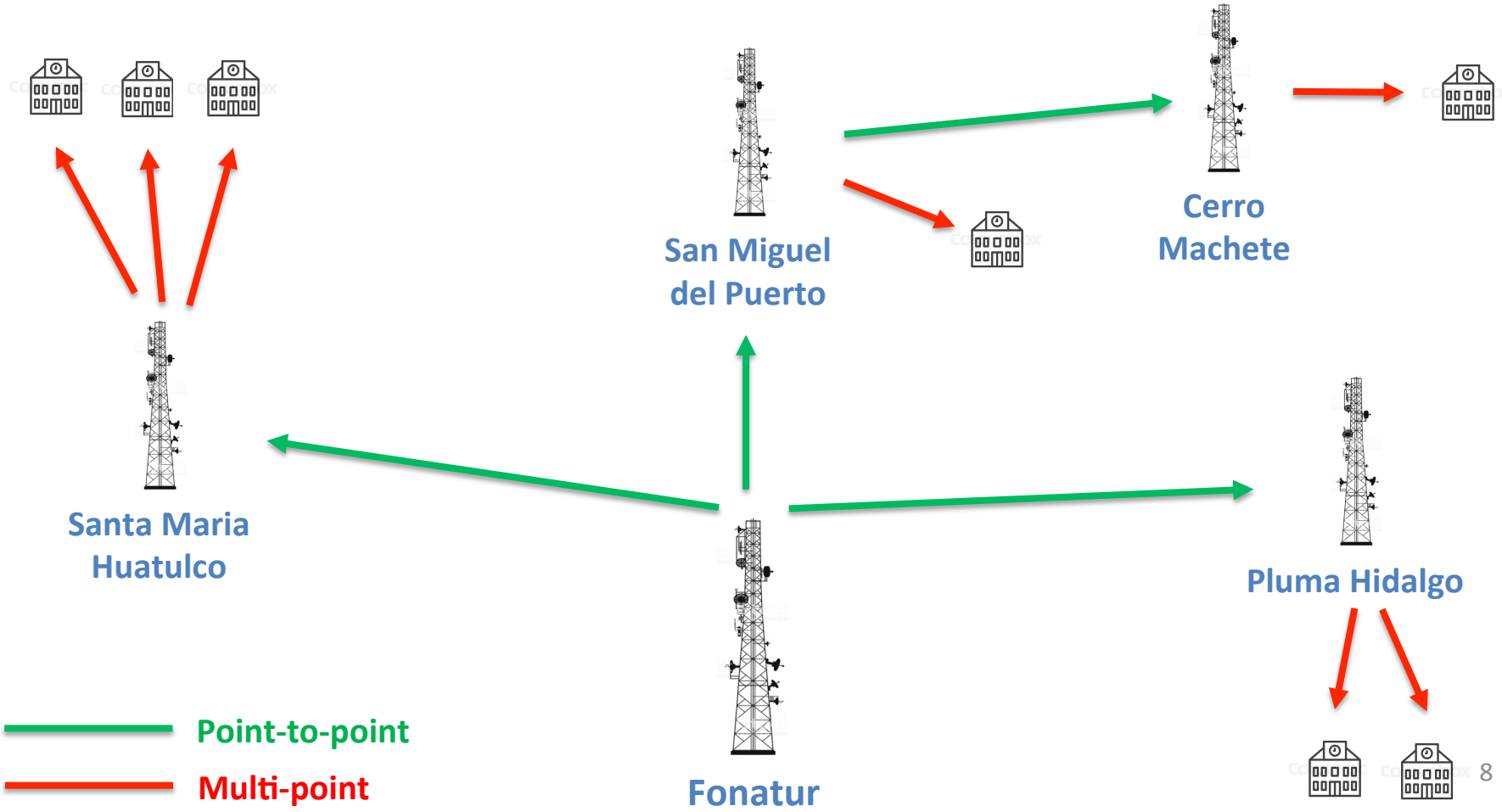
INSTITUTO MÉXICO DE HUATULCO

Site of the 6-meter origination tower and the project control center

30-meter Fonatur tower

From the Fonatur tower the signal is distributed by line of sight using point-to-point and multi-point MikroTik antennas to schools or to additional intermediary antennas

Step 2: Distribution Infrastructure



The signal is captured at each school by a rooftop antenna that feeds a wifi hub. The internet will be accessed through a Smart TV and iPad tablets, depending on educational goals

Step 3: Reception Infrastructure

Who Will Benefit

The first four phases of the project will initially benefit over 700 students

Phase 1

San Miguel del Puerto

- 130 students in 15 elementary schools
- 70 students in 7 middle (secondary) schools
- 48 students in preschool
- Main communities include Granadillo, Llano Grande, Copalita La Hamaca, El Tamarindo, Llano Jicara, Llano Palacio, Santa Catarina Jamixtepec and La Blas Xadani

