



NCDO - Bolivia

## Rio Taquesi Hydroelectric Power Project

**Sector:** Energy

### General Description:

The Rio Taquesi Hydroelectric Power system aims to prevent the emission of around 5 million metric tons of GHG over its 35 years life, by displacing electricity that would be supplied to the Bolivian grid by fossil fuel power plants dispatched if the project would not be implemented. The Taquesi system pursues to produce electricity through the operation of 89.5 MW (in the aggregate) hydroelectric generating plants along the Taquesi and Unduavi rivers. The system consists of two hydroelectric plants in La Chojlla (around 38 MW) and Yanacachi Norte (almost 52 MW), a 115 kV switch yard adjacent to ENDE's existing substation in Pichu and around 5.2 km of double circuit 115 kV transmission line and 7.3 km of single circuit transmission line in 115 kV.

### Project lifetime:

35 years

### Accreditation period:

21 years

### Estimated Greenhouse Gas Emissions Reductions:

**21 years: 3,146,898 tCO<sub>2</sub>e**

Up to and including 2012: 1,525,036 tCO<sub>2</sub>e

Up to a period of 10 years: 1,377,594 tCO<sub>2</sub>e

Up to a period of 14 years: 1,967,362 tCO<sub>2</sub>e

### Project Benefits:

- The project positively impacts economic development of the region by producing significantly cheaper electricity for the national grid by utilizing existing site, substation and transmission facilities, reducing project costs per MW and minimizing construction impact.
- Both temporary and permanent jobs were created during the construction and operation of the plants.
- The project adds momentum to developing clean independent power production in Bolivia.

### Total implementation cost estimate:

Development Costs: 7.8 US\$ million

Construction costs: 86.2 US\$ million

Other costs: 7.5 US\$ million

Total: 101.5 US\$ million

### Current Status:

The project is in commercial operation since June of 2002. It has a PDD and it is under validation procedure.

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## Cercado Landfill Gas Combustion Project

**Sector:** Energy

### Project Description:

The Project collects and uses the landfill of "Kara Kara" in the city of Cochabamba to install a modern system of extraction and gas combustion to maximize the extraction and methane flaring.

The landfill site was established in 1987 to address the need to store the city's production of urban solid waste. The site has an area of 40,000 m<sup>2</sup>, about 26 Ha are covered with confined waste. The landfill receives approximately 10,000 tons of waste per month. Taking a conservative approach, about 2 million tons of waste has been accumulated at Kara-Kara during its 16 years of operation.

### Project lifetime:

25 years

### Accreditation period:

10 years

### Estimated Greenhouse Gas Emissions Reductions:

Up to a period of 10 years: 800,000 tCO<sub>2</sub>e

### Project Benefits:

- Reduction of methane emission, which is a Greenhouse Gases (GHG) due to the system of gas combustion and flare.
- Owe to the collection and combustion of landfill gas the odour levels in the surrounding will decrease significantly. Furthermore, methane is an explosive gas which if it is not collected can result in dangerous situations on site and the landfill surroundings.

- Income from the CERs transactions would reduce the solid waste tax for the population.

### Total Project cost estimate:

Development Costs: 0.8 US\$ million

Construction costs: 0.3 US\$ million

Other costs: 0.2 US\$ million

Total: 1.3 US\$ million

### Current Status:

The project has a PIN and it is under revision.

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## Santa Cruz Landfill Gas project

Sector: Energy

### Project Description:

The objective of the project activity is to capture methane from the existing compartment 6 and the new compartment 7, under construction, of the Normandia landfill in Santa Cruz. By capturing and combusting the landfill gas (using a flare system), global GHG emissions are reduced, local environmental impacts are mitigated and operational safety is increased. Through the installation of a gas extraction system the odour levels and air pollution in the surrounding areas will decrease. As a consequence of decreasing odour levels and air pollution the living conditions and health situation for the people living in the surrounding areas will improve.

### Project lifetime:

21 years (2005 – 2026).

