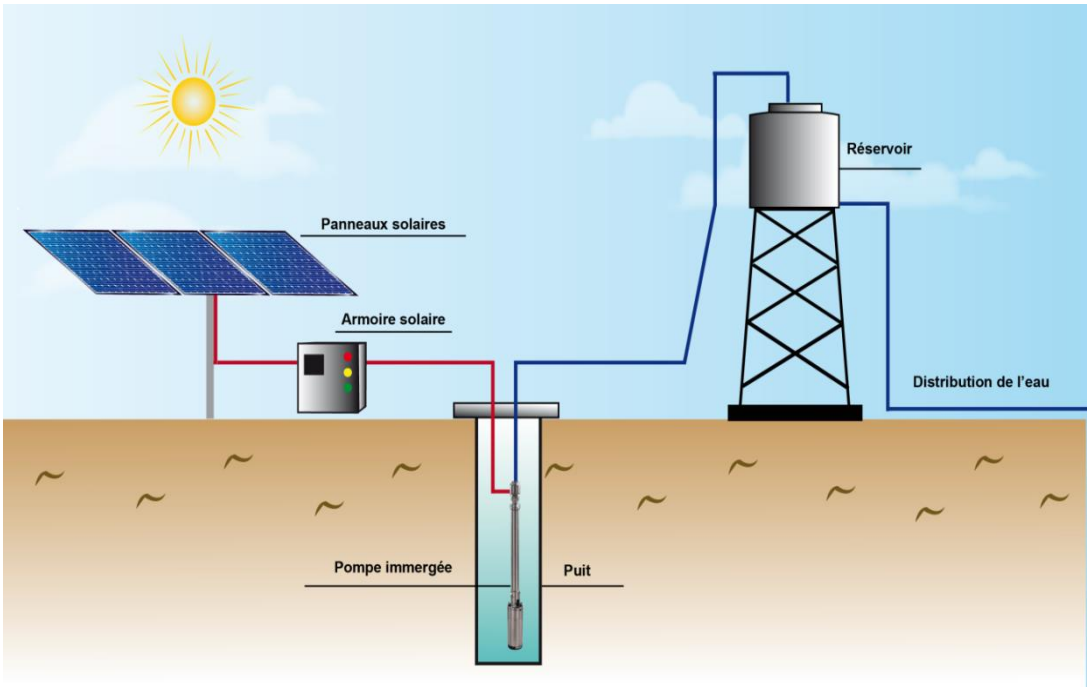
INNOVATIVE PROJET PROPOSAL FOR THE GOVERNMENT OF BELGIUM



Solar water project for Sudanese refugees in Chad

February 2018

Project overview

Project Title	Solar water project for Sudanese refugees in Chad
Total Budget	EUR 998,498 (USD 1,225,150)*
Implementation Period	12 months from the start of the project
Number of Beneficiaries	52,834 Sudanese refugees in eastern Chad
Summary of Project and Expected Outcomes	This project will see the replacement of the current generator-run water pumping system with that of a solar pumping system, along with the rehabilitation of current water-related infrastructures in two Sudanese refugee camps located in the east of Chad. The installation of the solar pumping system will increase the supply of potable water in the two camps, bringing it up to standards (20l/p/d). Reinforcing refugees' (water committees) capacity in the management and maintenance of the water system will ensure its sustainability.

* The exchange rate used is 0.815 (UN rate 01 March 2018)

Project objective

The objective of this project is to provide sustainable access to potable water supplied to Sudanese refugees living in Touloum and Farchana camps in the East of Chad, while reinforcing their capacities in water management and maintenance of infrastructures.

Background and operational context

The total number of refugees and asylum seekers living in Chad, as of 31 December 2017, is 412,143. This includes 324,389 Sudanese; 77,122 Central Africans (CAR); 9,544 Nigerians and 1,088 of various nationalities residing mostly in the N'Djamena area. Over 85 per cent of refugees in Chad reside in the 18 camps (12 in the East and 6 in the South), while the rest live in host villages.

Sudanese refugees have been living in the 12 camps in eastern Chad since 2003 when conflict broke out in Darfur and hundreds of thousands of people fled in search of shelter and protection. Since then, political and security instability in the Darfur region has not yet made it possible for a safe return. UNHCR and its partners have been providing assistance and protection to refugees located in both the camps and host communities. To prevent and ease tension between refugees and host community members, UNHCR includes host communities in its planning of activities and provides them with community-based assistance such as water, health, education, agriculture and self-reliance projects. In spite of ongoing efforts to strengthen livelihood opportunities, a majority of Sudanese refugees are entirely dependent on humanitarian aid.

Sudanese refugee camps are located in an arid area where natural water sources are scarce, making for even more difficult living conditions. UNHCR and its partners have made extensive efforts, to the extent possible, to ease suffering in the region. The water supply network in Sudanese refugee camps is maintained by an infrastructure inherited from the emergency period over 12 years ago. Currently, the system only allows for the provision of an average of 14.6 litters per person per day, well below the standard of 20 litters per person per day recommended by the WHO. In the two camps targeted for this pilot project, the average currently stands at 15 (Farchana) and 13 (Touloum) l/p/d, but can drop to as low as 10 l/p/d when a generator breaks down.

In search of new and improved methods of pumping water and given the supply of solar energy in the area, UNHCR commissioned a technical feasibility study for the introduction of a solar system. The assessment study concluded that a solar power system was a technically valid alternative. The study also showed the advantage in economic terms.