Phase 2

Pluma Hidalgo

- 126 students in 12 elementary schools
- 23 students in 1 middle (secondary) school
- 45 students in preschool
- Main communities include Tres de Mayo, El Manantial, Barrio Nuevo Cimarrón, San Jose Palo Grande and El Rosario

Phase 3

Santa Maria Huatulco

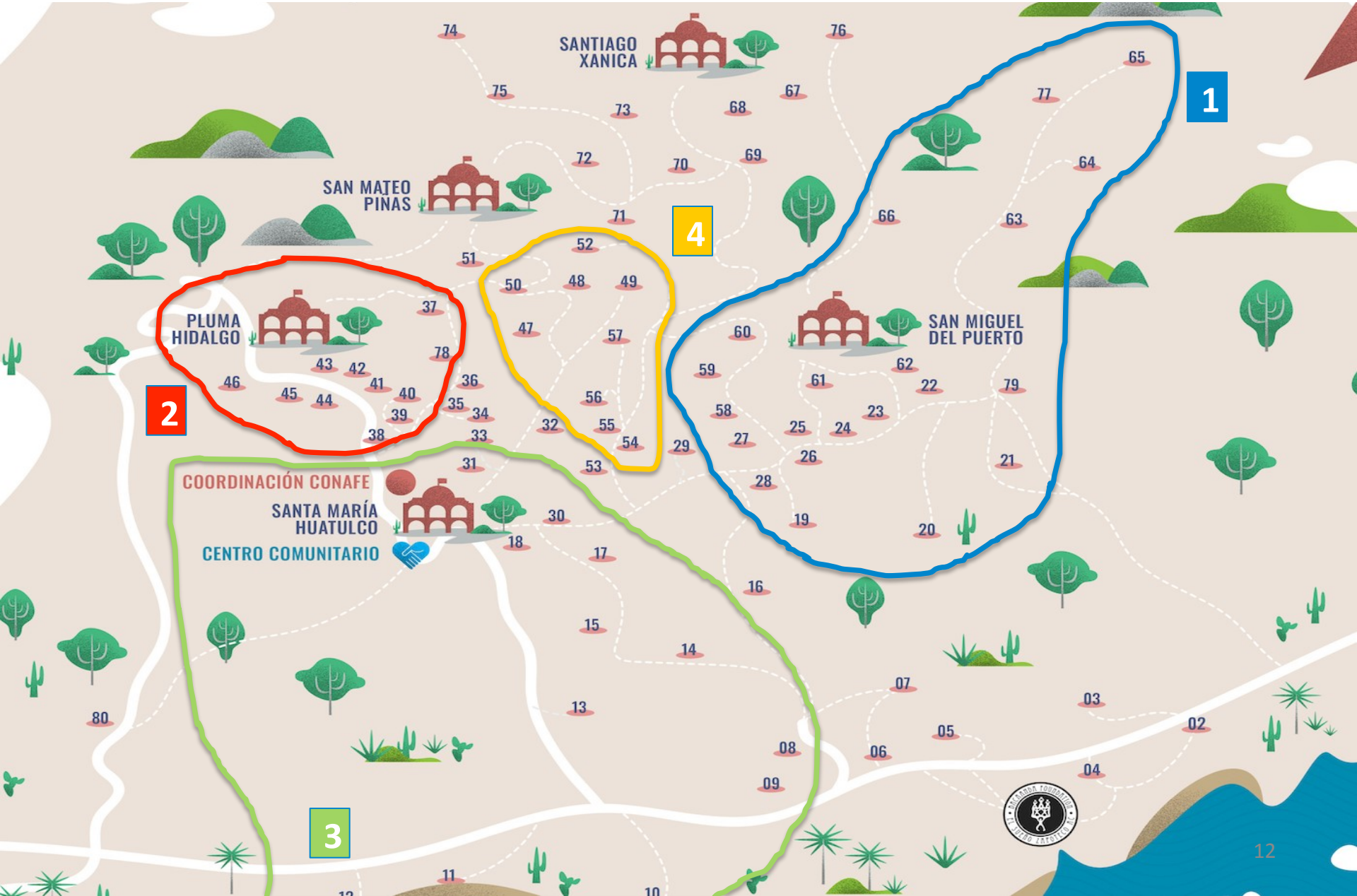
- 137 students in 13 elementary schools
- 8 students in 1 middle (secondary) school
- 88 students in preschool
- Possible connection to CONAFE
- Main communities include Derramadero, Agua Hedionda, La Jabalina, Puente Todos Santos, Chacalmata and Arroyo Limón