### Accreditation period:

21 years

### Estimated Greenhouse Gas Emissions Reductions:

**21 years: 1,736,278 tCO<sub>2</sub>e**

Up to and including 2012: 514,894 tCO<sub>2</sub>e

Up to a period of 10 years: 988,059 tCO<sub>2</sub>e

Up to a period of 14 years: 1,386,324 tCO<sub>2</sub>e

### Project Benefits:

- Due to the collection and combustion of landfill gas the odour levels in the surrounding will decrease significantly. Furthermore, methane is an explosive gas. If the methane is not collected this can result in dangerous situations on site and surroundings.
- Under the scope of the project a green belt will be planted around the landfill site. The visual impact of the landfill on the surrounding will thus decrease significantly. Furthermore, dust pollution in the surrounding will decrease

because small particles caught by the wind will be contained on site.

- The City Council will build a Park within the district, as an “environmental compensation” for the nuisance of living along the road that takes all Santa Cruz’s solid waste to Normandia and for living near, 3 kms, the landfill.
- Public awareness campaign for the prevention of litter and hazardous waste in the city of Santa Cruz.
- Public awareness campaign for the minimisation of hospital waste in the local hospitals. Currently all hospital waste is treated equally. By separating the medical hospital waste (needles, pathogenic waste, etc) from normal “restaurant” waste (food, sheets, etc) the amount of hospital waste can be reduced and thus costs can be reduced. Also the smaller amount of hospital waste can be treated with less risk for infections etc.

### Total Project cost estimate:

Development costs: 150,000 Euros

Installed costs: 850,000 Euros

**Total costs: 1,000,000 Euros**

500,000 US\$ Grontmij Climate & Energy

500,000 US\$ SUMA

(Common stock of the company: “Reducción de Emisiones Gases Efecto Invernadero – REGEI S.R.L.”, and partly with subordinate loans)



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### **Current Status:**

The project is already registered to the Executive Board of the Clean Development Mechanism.

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## The San Ramón Rural Electrification Project

**Sector:** Energy

### General Description:

The San Ramón replaces diesel powered generators with natural gas fuelled generators. Thus, reducing the emission of greenhouse gases (GHGs) and improving the power generation and distribution in the Chiquitania Norte in Santa Cruz, Bolivia. The total project provides: i) a natural gas fired electric power generation plant with a capacity of approx. 2.9 MW in San Ramón supplying approximately 9000 MWh; and ii) a distribution network that will serve more than 20 towns and villages benefit around 2800 customers. The project will result in increased reliability and decreased electricity cost.

The San Ramon Rural electrification Project contributes to the sustainable development of the country since it has allowed the cheapest, non-stop throughout-the-day provision of the electric power, without great voltage variations and with enough power to take care of the energy needs of the area. The project replaced a fragmented system of low voltage small plants, enabling the existence in the Chiquitania Norte a cheaper, highly reliable power source, with the right amount of power to take care of its industrial requirements.

### Project lifetime:

20 years.

### Accreditation period:

21 years.

### Estimated Greenhouse Gas Emissions Reductions:

Up to and including 2012: 26,390 tCO<sub>2</sub>e  
Annual average for 2008-2012: 5,394 tCO<sub>2</sub>e  
**Up to a period of 21 years: 64,148 tCO<sub>2</sub>e**

### Project Benefits:

- The project has created a significant potential for the economic growth and the social development of the one of the poorest areas of the country.
- The economic growth has been fundamentally favored on account the energy generated by the project, which has brought along

productivity improvements mostly in family micro-companies.

- The San Ramon Rural Electrification Project has favored the social development, facilitating an improvement in education, health and drinking water services as well as the administrative attention provided by the municipalities.
- The greatest direct benefit of the project to improve the quality of life in the homes of the region is the lighting during the night

### Total Project cost estimate:

1st Phase: 815,000 US\$  
2nd Phase: 1,545,000 US\$  
3rd Phase: 4,120,000 US\$  
**Total: 6,480,000 US\$**

### Current Status:

The project has a PDD and is under validation process.



