

## CASE STUDY

# A Partnership for Cleaner Air in Ethiopia: Infrared Industries and V-SAFE

## The Challenge

Ethiopia has over 82 million people, making it the second most populous African country. Despite a fast-growing economy, it still has one of the lowest GDPs (gross domestic product) per person of any country in the world. Even though life expectancy has increased considerably, today men live on average 56 years and women live on average 60 years. The high level of pollutants found in the air and other environmental conditions can lead to severe illnesses and shortening of life.

## Getting Started

In 2003, Derebew Shankute traveled to Ethiopia to show his family where he was born. After they exited the airport in the capital city of Addis Ababa, they all had trouble breathing. Derebew, a mechanical engineer specializing in environmental engineering, noticed that every car had plumes of smoke coming out of the tailpipe. He saw children playing soccer and having trouble breathing. He knew that something had to be done and felt a calling to be the one to do something about this issue.



*Bob Benjaminson and Derebew Shankute*

He returned to the United States and spoke with colleague Bob Benjaminson, a chemical engineer, and Garrett Torgerson, another mechanical engineer, both specializing in environmental engineering. Bob and Garrett were both immediately on board to do something. Together they formed the non-profit organization V-SAFE, which stands for Vehicular-Smogless Air for Ethiopia.

V-SAFE—headed by President Bob Benjaminson—held a fundraiser and the founders still had to spend thousands of dollars of their own money. They also worked on their own time to determine what they could do to help the Ethiopians.

V-SAFE decided to perform a study to determine quantitatively just how bad the air pollution was in the capital city of Addis Ababa and how much of this was caused by motor vehicles.

## Making Contact with Ethiopian Authorities

Derebew Shankute knew that for him and his colleagues to have a chance of affecting the environment in Ethiopia, they would need to work with the Ethiopian government. He contacted the Ethiopian Consul General in Los Angeles, expressed his concern about Ethiopia's air pollution, and stated V-SAFE's desire to help. The Consul General put V-SAFE in contact with the Addis Ababa Environmental Protection Authority (AAEPA). The V-SAFE partners, together with AAEPA—and with the blessing of the Ethiopian government—worked to bring the project to fruition.

## SYNOPSIS

**CUSTOMER:** V-SAFE

**INDUSTRY:** Motor Vehicle and Environmental

**WHERE:** Addis Ababa, Ethiopia

**PRODUCTS USED:** FGA4000XDS Gas Analyzers and HM5000 Gas Analyzers (hand-held)

**HOW USED:** To do ambient air emissions testing and automotive emissions testing



Technicians and Engineers in Training

## The Infrared Industries Solution

Bob Benjaminson was familiar with the Infrared Industries gas analyzers and approached CEO Mark Russell about helping V-SAFE in its cause. Mark decided to help V-SAFE because it seemed like a worthwhile endeavor and he felt that Infrared Industries gas analyzers could be used to make a difference in the lives of the Ethiopian people.

Infrared Industries gave V-SAFE a nominal rental fee for six FGA4000XDS gas analyzers and four HM5000 handheld gas analyzers along with all of the necessary accessories to take to Addis Ababa for the testing.

### Training Technicians and Engineers in Addis Ababa

Bob, Derebew, and Garrett did all the preparations and traveled in March of 2011 to Addis Ababa to train the technicians and engineers and to oversee the emissions testing. They paid the salaries of the prospective inspectors. V-SAFE conducted three days of training, which started with everyone together and progressed to specialized training:

- For the technicians on how to do roadside vehicle emissions testing
- For the engineers on how to do ambient air testing



Training on HM5000 in Addis Ababa



HM5000

### Ambient Air and Automotive Emissions Testing

The engineers trained to do the ambient air testing worked in one location for eight hours a day for 10 days logging data with the use of the Infrared Industries handheld HM5000 Gas Analyzer. V-SAFE was looking for this kind of information:

- How had air pollution increased from previous studies?
- How much worse than average was air pollution in the most crowded areas?
- What was the composition of this air pollution?

The technicians doing automotive emissions testing had the permission of the Addis Ababa government to pull cars out of traffic to test them. V-SAFE went there with the goal of gathering information. Over the ten days of testing, about 800 cars were inspected roadside.

Some information about the test:

- Used the Infrared Industries FGA4000XDS Gas Analyzer
- Took ten minutes per car
- Performed a “two-speed idle” test with a probe inserted in the tailpipe to measure the emissions, first with the engine at 2500 RPM and then with the engine idling

Local residents in their cars were happy to pull over and received a printout with the results of the test and a brochure about what a car in good condition would emit. Since there are no emissions standards, participants did not pass or fail.



FGA4000XDS



Derebew and Technicians Doing Testing with FGA4000XDS

## Attracting the Media

The cars being pulled over for emissions testing on the streets garnered a lot of attention; something like this had never been done in Addis Ababa. A local television station got in touch with the V-SAFE team and filmed what was being done—a first of anything like this for Ethiopian television.

Television crews followed the V-SAFE-employed engineers and technicians, documenting and broadcasting their work. They also spoke with Derebew and Bob. An edited version of the video broadcast is located at <http://youtu.be/LSi-zo8bhPU>.

## Compiling the Results and Next Steps

After the testing was completed, the V-SAFE team returned to the United States. They are currently compiling the data into a scientific report, which they will formally present to the Ethiopian government through the Addis Ababa Environmental Protection Authority.

They also intend to provide copies of the report to the United States Environmental Protection Agency (EPA), the World Health Organization, human rights organizations, and anyone else interested in the results.

The V-SAFE team will include recommendations on what—in their expert opinions—should be done to abate the excessive pollution in the air in Ethiopia, which can lead to things like emphysema, cancer, asthma, and even shortened lives.

V-SAFE partners plan to continue their personal commitment to this project by working with the Ethiopian government as consultants to provide guidance as they begin to put in place standards to improve the air quality in their country.

## Benefits of Working with Infrared Industries

**“Their willingness to cooperate with us was superb. They even modified the software to suit our needs.”**

**“The software was unlike any I’ve used before; there were no errors.”**

**“The analyzers arrived, we turned them on, and they worked.”**

**“The Infrared Industries gas analyzers are very stable, even with the high level of emissions we encountered.”**

**~Bob Benjaminson  
President, V-SAFE**