Phase 4

San Pedro Pochutla

- 32 students in 3 elementary schools
- 25 students in 2 middle (secondary) schools
- 12 students in preschool
- Main communities include El Paraiso, Cuajinicuil Alto and Unión de Guerrero

These initial benefits will cover the majority of the 80 rural schools in the region



There will be several additional benefits as the network is established

Additional benefits

- While the primary focus of the intelligent classroom will initially be on elementary and middle school students, there are an additional 200+ preschool students in these communities that will benefit as well – we are actively studying options for how to incorporate technology into the preschool curriculum
- There are hundreds of middle school students that do not go on to high school because of cost and distance to travel. There are already well established online programs in place – we just need to equip these students with the necessary hardware and support them along the way
- It is currently very difficult for CONAFE to recruit strong qualified teachers due to the challenges of living in isolated communities. An internet enabled network will provide CONAFE's over 100 teachers a significant improvement in quality of life and the chance to belong to an online community of educators that can share best practices and support each other in multiple ways
- As technology continues to develop and our network grows, we expect to be able to reach the final 20% of schools that do not form part of Phases 1-4

Costs and Financial Projections

The total setup cost of the project will range from US$270,000 to US$300,000.

	Phase 1 San Miguel del Puerto	Phase 2 Pluma Hidalgo	Phase 3 Santa Maria Huatulco	Phase 4 San Pedro Pochutla
Transmission and distribution	$20-22K	$20-22K	$18-20K	$12-14K
Signal reception at schools	$38-42K	$24-27K	$26-29K	$9-11K
Smart TV, tablets and accessories	$30-38K	$19-27K	$21-29K	$8-10K
Curriculum development and teacher training	$8-10K	$3-4K	$2-3K	$1-2K
TOTAL	$96-112K	$71-85K	$67-81K	$30-37K

The main cost drivers are school size, school clustering, local topography and our cost to acquire tablets

