



## Energy demand and biogas production in rural areas

### Before departure

I applied for Minor field studies because I was very interested in learning more about the work you can do as an engineer in low- or middle-income countries. Travelling to another corner of the world to apply the skills that I have learned during the first three years of my studies in a way that could make a difference for someone sounded really appealing to me. We chose Bolivia as the location partly because my project partner Noel is half Bolivian, and we therefore knew that Bolivia has a huge unexploited potential for renewable energy generation. The unexploited potential for renewable energy generation was also partly the reason behind the project we did, which we decided on together with two Bolivian PhD students at KTH.

I did not need to take any language courses to do this project, but I did try to learn some basic Spanish on my own both before departure and during our stay. My project partner is fluent in Spanish which I think was very important for the project, as we could easily communicate with anyone and use references written in Spanish. As for vaccinations, the only vaccine you are obligated to take before travelling to Bolivia is for yellow fever. However, a couple other vaccines are recommended, such as for Hepatitis.

### Upon arrival

We arrived in Cochabamba Bolivia on the 2<sup>nd</sup> of April, after spending two weeks in Argentina. The project we were doing did not have a set start date, but the plan was to stay in Bolivia from the end of March/beginning of April until the end of May. By the time we left the country on the 30<sup>th</sup> of May, we had spent just over 8 weeks in the country.

There was no organized reception for us when we came. However, the Sunday we arrived we were met by Jhonny who had just finished his PhD at KTH and moved back to Cochabamba, who showed us around the city centre. The day after we met and had lunch with our contact person and some of the other researchers at the university.

### Financials

Bolivia is a lot cheaper than Sweden! For example, taking a trufi (a minibus) which probably is the most common public transport in Bolivia, usually costs around 3 SEK. This is one way to save some money on transport. Although being a more expensive alternative, taxis is also quite cheap. Our taxi rides in the city centre usually cost somewhere between 15 and 30 SEK.

Flying directly to Bolivia is quite expensive, compared to flying to other big cities in south America. We therefore decided to fly to Buenos Aires and work our way north to Bolivia by bus. This was a nice way to see more of the continent and save some travel expenses. We also ended up flying home from Rio de Janeiro, after spending a week in Brazil after finishing our project. Although it saved us some travel expenses, it naturally brought several other expenses. We found it to be worth it as we got to see and experience more during our stay in South America.

I was not on a strict budget during my stay, and I decided to use some savings I had to cover expenses for some activities and traveling. However, I definitely think I could have stayed within a budget of the MFS scholarship and my normal student loan if I wanted to.

### **Accommodation**

Jhonny, which was one of our contact persons offered us to rent his apartment during our stay in Cochabamba. This was very convenient, and I think it would have been hard to find a better place for the same price without his help. The apartment was spacious, and we both had our own bedrooms and bathrooms. The apartment was in a quiet area, but located just a couple blocks of the main street where you could find a large supermarket and lots of restaurants and bars. For the apartment we paid around 2700 SEK per person per month, which we both found to be cheap.

### **Project**

The purpose of our project was to estimate the energy demand and the potential for biogas production in the village of Raqaypampa outside of Cochabamba, as well as to propose a polygeneration plant for the community which can supply both electricity and heat to the people. As of today, we don't have any plans to continue the project but as written in our report there are multiple options for future work which can be done by other students or researchers. A typical day for us generally consisted of working on our project at the university, as the field study in Raqaypampa where we collected our data only took two days. We were lucky enough to be in an office with other researchers with lots of experience within energy research and planning. This meant that we could not only get help from our supervisor but from the other researchers as well, which of course was super helpful.

We did not have a final presentation of our results locally, but Jhonny and Luis who were the two PhD students who helped us out were there on zoom when we presented in front of our examiner and the class. We also shared our report with the other researchers at our office.

### **Country**

I really liked both the destination and the culture in Cochabamba and Bolivia in general. Everywhere we went I felt very welcomed. Since it was my first time in Latin America the culture was completely unfamiliar to me, but I would not say that I experienced any cultural shocks. I went in with an open mind which I think helped me experience more of the local culture.

### **Leisure and social activities**

During our stay we tried to work on the projects on the weekdays and take the weekends off. On regular weekdays we usually went to the university and did some sort of workout afterwards before going out to eat later in the evening.

We became good friends with some Bolivian PhD students and a Belgian Master student who sat in the same office as us, who we hung out with a lot. We usually always went out for lunch together and quite a few times for dinner. Together with them we amongst others went to a nearby lake for a day, went climbing and travelled to a village called Villa Tunari, where we stayed for the weekend. Here we visited some adventure parks and went rafting in one of Bolivia's many rivers.

During our two months in Cochabamba, we spent many of the weekends travelling around Bolivia and exploring the country. Amongst others we went to the cities of La Paz, Santa Cruz, Tarija, Sucre, Potosi and the salt flats in Uyuni.

### **Sustainability**

Traveling to South America without flying is of course difficult, and as written earlier we flew first to Buenos Aires. However, within South America there are good bus connections, and the busses are usually very comfortable. We travelled by bus from Buenos Aires to Bolivia but flew the final stretch from Tarija to Cochabamba. When travelling around Bolivia for leisure we always went by bus, except from when we visited La Paz.

As for sustainability in our everyday life, it was challenging to live in a very sustainable way during our stay in Bolivia. For transport we tried to use public transport when we were going places. In South America the average person eats a lot more meat than in Sweden and I ate more meat during my stay

there than I do back home. When going out to restaurants there were rarely vegetarian options. Recycling stuff and sorting our waste was also very challenging.

Our project is relevant to the fulfilment of multiple of the sustainable development goals, but the main goal touched by our project is goal number 7; Affordable and clean energy, as our project may increase the energy access for the people in the village, as well as making it more sustainable. Other goals that our project can contribute towards are goal number 1: No poverty, 3: Good health and well-being, 4: Quality education and 13: Climate action.

### **Other recommendations and observations**

First, I want to recommend doing a minor field study to everyone, and I also highly recommend Bolivia as the destination! I learned so much during my stay in Bolivia and had an amazing time there.

If you are going to Cochabamba, I have a few recommendations:

- Be open minded! A simple recommendation, but it helps a lot when exploring and getting to know a whole new culture.
- Get to know some locals.
- Eat the local food! Although it is sometimes a bit simple, Bolivian food tastes great, and the restaurants that serve Bolivian food are generally a lot cheaper.
- Go to La Cancha, a huge market located by the bus station In Cochabamba. You can walk around for hours and find anything here. It is a true cultural experience!
- Explore the mountains around the city, the view is amazing!

When in Bolivia, I highly recommend you travel around and explore the country, it truly has everything. Some highlights that I recommend you visit is the spectacular Uyuni salt flats, the vineyards in Tarija, cycling the death road and climbing Huayna Potosi in La Paz.