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## Small Hydroelectric Power Station YATA

**Sector:** Energy

### Project Description:

The main objective of the project is the electricity supply to the populations Guayaramerin, Riberalta and Cachuela Esperanza (Beni) by renewable hydro energy through the small hydropower station in substitution the actual diesel generation decreasing the cost per kWh. The project will be implemented in three phases, the first one of 500 kW, the second one 2000 kW and the third 6000 kW. The project consists in a low head hydro

scheme with inflated dams to regulate the water flow and level, especially in dry season, using the "cachuelas" (small waterfalls) to create a difference in the river level, which is required for the hydroenergy generation. The hydroturbines to be implanted are: low head propeller and synchronous generators 380V/50Hz of frequency. The electrical line to consumption center will be extended in a 30 km by 34.5 kV of voltage.

### Project lifetime:

40 years.

### Accreditation period:

21 years.

### Estimated Greenhouse Gas Emissions Reductions:

Up to and including 2012: 166,589 tCO<sub>2</sub>e  
Up to a period of 7 years: 134,202 tCO<sub>2</sub>e  
Up to a period of 10 years: 220,732 tCO<sub>2</sub>e  
Up to a period of 14 years: 278,419 tCO<sub>2</sub>e  
**Up to a period of 21 years: 538,009 tCO<sub>2</sub>e**

### Project Benefits:

- With the present project the energy price payed at the moment by the consumer will be reduced in a range of 31.81% to 36.36%. With a cheaper energy, it will be possible to encourage industrial development.
- More population will receive the benefits of the use of the electricity.

- Reduce the emissions of GHG due to the use of diesel for generation's purposes.

### Total Project cost estimate:

1st Phase: 815,000 US\$  
2nd Phase: 1,545,000 US\$  
3rd Phase: 4,120,000 US\$  
**Total: 6,480,000 US\$**

### Current Status:

The project has a PIN, its Feasibility Study is under construction and it has a Note of Interest.

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## Santa Rosa Hydropower Plant Project

Sector: Energy

### General Description:

The project will be composed of a new run-of-river hydroelectric plant with an approximate cumulative capacity of 16.8 MW that will use part of the hydraulic infrastructure left without damage after a landslide destroyed an existing hydropower Plant at this location. The project will be located 80 km by road from the main urban center (La Paz City) in the middle portion of the Zongo River Valley. The

basin extends north, with its origin in the eastern region of the Andes, in the La Paz Department of Bolivia, and is part of the Amazon Basin. The project will consist of a low head unit with a capacity of 6.4 MW and an average generation of 33 GWh/year and a high head unit with 10.4 MW of capacity and an average generation of 47 GWh/year, making a total of 80 GWh/year.

### Project lifetime:

40 years

- The Bolivian Power Company Limited (COBEE, by its abbreviation) maintains existent forest in the watershed to conserve the hydrological conditions and reduce soil erosion.

### Accreditation period:

21 years.

### Total Project cost estimate:

Development Costs: 0.6 US\$ million  
Construction Direct Costs: 15.0 US\$ million  
Construction Indirect Costs: 1.0 US\$ million  
**Total: 16.6 US\$ million**

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 38,160 tCO<sub>2</sub>e  
Up to a period of 7 years: 267,120 tCO<sub>2</sub>e  
Up to a period of 10 years: 381,600 tCO<sub>2</sub>e  
Up to a period of 14 years: 534,240 tCO<sub>2</sub>e  
**Up to a period of 21 years: 801,360 tCO<sub>2</sub>e**

### Current Status:

The project has a PDD, which it is under Validation process, and its Approval Letter is under evaluation.

The EPC contract was signed with Soluziona / Va Tech on August 29, 2004. The power plant is expected to enter in commercial operation for April 2006.

### Project Benefits:

- The construction of the project will displace fossil-fueled generating facilities, reducing the emission of greenhouse gases that would be emitted in absence of the project.
- The construction of the project will create jobs in the project area.
- Large capital investment will be injected to the Bolivian economy due to the development of the project.
- Increased training capacities in the technical personnel.