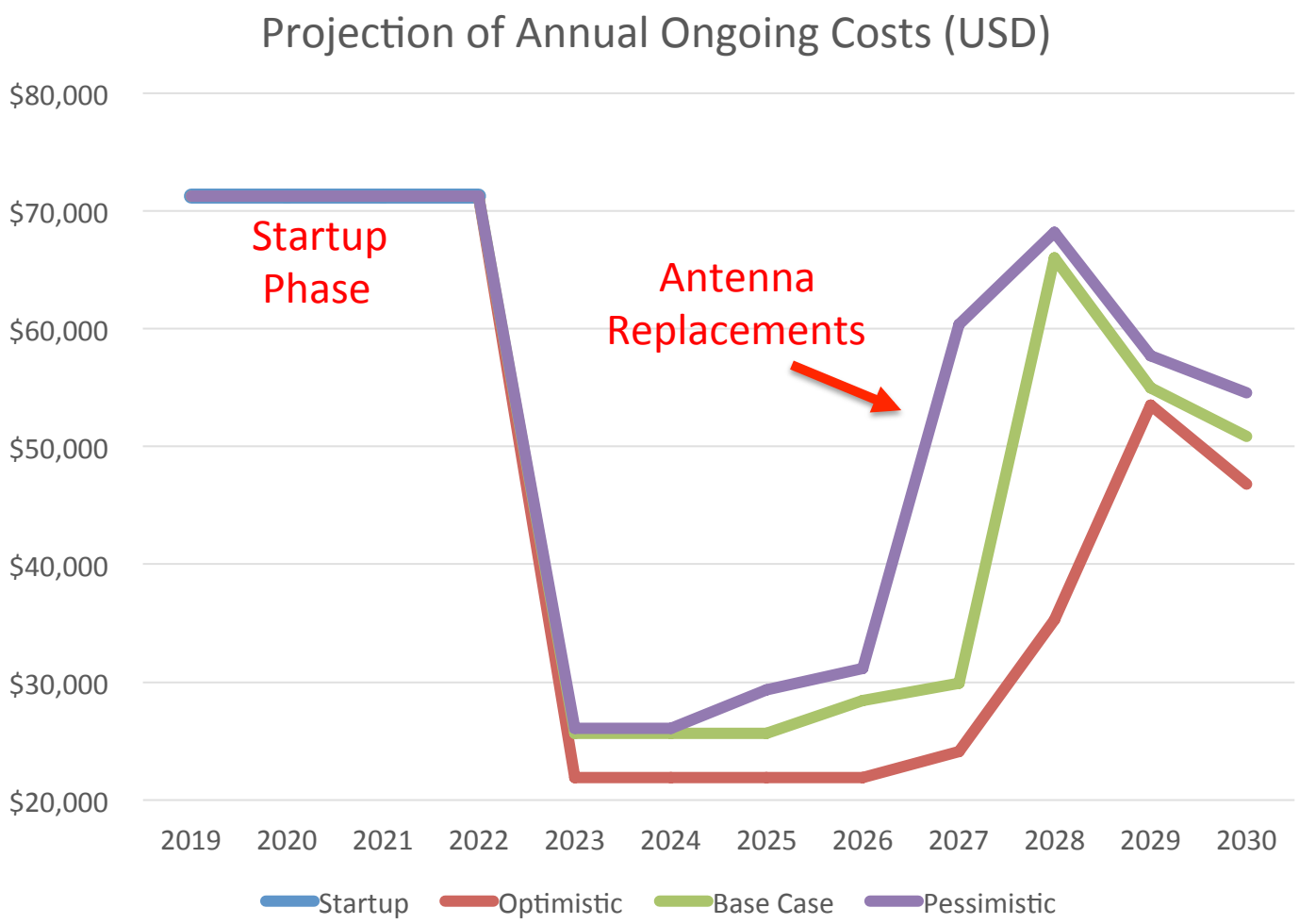
Cost Drivers

- Not surprisingly, schools with double digit student headcounts will be more cost efficient on a per student basis. Schools with very small (less than 5) student enrollment may be de-prioritized
- Villages with multiple schools can enjoy economies of scale such as a common wifi setup and sharing of tablets
- Schools that enjoy clear sight connection to distribution antennas can be set up with standard equipment configuration costing approximately US$ 1,800. Schools whose sightlines are blocked by mountains or foliage will require more expensive solutions. In some cases cost effective internet access may not be an option
- We are projecting the four school districts will require 280 iPads. For purposes of this analysis, we are assuming the following:
  - Our current vision is that each teacher will have an iPad and each 2.5 students will share one
  - 40% of all iPads will be used – costing $50 for new covers and setup
  - 60% of all iPads will be new – at a total cost of $350
- 42-inch Smart TVs will be purchased locally at a cost of $375

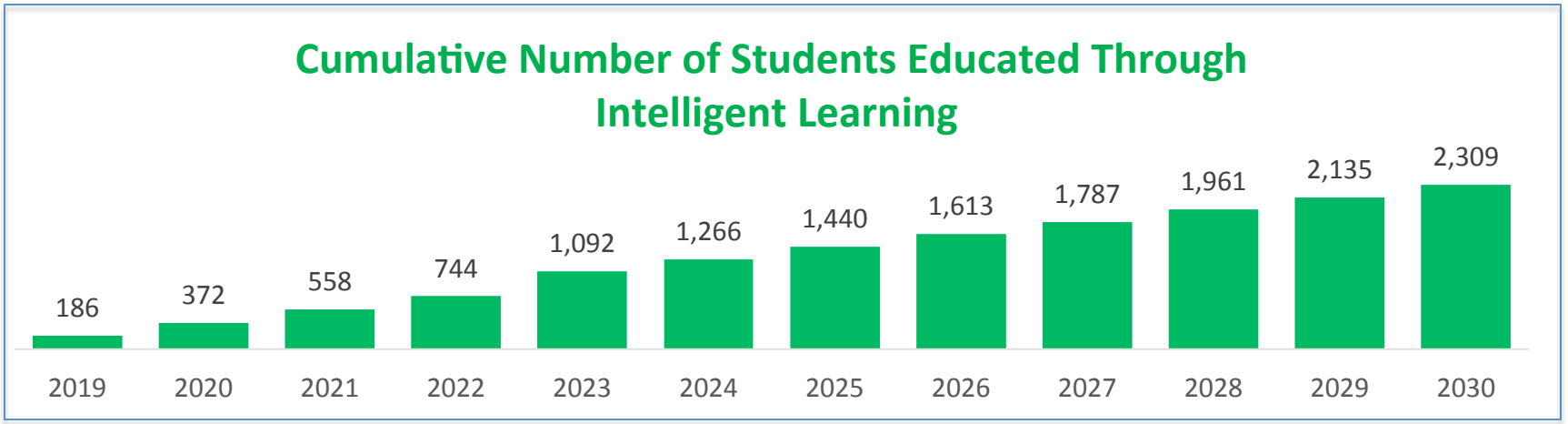
There will also be ongoing costs related to operation, repairs and replacement of each project component. We have modeled three scenarios