Activities

UNHCR hopes to receive the funds to launch a pilot programme to replace the existing generator-based water pumping systems with solar systems in the camps of Touloum and Farchana, while involving refugees in the running and maintenance of water services in the camps. In Touloum and Farchana, water is currently provided through groundwater extraction. Under this system, water is pumped from boreholes to elevated storage tanks and is then fed into the distribution systems using gravity. Due to the semi-arid environment found in eastern Chad, low groundwater tables, and the large quantities of potable water needed, pumping water requires a high-energy consumption. Fuel-powered generators are the principle source of energy, and depending on borehole conditions, a litter of diesel fuel is required to pump an average of 3-4 m^3 of potable water into the reservoirs. In nine of the camps where water is extracted through diesel-powered generators, which include Touloum and Farchana camps, fuel costs amount to an average of US$1,100 per day (US$401,500/year).

The change to a solar power pumping system will be phased in order to provide space for innovation. The first phase will entail a partial introduction of the solar equipment where most necessary. Generators will be replaced gradually until the initially targeted area is covered. The second phase will evaluate the remaining water points and outputs in order to assess which hybrid system would be most appropriate for them. In terms of hybrid systems, two options are possible. One would introduce wind energy in complement to a generator, in order to reduce the cost of fuel consumption. Wind energy would only be viable in areas where government environmental studies show that winds reach speeds of 2-5 m/s and would require a further study/feasibility evaluation. Where wind energy is not a viable option, systems would be run on a combination of solar and generator power. The third phase will focus on consolidation. During this phase, evaluations will be done to test outputs/flows and determine if the method used (full solar; solar/generator, etc.) is the most appropriate for each point or if it should be different. This phase will see the overall reinforcement of the water pumping system in order to ensure sustainability.

In parallel, the project will strengthen refugees' capacity to use and maintain the solar system in order to devolve the implementation of certain services delivered directly by UNHCR and its partners. This strengthening of refugees' capacities will be done through training courses that will be held in both camps. The development of refugees' skills and support for the transfer of the system's management to refugees will be led by UNHCR in collaboration with an enterprise with solar energy expertise, which will be selected through UNHCR's standard selection process. Refugees themselves will participate in each step of the implementation of the proposed project for the purpose of training, sustainability and appropriation. UNHCR headquarters will continue to provide the technical oversight necessary for the success of the project.

Along with the new solar system, this project will require further investments for the rehabilitation of water storage tanks and distribution systems (water pipeline, water tap stands), as well as for the digging of new boreholes in order to maintain and improve water access. This rehabilitation is necessary as the current systems date to the period of the emergency more than a decade ago and thus must be reinforced, particularly given the harsh semi-desert and severely dusty conditions under which they have been operating.

Solaire Tchad, the enterprise who conducted the original feasibility study is an example of a company at the forefront of solar energy in Chad, implementing projects for the European Union and other international entities, giving proof of the presence of local and sustainable expertise in the sector, a minimum requirement for the long term impact of the project. In order to ensure the integrity of the project and that the most

qualified enterprise is selected for the training of refugees, a new call for tender will be launched and an enterprise selected in line with UNHCR's regulations. UNHCR will ensure that all activities are carried out effectively and respect standards.

The proposed intervention will enable a greater sustainable water provision in the targeted refugee camps. Solar powered water pumping, coupled with the strengthening of the existing water supply systems, will allow rational water management by refugees and will improve access to potable water in a region where water is a major social and economic challenge.

The switch to solar energy will also reduce emissions in the environment, contributing to the fight against climate change.

Considering fuel and the other costs associated with water delivery, the investment will be fully defrayed in five years. However, the after the initial investment, the costs of operating the camps will be reduced immediately, freeing up precious funds for other needed support. By providing a more reliable and increased supply of clean water, this project will also improve the lives Sudanese refugees living in the camps of Touloum and Farchana, and teach new skills to those involved in the project.

Solar pumping is an innovative method that can be implemented in all 12 of the camps in the East, and is in fact the long-term goal. If funded, this specific project will be launched in Touloum and Farchana as a pilot. After the project is finalized, UNHCR will monitor and evaluate the impact of the project and will use its lessons learnt to push for its gradual replication in the other camps, which are subject to the same conditions. Successfully installing and implementing a solar water pumping system in all of the camps in the East would drastically change the situation and lives of Sudanese refugees and would allow for water provision to reach international recommended standards.

Beneficiaries

This project will benefit 52,834 Sudanese refugees living in Touloum and Farchana camps in eastern Chad, as well as members of the host communities surrounding the camps.

Indicative logframe and budget

Objectives	Outcomes	Activities	Budget	
			Total USD	Total EUR
Rights Group: Basic Needs and Essential Services				
Supply of potable water increased or maintained	Installation of solar pumping systems and rehabilitation of water supply systems (Touloum camp)	- Procurement and transport of solar panels and pumps; - Installation of solar equipment; - Construction of boreholes; - Training; - Repair of water storage tanks; - Repair of water pipelines; - Repair of existing boreholes.	733,500	597,803
Supply of potable water increased or maintained	Installation of solar pumping systems and rehabilitation of the water supply systems (Farchana camp)	- Procurement and transport of solar panels and pumps; - Installation of solar equipment; - Construction of boreholes; - Training; - Repair of water storage tanks; - Repair of water pipelines; - Repair of existing boreholes.	411,500	335,373
Sub-Total			1,145,000	933,176
Programme Support Costs (7%)			80,150	65,322
Total Project Cost:			**1,225,150**	**998,498**
* The exchange rate used is 0.815 (UN rate 01 March 2018)				