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## El Condor and Punutuma Hydroelectric Project

Sector: Energy

### Project Description:

The overarching goal of this project is to utilize the electricity generation capacity of the Yura river system by installing a new hydroelectric plant, El Condor, and increase the capacity and efficiency of an existing run-of-the-river hydroelectric plant, Punutuma, in the Yura basin. Development of the Project will directly reduce greenhouse gas emissions produced by thermal energy using fossil fuels that are currently in operation in Bolivia. With an average annual generation of 12.48 GWh, the Project will reduce greenhouse gas emissions by 5,741 tonnes of CO<sub>2</sub>e per year.

The El Condor and Punutuma Hydroelectric Project is a series of two hydroelectric projects along the Yura River in the province of Potosí in Bolivia. Once completed, the two hydroelectric projects will have an installed capacity of 1.70 MW. The hydroelectric projects are situated within 65 km of each other along the Yura River, with a 750 m difference in altitude between El Cónдор and Punutuma. The Yura basin is fed by two watersheds, that of the Tambo river and Azula Vinto river, totaling 321 km<sup>2</sup>. The Yura basin has average annual flow of 2.5 m<sup>3</sup>/s. The goal of the Project is to generate electricity from the natural hydraulic resource and sell it to the national grid, Sistema Interconectado Nacional (SIN), through a 25-year PPA contract.

### Project lifetime:

50 years

### Accreditation period:

21 years

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 5,536 tCO<sub>2</sub>e

Up to and including 2012: 21,530 tCO<sub>2</sub>e

Up to a period of 7 years: 38,752 tCO<sub>2</sub>e

Up to a period of 10 years: 55,360 tCO<sub>2</sub>e

Up to a period of 14 years: 77,504 tCO<sub>2</sub>e

**Up to a period of 21 years: 116,256 tCO<sub>2</sub>e**

### Project Benefits:

- Installed capacity increased due to application of clean technologies.
- No Green House Gases (GHGs) emissions due to the run of the river plant type concept (by avoidance of new dams).

- Erosion control and regulation of water flows for irrigation in the Yura River in Potosí.

### Total Project cost estimate:

Development costs: 0.6 US\$ millions

Installed costs: 9.0 US\$ millions

Total costs: 9.6 US\$ millions

### Current Status:

The project has a PIN and the Note of Interest is in procedure.

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## Colorada Lake Pilot Project

Sector: Energy

### Project Description:

The project consists of implementing a 1.5 MW turbine and electricity generator using steam provided by a geothermal well.

The National Electric Company (ENDE) has completed the digging of five geothermal wells between the years of 1988 to 1992. The electricity demand comes from Borax producing firm established near to the wells, which generates its own electricity with diesel. Estimated demand of this company is 600 kW. A transmission line of about 1 km will transport electricity to the Borax plant. In addition, about 100 km of single-phase of transmission lines will be built to the Laguna Colorada Camp and to the rural towns of Quetena.

The project is an initiative of the a state-owned company ENDE (National Company of Electricity) and intends the installation of a geothermal turbine/generator of 1.5 MVA, capable to satisfy the demand of electric power of the company Tierra S.A., which is a borax producer, and has an approximated consumption of 4700 MWh/year and consumes 1.5 millions litres of diesel. Moreover, with this project is possible to have an additional reserve of 40% to cover the requests in a medium time term (5 years).

### Project lifetime:

30 years

### Accreditation period:

14 or a maximum of 21 years

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 3,325 tCO<sub>2</sub>e

Up to and including 2012: 26,383 tCO<sub>2</sub>e

Up to a period of 7 years: 26,383 tCO<sub>2</sub>e

Up to a period of 10 years: 40,247 tCO<sub>2</sub>e

Up to a period of 14 years: 61,690 tCO<sub>2</sub>e

**Up to a period of 30 years: 185,000 tCO<sub>2</sub>e**

### Project Benefits:

- Availability of electricity at a price below current costs for the industrial Borax producing company and the Laguna Colorada Camp.
- Electricity will be available for the rural communities of Quetena Grande and Quetena Chica.