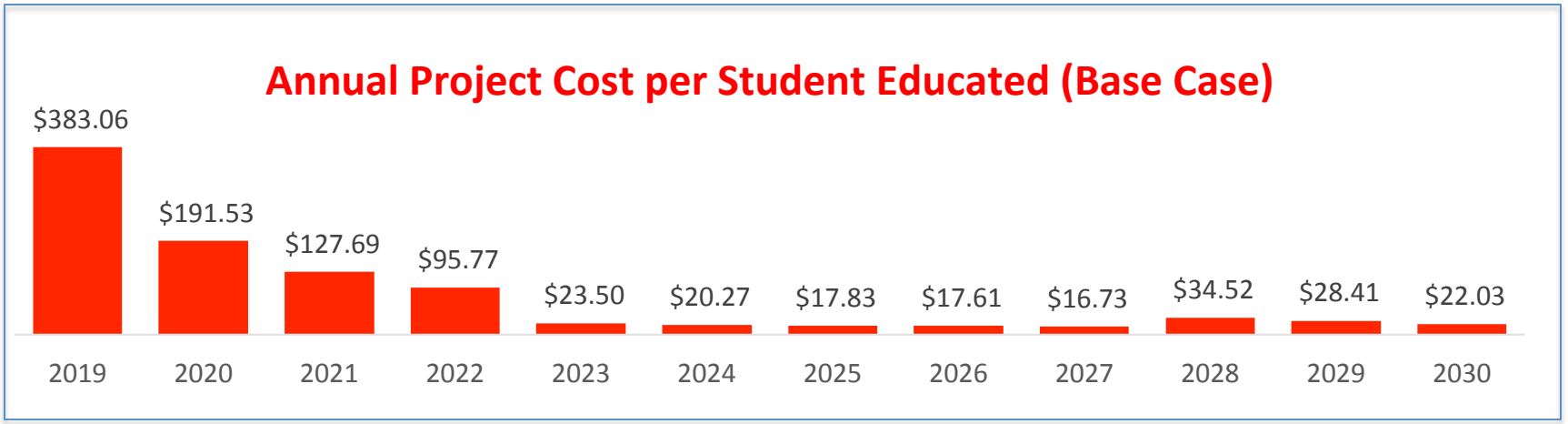
	Optimistic	Base Case	Pessimistic
Useful life of antennas	9 years	8 years	7 years
New antenna future cost	$1,400	$1,600	$1,800
Useful life of used iPads	2.5 years	2 years	1.5 years
Useful life of new iPads	5 years	4 years	3 years
New iPad future cost	$200	$250	$300
% of new iPads donated	75%	50%	25%
Useful life of Smart TVs	7 years	6 years	5 years
Smart TV future cost	$200	$250	$300
% of Smart TVs donated	40%	25%	10%
Network admin cost	$9,000	$12,000	$15,000

Average annual ongoing costs range from $33,000 in the optimistic to $44,000 in the pessimistic scenario. Given the pace of technology advancement, we are very optimistic



