



AN EXCEPTIONAL ENERGY CASE STUDY

The Role of LPG in Sustainable Farming within Climate-vulnerable Communities

This Exceptional Energy case study delves into the story behind the challenges faced by the agricultural community, and the solutions provided by Greengear Global's LPG water pumps. Greengear Global is a brand of the Cavagna Group, members and Industry Council Members of the WLPGA.



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1. The Challenge¹

According to the United Nations Environment Programme (UNEP), Uzbekistan, located in Central Asia, is classified as a drought zone susceptible to land degradation and desertification. Agriculture represents around 17.6% of the national GDP, with irrigated land being crucial to the agricultural sector in Uzbekistan. A major cause of declining agricultural productivity has been attributed to inappropriate irrigation and under-maintained drainage systems, resulting in increased salinisation and obstruction of

water systems. This degradation of arable land has estimated to have cost Uzbekistan in the region of \$1 billion annually in lost economic output.

Agriculture has thus been identified by the United Nations Development Programme (UNDP) as the most vulnerable sector to the expected impacts of climate change.

“Economic Benefits: being one of the leading gas producing countries in the world, Uzbekistan produces sufficient stock of LPG that in fact is much cheaper when compared to other sources of fuel. Environmental Benefits: Being mainly oriented to Climate Change concerns and reduction of CO₂, the Project has been looking into alternative resources to petrol and diesel.”
(A UNDP Project Collaborator)



2. The Project²

The frequent occurrence of drought in one of Uzbekistan's poorest regions, Karakalpakstan, exacerbated by an aging irrigation infrastructure and unsustainable water practices, places strain on water availability. Water shortages lasting years have been witnessed in the region, causing a decline in land productivity and thus the ability of the rural poor to withstand current and future impacts of climate change.

In seeking to improve the living conditions of vulnerable communities, in 2014 the UNDP commenced a project in Karakalpakstan with the primary objective to develop the climate resilience of farming and pastoral communities in the drought prone parts of Uzbekistan. The project aims to enhance basic services, manage natural resources, protect the environment and ensure the livelihoods of pastoral communities.

The decision to provide LPG water pumps to Pastoral Cooperatives was made part of this initiative.

“The provided water pumps are considered by users [Pasture Cooperatives] as high performance and cost-effective to use in rural areas, especially in water-short areas.”
(Project Specialist, Karakalpak)

3. The Technology³

The solution, provided by Greengear Global, consisted of supplying Karakalpakstan Pasture Cooperatives with a total of eighteen WP-4inch mono-fuel LPG water pumps. Including the supply of Cavagna Group hoses and regulators. The LPG water pumps have been used extensively by the Pasture Cooperatives, primarily for irrigating plots with poor gravity supply. With each unit providing the equivalent displacement of 260 cc resulting in a flow of 70m³ per hour (308.2gal/m).



LPG water pumps provide the ideal equipment for rural areas facing extreme climatic challenges



Combining functionality and sustainability, LPG water pumps provide the ideal equipment for rural areas facing extreme climatic challenges. At a weight of 42,5kg per unit, the portable nature of the water pump alongside the LPG cylinder, allowed for easy distribution and use within the rural communities. Offering lower emissions compared to traditional fuels like petrol and diesel, LPG water pumps also require significantly less refuelling – on average a 9kg LPG cylinder provided the farmers with a total run time (at full load) of 7.5hrs⁴.

4. Benefits for the Farming Community

Portable fuel and equipment

- LPG's portability allowed for simple energy transportation into rural areas.
- At a weight of 42,5kg per unit, LPG water pumps are easily transported to needed areas.

No pollution to aquifers / water sources

- As water is a critical resource within the community, LPG provided an attractive fuel solution that provided no threat of pollution to the sensitive water canal ecosystem.

Relatively low equipment maintenance of LPG water pumps in comparison to petrol engines

- Due to LPG being a cleaner burning fuel, LPG water pumps require less maintenance than comparative petrol engines and can easily be serviced by any skilled petrol-engine mechanic.

Accessible, clean energy

- Due to the lack of fuels and lubricants in the country, farmers faced certain difficulties in obtaining fuels, and were looking for suitable alternative energy sources.
- LPG provided an attractive solution to traditional fuels, as LPG does not spoil over time as in the case of petrol.

5. The Results

In the water-scarce Karakalpak region, more than 200 ha of plots have been irrigated by using the LPG water pumps, with positive feedback obtained from local users and the organisation.

6. Timeline

June 2019 – Tender for six LPG powered water pumps released by the UNDP.

August 2019 – Tender won by Greengear Global Srl for the supply of six water pumps and further collaboration with the UNDP.

September 2019 – Contract signed between both parties for 'Contract of Goods and/or Services' and as a supplier on the procurement list for the UNDP.

September 2019 – Six units of WP4 Greengear pumps with hoses and regulators were shipped to the UNDP in Uzbekistan.

October 2019 – Goods arrived in Nukus, inspection and commissioning of units completed.

January 2020 – Feedback given from pasture cooperatives in northern districts of Karakalpakstan after testing the units from minor rivers to move water to land with positive results.

April 2020 – New tender released by UNDP for a procurement of twelve more LPG powered water pumps.

May 2020 – Tender won by Greengear Global Srl for the supply of twelve water pumps and further collaboration with the UNDP.

June 2020 – Twelve Units of WP4 Greengear pumps with hoses and regulators were shipped to the UNDP in Uzbekistan.

July 2020 – Goods arrived in Nukus, inspection and commissioning of units completed.

August 2020 - All twelve pieces of the pumps were transferred to the beneficiaries (pasture cooperatives) in the project's pilot districts of Karakalpakstan. All water pumps operate properly and the beneficiaries have started using them to irrigate household plots of the rural population. As of today, more than 200 ha of household plots been irrigated by using the pumps. The provided water pumps are considered by users as high performance and cost-effective to use in rural areas, especially in water-short areas.

October 2020 – Project is considered completed with a high success rate overall. Greengear Global Srl will be considered as a procurement option for any future projects.

7. Contributors

Equipment Providers: Greengear Global and Cavagna Group

Implementing Entity: UNDP (United Nations Development Programme) Uzbekistan

Executing Entity: Uzhydromet / Makhalla Fund



8. Sources

¹ Mid-Term Review of the UNDP-AF Project "Developing climate resilience of farming communities in the drought prone parts of Uzbekistan" <http://pubdocs.worldbank.org/en/434511548693973011/pdf/50-MTR-AF-Uzbekistan-Report-FINAL2.pdf>

² <https://www.adaptation-fund.org/project/developing-climate-resilience-of-farming-communities-in-the-drought-prone-parts-of-uzbekistan/>

³ Greengear Global product catalogue.

⁴ Data depends on environmental conditions and type of LPG mixture.