- Technology transfer in the exploitation and evaluation of the geothermal energy.
- New employment sources will be created.

### Total Project cost estimate:

Development costs: 0.2 US\$ millions

Installed costs: 3.0 US\$ millions

Other costs: 0.3 US\$ millions

**Total costs: 3.5US\$ millions**

### Current Status:

The project has a PIN which is under revision.

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## Conversion of existing open cycle gas turbine to combined cycle operation at Guaracachi power station, Santa Cruz, Bolivia

**Sector:** Energy

### General Description:

The project activity will convert two General Electric 6FA gas turbines currently operating in open cycle mode to combined cycle operation at Guaracachi power station in Santa Cruz, Bolivia. This will involve the installation of two heat recovery steam generating boilers which utilize the waste heat from the gas turbine to raise steam. The steam will be used to generate electricity using an associated steam turbine; operating the 6FA gas turbines in combined cycle mode results in significant efficiency gains. This is the first project of this type in Bolivia.

### Project lifetime:

20 years.

### Accreditation period:

10 years.

### Estimated Greenhouse Gases Emissions Reductions:

Up to and including 2012: 2.27 millions tCO<sub>2</sub>e

Up to period of 10 years: 3.4 millions tCO<sub>2</sub>e

### Project Benefits:

- Projections from the national grid operators in Bolivia suggest that due to increases in power demand the reserve capacity on the Bolivian grid will be mostly eroded by 2006. The current difficulty in making investments in generation capacity in Bolivia may mean that diesel generators would need to be commissioned. This project will help ensure Bolivia's development is based on high efficiency reliable generation.
- Better use will be made of the natural gas resources of Bolivia through the efficiency gains of the project.
- The proposed CCGT conversion is the first in Bolivia. Technology transfer to Bolivia will be

facilitated through the UK based project developer Independent Power Corporation.

- The CCGT project will increase the skilled workforce required at the generating station. The CCGT will result in training of local workers.
- Guaracachi power station is very close to a major load centre of Bolivia (Santa Cruz, a city of approximately 1 million people). Increasing capacity at Guaracachi will reduce the need to import power to the city, thus reducing transmission losses.
- There is the potential for other CCGT conversion projects in Bolivia, the proposed project at Guaracachi will result in the transfer of technology and knowledge to Bolivia to help to facilitate of the efficiency improvement across the grid.

### Total Project cost estimate:

Not available.

### Current status:

The Project has a PDD under validation process, and its methodology was approved by the Executive Board as Approved Consolidated Methodology ACM0007.



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## Mallasa and Alpacoma Landfill Gas Project

**Sector:** Energy

### Project Description:

The aim of the project is to reduce Greenhouse Gases (GHG) emissions through the collection, capture and combustion of the biogas of the Mallasa landfill, which is in close-down phase and is located in Mallasa Town, 16 km from La Paz city, and also the biogas combustion of the "Nuevo Jardín de Alpacoma" landfill, which is in operation and is located 9 km from La Paz city.

### Project lifetime:

21 years.

- Generation of new employment due to the infrastructure building, implementation of the operation system of collection, extraction and combustion.

### Accreditation period:

21 years (3 renewable periods of 7 years)

### Total Project cost estimate:

Development cost: 0.15 US\$ million

Installed cost: 2.0 US\$ million

Total cost: 2.15 US\$ million

### Estimated Greenhouse Gases Emissions Reductions:

Up to and including 2012: 1.198.191 tCO<sub>2</sub>e

Up to period of 7 years: 1.111.961 tCO<sub>2</sub>e

Up to period of 10 years: 1.728.882 tCO<sub>2</sub>e

**Up to period of 14 years: 2.658.546 tCO<sub>2</sub>e**

### Current status:

The Project has a PIN and its Note of Interest is under process.

### Project Benefits:

- Reduction of GHG emissions produced in the Mallasa and Alpacoma Landfill.
- Avoidance of biogas fugitive emissions and odours.
- Increase of the private investment in the country.
- Maintain or reduce the clean service taxes, in the middle and long term, in benefit of the inhabitants of the La Paz city.