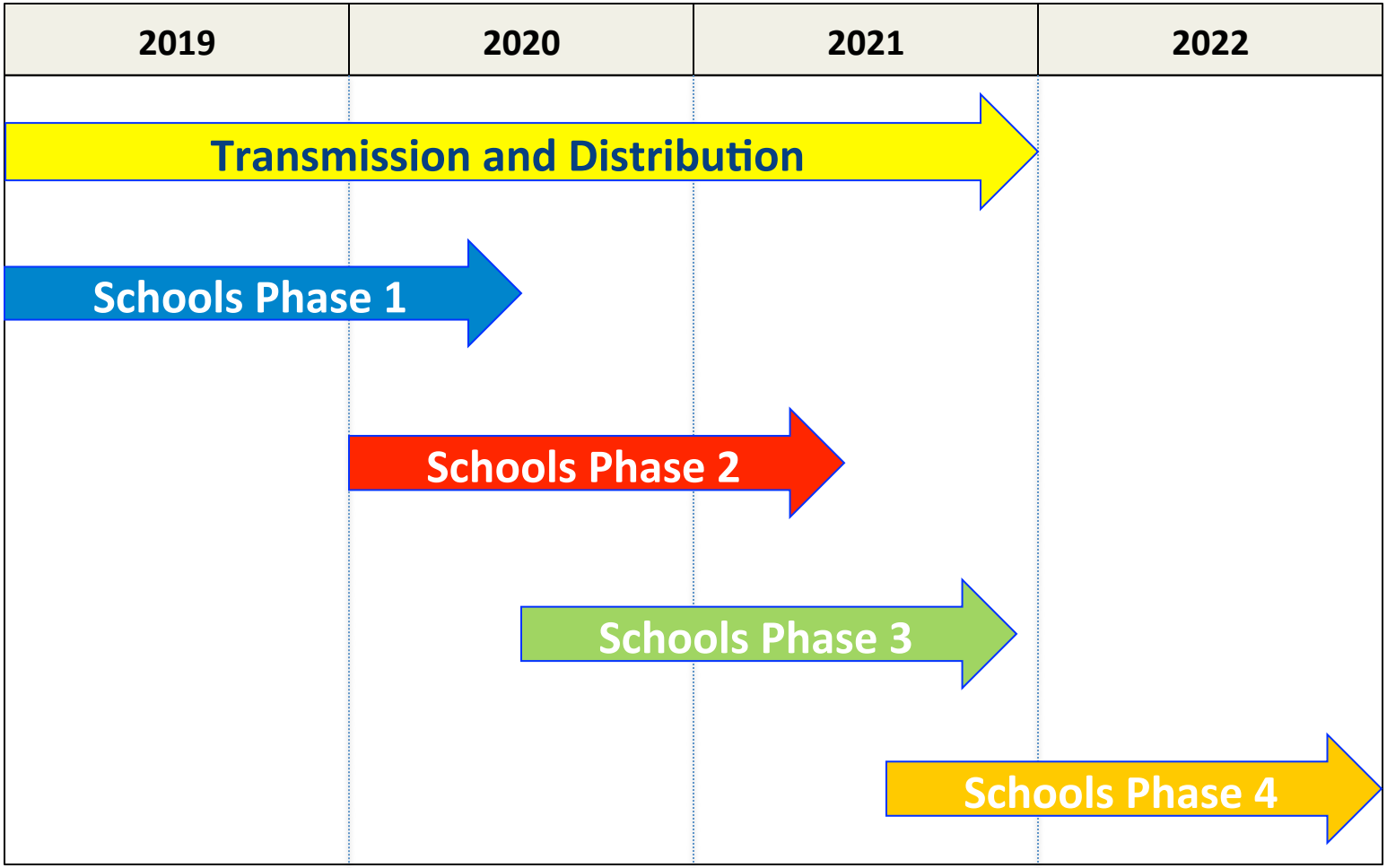
Furthermore, as more children study their way through the schools, the total cost per student falls significantly on a cumulative basis





Timing and Progress to Date

Depending on our fundraising efforts, we expect to complete the project within the next three years



We are off to a great start!

- We have established a partnership with Instituto Mexico, Huatulco's premier private school. Instituto Mexico is adjacent to Telmex, where our signal originates. It is also the site for our network control center

- Our phase 1 transmission infrastructure - allowing us to reach 200 students in 22 schools - is 80% complete. We expect to add the final two repeater antennas within the next few months

- We have received donations of 50 iPads - almost 20% of what we need for our four startup phases

- Our team of educators and IT experts is configuring the first generation of customized iPads for the internet project. The iPads will be equipped with both internet-enabled educational resources and offline apps that can be used when the internet is down or in communities where the internet signal can't reach

- Pilot tests have started at Los Olivos and Puente de Cuajinicuil - schools relatively close to the Huatulco area

We have a great team in place!

Ana Melo
Project Leader
BA – Public Admin
PhD – Public Admin
University of Chiapas

Britt Jarnryd
Community Outreach
President
El Sueño Zapoteco

Susanne Jarnryd
Project Oversight
BA - Bates College
M. Ed – Harvard
Education School

Erik Jarnryd
Finance
BA - Bates College
MBA – Harvard
Business School

Meny Hermida Lara
Curriculum Design
BA - Veracruz
M. Ed – IMD Oaxaca

David Perez Alonso
Teacher Training
Current CONAFE
Regional Trainer

Abigael Martinez
Device Management
BS - Info Systems
University of Pochutla
Former CONAFE
teacher

Alejandro Reyes
System Installation
BS – Isthmus Tech Inst
Owner, LockHouse

Get Involved!

Get Involved!

- The foundation has already invested $30,000 to launch Phase 1
- We are currently in the process of fundraising for the remaining funds required to complete the four start-up phases of the project
- Once we have secured this funding, we will look to build a fund to endow future operating and maintenance costs
- To execute this project we will eventually require more than 300 iPads and more than 40 Smart TVs
- Donations of new iPads (approx. cost $300) and gently used ones (must be fifth generation or newer models with Lightning chargers) are most welcome!
- All donations are tax deductible in the United States, and soon will be in Canada
- Please contact us at (781) 799-5102 or bacaandafoundation@hotmail.com
- THANK YOU!

Here are some examples of ways you can help!

Equipment Sponsors

$350	$400	$1,800
Buys a brand new iPad with 32GB of memory and a UZBL protective cover	Buys a Smart TV with an Apple TV programming box and accessories	Buys a Mikrotik Antenna, cabling and hub to connect a school to the internet

School Adopters

$4,300	$9,500	$12,000
Buys an antenna, a Smart TV and six iPads, enough for a teacher and a school of ten students	Buys all equipment for El Granadillo, our largest multi-school community (23 students)	Buys the equipment for the network monitoring center and pays for one year of monitoring

Appendix:
Frequently Asked Questions

The Bacaanda Foundation's Intelligent Schools Project - FAQs

What is the Bacaanda Foundation?

The Bacaanda Foundation is a non-profit organization whose focus is to empower disadvantaged rural communities in southern Oaxaca through improvements to education. In the ten years since its inception, the Foundation has built 22 new schools and overseen improvements to educational infrastructure in dozens of communities. The Foundation is legally established in the United States as the Bacaanda Foundation and in Mexico as El Sueño Zapoteco AC. Certification in Canada is expected soon.

What is the Intelligent Schools Project?

The Internet Project is an initiative to bring connectivity to rural schools within the state of Oaxaca. The signal, originating in downtown Huatulco, will be delivered via a network of transmission towers.

What is CONAFE?

CONAFE - the national commission for the promotion of education – is a public entity charged with overseeing the education of preschool, elementary and middle school children in primarily indigenous rural communities across the country. The Bacaanda Foundation works hand-in-hand with CONAFE to service the schools in the CONAFE district around Santa Maria Huatulco in southern Oaxaca. This is a 400 square mile area north of the city of Huatulco.

Shouldn't the government be doing this instead of the Foundation?

The federal government has announced a program to bring internet to Mexico. However, because of limited financial resources, if this project happens at all it will prioritize high density population pockets across the country. The rural communities that we service are sparsely populated and topographically isolated. Even in the best scenario it would be many years, if not decades, before some of the schools are wired. Meanwhile the educational gap between wired and unwired schools will continue to widen. It is important to note that government entities such as Fonatur are supporting the project by allowing us to tap their existing infrastructure such as transmission antennas

What role do the parents of the students play?
One of the the Foundation's core beliefs since its inception is the need to work with the communities, and not for them. Parents play a fundamental role in the planning and construction of every school, providing hundreds of hours of volunteer labor and safeguarding the integrity of the finished product. This gives them pride, satisfaction and ownership of the community improvements. This project will be no different. Dozens of parents have already been heavily involved helping us install massive transmission antennas in remote locations. Their enthusiasm for this project is amazing, and a source of inspiration to the Foundation staff.

How many schools will the project reach?
Over the course of four phases we expect to reach 64 schools. Phase One will consist of 22 schools in 16 communities, serving 248 students.

How have you chosen these schools?
The schools are all elementary and middle schools that form the local CONAFE (rural schools) district. The first schools will be near San Miguel del Puerto. We chose these schools for their relative proximity to Huatulco and the large number of middle schools within this district, as we believe middle schools will derive the most immediate benefit. We are launching a two-school pilot program in the spring of 2019.

How much will it cost to connect schools?
The cost is variable, depending on the challenges to bring the signal to the community and the number of students in the school. There are three cost components: the shared cost of transmission infrastructure for each region, the cost of the reception equipment at each school (US $1,800-3,000 per school), and the cost of the classroom hardware (tablets, Smart TV, storage unit). As an example, an elementary school with ten students in a community reachable by internet would require a standard antenna ($1,800), a Smart TV ($400), one iPad for the teacher ($350), and four shared iPads for the students ($1,400) – for an initial setup cost of $3,950. There would then be additional future costs for replacement of equipment as it wears out. These costs can be lower if some of the equipment is used instead of new.

What will the kids learn?
The schools will follow the CONAFE curriculum, heavily supplemented with online materials from a variety of sources chosen for their rich educational content and applicability to rural school education. Based on available research, we will follow global best practices to optimize the effective use of technology in the classroom.

What devices will the students use and why?
Students will use iPads with "ultra-protective" UZBL cases. We believe iPads offer the best potential for long-term technical growth within a closed architecture resistant to viruses. Tablets will be shared in the classroom. In our multi-grade classrooms this will allow the teacher to work directly with small same-level cohorts while other students work independently. Each school will have a lockable charging cart for overnight charging and overnight iPad storage. Larger classrooms will also be equipped with a Smart TV to allow the teacher to do whole class teaching.

How will the teachers be trained on use of the internet?
We recognize the crucial role played by teachers in this project. Our implementation team includes a specialist with many years of experience in training CONAFE teachers. Teachers will be trained in the field and also during their monthly and summer-long sessions at CONAFE headquarters.