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## Enlargement of the hydroelectric power station Santa Isabel

Sector: Energy

### General Description or Project Description:

The purpose of the project is increase the electricity generation capacity of the hydroelectric power station Santa Isabel, adding a fifth generation unity of 18 MW of capacity to the already existing four generation units, each one has a 18 MW of capacity. The energy to be produced by the project will be sold to the Bolivian Electricity Market through the national grid system.

### Project lifetime:

40 years

- Support forestry programs in the damping area of Carrasco National Park.
- Environmental education to the people who lives in the project area.

### Accreditation period:

14 years

### Total Project cost estimate:

Development costs: 0.2 US\$ million

Installed costs: 8.0 US\$ million

**Total: 8.2 US\$ million**

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 35,888.6 tCO<sub>2</sub>e.

Up to and including 2012: 322,998 tCO<sub>2</sub>e

Up to a period of 7 years: 251,220 tCO<sub>2</sub>e

Up to a period of 10 years: 358,886 tCO<sub>2</sub>e

**Up to a period of 14 years: 502,441 tCO<sub>2</sub>e**

### Current Status:

The project has a PIN, pre-feasibility study and it has a Note of Interest.

### Project Benefits:

- The project will reduce the emission of the Green House Gases (GHGs).
- Due to the actual use of the land in the project area, the project will not cause negative effects on the communities and population.
- Create a new employment in the project area.
- Attract private investments

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NCDO - Bolivia

## Improvement in the use of Renewable Energies for the Sustainable Development of the Rural Communities in Bolivia

**Sector:** Energy

### General Description or Project Description:

The project consists in the construction of the hydroelectric micro-power stations in 71 communities, distributed in the departments of La Paz, Potosí, Tarija, Beni, Santa Cruz and Pando. The implementation of hydroelectric micro-power stations aims to use the hydro energy potential to generate clean, sustainable and cheaper energy.

### Project lifetime:

It is not specified.

### Accreditation period:

10 years.

### Estimated Greenhouse Gas Emissions Reductions:

10 years: 10,707.23 tCO<sub>2</sub>e

### Project Benefits:

- Provision of electricity to the rural communities of Bolivia by less polluting technologies.
- Provision of less polluting solutions for production and transformation engines in the rural communities of Bolivia.
- Reduction of the CO<sub>2</sub> emissions in rural areas of Bolivia by substitution of high emission sources with less emitting sources.

- The project allows providing to the isolated communities of the country with electrical energy, in order to develop human capacities, support production transformation and facilitate the productive diversification.

### Total Project cost estimate:

Total Cost estimated: 5,747,618 US\$ millions

### Current Status:

The project has a PIN.

### Contact Information:

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NCDO - Bolivia

## Wind Power generation Roboré – Santiago de Chiquitos

Sector: Energy

### General Description or Project Description:

The project expects to replace diesel electricity generation by wind power generation in the Roboré system. It is expected to create a hybrid diesel-wind power generation system to minimize the generation costs, thus avoiding the price increase and reduce the emission of greenhouse gases. The actual energy demand of the power plant is around of 600 kW with a greater consume of 2.2 GWh/year. In the next 20 years the energy demand estimated will be approximately of 2000 kW with a consumption of 8.5 GWh/year.

### Project lifetime:

It is not specified.

### Accreditation period:

10 years

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 1,100 tCO<sub>2</sub>e

Up to and including 2012: 8,880 tCO<sub>2</sub>e

Up to a period of 7 years: 11,100 tCO<sub>2</sub>e

Up to a period of 10 years: 7,770 tCO<sub>2</sub>e

**Up to a period of 14 years: 15,540 tCO<sub>2</sub>e**

### Project Benefits:

- Capital investment will be injected to the Bolivian economy due to the development of the project.
- The energy production in the project area is economically viable owe to the diesel subsidy by the state, which means 87 US\$/MWh. However, through the present project the economic impact of the elimination of the diesel subsidy will diminish to 47 US\$/MWh.

- Create a new employment in the project area.
- Technology transfer and development capacities in the wind energy generation.
- The project will reduce the emission of the Green House Gases (GHGs).

### Total Project cost estimate:

Preparation costs:	100,000 US\$
Establishment costs:	650,000 US\$
Other costs:	131,800 US\$
<b>Total Cost:</b>	<b>750,000 US\$</b>

### Current Status:

The project has a PIN.

### Contact Information:

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NCDO - Bolivia

## Energy supply to the region of San Ignacio, San José and Roboré

**Sector:** Energy

### General Description or Project Description:

Supply the energy demand of the region of San Ignacio, Roboré and San José using natural gas to substitute diesel energy generation. The natural gas is an abundant national resource, which enables a cleaner energy generation in substitution of the existing diesel energy generation. Moreover, the diesel is imported by the country with the cost that this implies.

### Project lifetime:

It is not specified.

### Accreditation period:

It is not specified.

### Estimated Greenhouse Gas Emissions Reductions:

It was not determinate the emission reductions of the GHG by the substitution of the diesel energy generation.

### Project Benefits:

- The project will reduce the emission of the Green House Gases (GHGs).
- Create a new employment in the project area.
- Due to the present project the investments directed to the diesel subsidy for the energy production will divert to the gas pipeline construction, that it will allows to solve the regional power problem existing in the project area.

- The cheaper energy production will produce the regional development.

### Total Project cost estimate:

Preparation costs: 0.8 US\$ millions  
Establishment costs: 20.7 US\$ millions  
**Total Cost: 21.5 US\$ millions**

### Current Status:

The project has a PIN.

### Contact Information:

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NCDO - Bolivia

## Thermoelectric power of biomass - Biomass Gasification Unit for Sustainable Energy (BIGUSE)

Sector: Energy

### Project Description:

The project consists in the installation of two combined units of electricity generation, each one of 0.7 MW of capacity, from the biomass of the shell and woody capsule of the Brazil nut (*Bertholletia excelsa*). In this manner, it is possible to obtain a stable source of energy and liberates the diesel subsidy which exists in the region for a competitive electricity generation. Later, the energy produced will be sold to the energy distribution company of the grid off system of Cobija. The shell of Brazil nut (biomass of homogenous wood), fractionated in chips, it is processed in a digester and from this process is methane ( $\text{CH}_4$ ) of low calorific power obtained, after a conditioning process (cooled, filtered and pressurized) the gas is conducted to two motors of internal combustion which drive the electricity power generators with an installed electricity power each one of 0.35 MW, making a total of 0.7 MW.

### Project lifetime:

10 years

### Accreditation period:

7 years

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 15,789 tCO<sub>2</sub>e

Up to and including 2012: 114,472 tCO<sub>2</sub>e

Up to a period of 7 years: 110,525 tCO<sub>2</sub>e

Up to a period of 10 years: 157,893 tCO<sub>2</sub>e

**Up to a period of 14 years: 221,051 tCO<sub>2</sub>e**

- Diminish the diesel subsidy for the energy production existent in the project area and contributes to the reduction of the fiscal deficit.
- New employment sources will be created.
- Technology transfer and development capacities in the biomass energy generation.
- Produces a new economic activity due to the harvesting of the shell and the woody capsule of the Brazil nut.
- Creation of a new biomass market.
- Provision of electricity in a better quality and in a major cover area to Cobija and its surroundings.
- Generation of new investments in the project area.

### Project Benefits:

- The construction of the project will displace fossil-fueled generating facilities, reducing the emission of greenhouse gases that would be emitted in absence of the project.
- The project will reduce the emission of methane ( $\text{CH}_4$ ), produced by degradation of the shell of the Brazil nut, and using it as combustible for the production of energy.

### Total Project cost estimate:

Development costs: 2.251 US\$ millions

Installed costs: 1.983 US\$ millions

Other costs: 0.24 US\$ millions

**Total costs: 2.251 US\$ millions**

### Current Status:

The project has a PIN and it counts with a Note of Interest.