Who will troubleshoot technical issues?
In addition to our own in-house tech person we have engaged a consultant to provide technical expertise in Huatulco. He will be able to check signal speeds and usage patterns remotely and make on-site modifications as necessary. We will also monitor for issues during periodic visits to the schools and during teacher training sessions at CONAFE.

What about schools where you can't get the internet to the community?
We're investigating the use of devices capable of providing off-line content in the classroom in the 10-15 % of CONAFE schools we do not expect to be able to reach with the internet

Can you accept used iPads? What type?
YES! Our standard classroom tablet will be a 9.7" model (model 5 or 6) with the small charging port. Unfortunately we can't use older models with the wide charging port.

How much does the internet signal cost?
The current cost is less than $100 per month. We expect his will increase nominally when fiber optic technology and the greater capacity it will provide becomes available.

How many towers? How does it work?
The internet signal originates at the TELMEX offices in downtown Huatulco. From there the signal travels to a transmission tower at Instituto del Mexico, and from there to a network of repeater towers to an antenna at each school. The towers are powered by green solar cells.

What does the signal strength allow you to do?
The initial signal will consist of six lines of 10MB each to be shared across target schools. This will allow us to provide a streaming experience to 8-10 schools at a time. We will schedule usage across a fixed daily timetable so each school can enjoy an optimal experience without interruption. Teachers will also be able to download content for off-line use after school hours. We expect within the next 3-5 years fiber optic technology will become available in the Huatulco area, at which point we will to upgrade the signal to fiber optic speeds, ending the need for signal rationing.

What are the limitations of the technology?
The technology depends on line of sight connectivity between antennae. There are communities where local topography makes internet access impossible. We are investigating the use of offline resources in these cases. Due to high costs and slow speed satellite internet is not a viable option.

How long will it take to finish the project?
This will be a long-terms and ongoing project. Depending on the success of our fundraising efforts we expect to complete the transmission infrastructure by early 2021.

What has been accomplished so far?
We have completed transmission infrastructure for the first school district, San Miguel del Puerto (our Phase One coverage area). We have launched a pilot program at the Los Olivos school which is near HUatulco

How many kids/tablets per school?
An average school has 10-18 kids, so most communities will need 5-8 iPads.

Why not a 1 to 1 program?
We have been advised that within the classroom shared iPads will be sufficient for our educational goals. We also feel it's important to reach as many rural schools as possible, and sharing resources will allow us to impact more children more quickly.

Why not high schoolers?
The communities we serve do not have high schools. Rural high schoolers must travel to high schools in larger, less remote communities. With the addition of the internet we anticipate an opportunity for distance learning among students who are unable to attend high school outside our communities.

What is the life of an iPad?
Most school tablet programs have a replacement rate of 4-5 years for new iPads. We are assuming a rate of 2-3 years for used iPads

What are the costs to charge the iPads overnight?
The Mexican government provides electricity to rural schools at no cost to the schools.

Will the kids bring them home?
The iPads will remain in the schools under a teacher's supervision. We expect there will be opportunities for iPads to be borrowed on a case by case basis, and for the technologies to be employed for wider community engagement.

How will you control inappropriate content and ensure internet security for the students?
We recognize the need not only to ensure the productive use of the internet in an educational environment, but also to prevent inappropriate web browsing and protect children from online predators. We plan to extensively train teachers as our first line of defense to ensure appropriate usage in the classroom. We will also have software that will allow us to monitor and control content in all schools from a central location at the Instituto Mexico offices. We have factored in network administration costs to our financial forecasts.

What are your goals? How will you know if the program is a success?
We are developing a baseline set of metrics against which to measure our progress. These include school attendance, school enrollment, performance on current testing measures, teacher satisfaction and teacher retention

Who will administer the program?
Foundation staff. The iPads will remain the property of the foundation so that they can be transferred among schools as enrollment changes.

What role does the public sector play? Do you have any partners?
In addition to many generous individuals, we are being supported by:
The Phillip and Elizabeth Gross Family Foundation
CONAFE
FONATUR Huatulco
Instituto Mexico de Huatulco

Can I buy my own iPad to donate?
Yes, but we can usually get a better price with the Foundation's bulk discount through Apple and the Foundation's tax-free status. Contact us for current pricing.

Do you have other ideas for how I can help?
-Ask friends and family for gently used iPads (9.7", generation 5 or later).
-Establish a sister school relationship between your home school and one of our rural schools.
-Check in your area for school or corporate iPad recycling programs. For instance, schools which require student to own iPads for classroom use often have a preferred donation program.
-Throw a fundraiser with the goal of raising money to support a school (we'd be happy to provide materials).

THANK YOU!