NCDO - **Bolivia**

### **Contact Information:**

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NCDO - Bolivia

## Guabira Cogeneration Project

**Sector:** Energy

### Project Description:

The objective of the project, according the PIN, is to make a better use of the bagasse surplus that already produces the sugar company Guabira as well as to increase its cogeneration capacity from currently 7 MW up to 50 MW. The electricity surpluses will be sold to the national grid. At the same time, the new cogeneration technology improves the efficiency of the sugarcane production, thus allowing increasing the sugar and alcohol production.

The project consists mainly in the expansion of biomass cogeneration with a better use of the bagasse in the sugar mill. The expansion of the electricity production is carried out by a boiler/turbo-feeder system and 18/35 MW turbo generators in accordance to a "turn key" agreement. Due to the low costs of bagasse, the generation costs are lower than the plants of thermal generation. Consequently they facilitate their competitiveness in the market electric spot.

### Project lifetime:

20 years

### Accreditation period:

14 years

### Estimated Greenhouse Gas Emissions Reductions:

Up to and including 2012: 386,472 tCO<sub>2</sub>e

Up to a period of 7 years: 547,000 tCO<sub>2</sub>e

Up to a period of 10 years: 788,000 tCO<sub>2</sub>e

**Up to a period of 14 years: 1,111,000 tCO<sub>2</sub>e**

### Total Project cost estimate:

Guabirá S.A. funds: 30%

Debt: to be defined

Total investment of the project – 15 MM US\$

(For the first phase 5 MMUS\$ y 10 MMUS\$ for the second).

### Current Status:

The project has a PIN.

### Contact Information:

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NCDO - Bolivia

## Paracti River Hydroelectric Power Project – Empresa Eléctrica Valle Hermoso S.A (EEVH)

**Sector:** Energy

### General Description:

The objective of the project is to use three passing power stations in cascade that allow a gradual development of the hydroelectric potential of the Paracti River in the Department of Cochabamba. The project will allow to increase gradually the hydroelectric capacity generation of the company and therefore of the National Interconnected System, displacing in this way the thermal energy generation. The proposed development will increase the installed capacity of the company in 68.5 MW of power and generation of 378 GWh/year.

The power stations (Plant Locotal, San Onofre and San Pedro) are located in the right side of the Paracti River, among the turbinated water discharge point by the hydroelectric plant Santa Isabel and the confluence with the rivers Mascota and Paracti.

The project includes the intake, compensation reservoir, channel (or tunnel), load camera, pipe of pressure, house of machines equipped with turbines pelton of several jets or turbines Francis (according to recommendation of the manufacturer) and electric substation, besides the connection line with the Interconnected System.

In its first implementation stage (2006-2008), the Company has foreseen to build the Planta Locotal with a power of 18.1 MW to generate 100 GWh/año (November of 2008). Later on, concluded the feasibility studies and the financial procurements, the Plants of San Onofre and San Pedro will be gradually implemented.

The proposed project has the following characteristics:

Description		"Locotal" Project	"San Onofre" Project	"San Pedro" Project
Height	m	168,53	262,6	206,2
Design floor	m <sup>3</sup> /s	13,62	13,62	13,62
Installed capacity	MW	18,1	28,2	22,145
Annual energy	GWh	100	156	122

Source: Valle Hermoso S.A.

### Project lifetime:

30 years

### Accreditation period:

21 years

### Estimated Greenhouse Gas Emissions Reductions:

Annual: 50,000 tCO<sub>2</sub>e

Up to and including 2012: 200,000 tCO<sub>2</sub>e

Up to a period of 7 years: 350,000 tCO<sub>2</sub>e

Up to a period of 10 years: 500,000 tCO<sub>2</sub>e

**Up to a period of 14 years: 700,000 tCO<sub>2</sub>e**

### Total Project cost estimate:

Valle Hermoso S.A. Funds: 30%

Debt: 70%

Total investment of the project – 73 MM\$US

For the first phase 21 MM\$US (Locotal Power Plant)

### Current Status:

The project has a PIN.

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