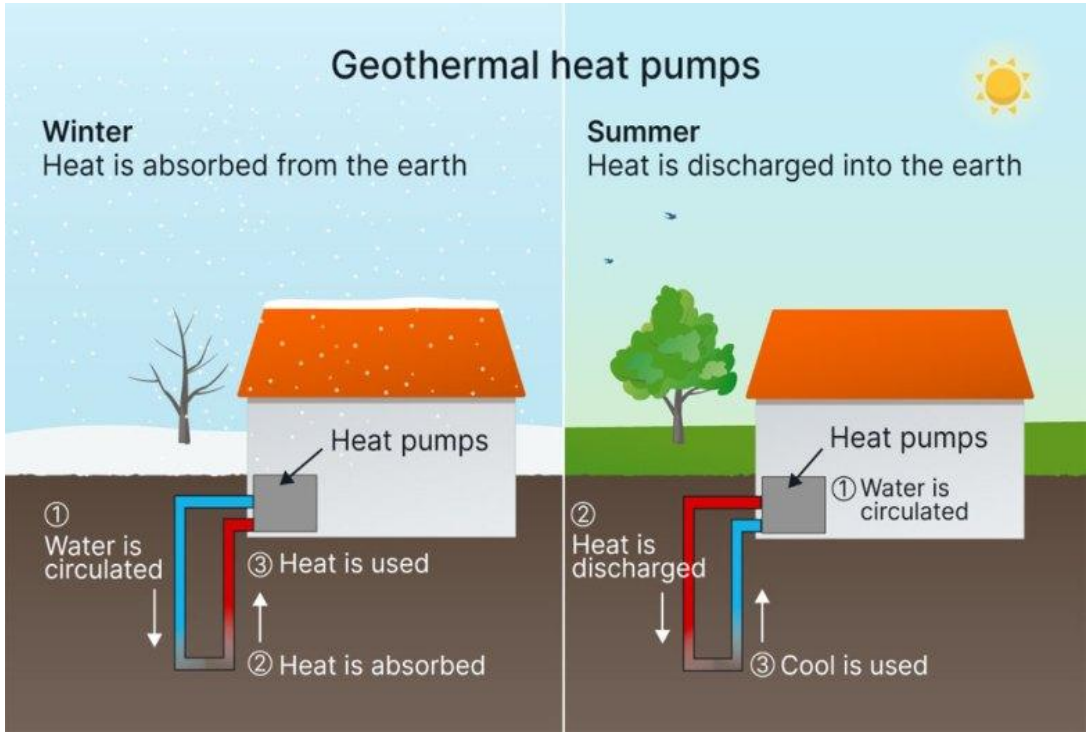
Karakalpakstan, Uzbekistan

- Population: ~2 to 2.1 million
- Capital City: Nukus (~300,000 residents)
- Air quality is mainly affected by environmental degradation and energy use.
  - [Primary Source] Toxic dust from Aral Sea: producing high levels of $PM_{2.5}$ and PM_{10}
  - Winter Residential Heating: $PM_{2.5}$, NO_2, and CO
  - Land degradation/agriculture and older vehicles: $PM_{2.5}$, PM_{10}, NO_2, and CO

Project Seed 1: Sustainable Heating Systems for Schools/Technikums in Kungrad,Karakalpakistan



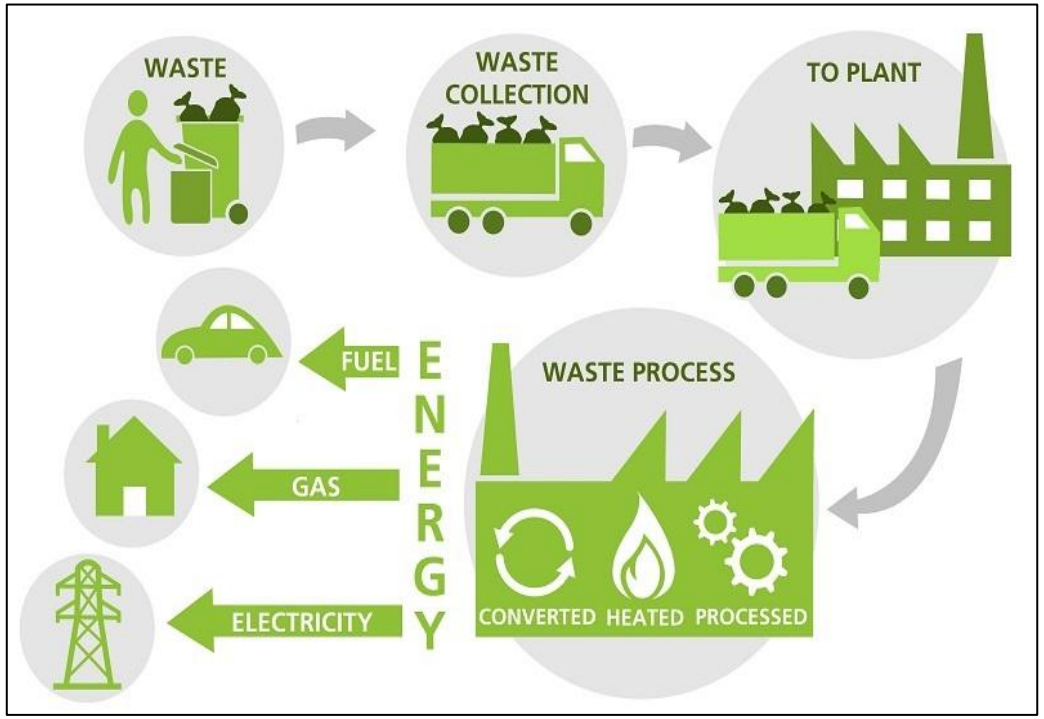
- Coal use in schools: In 2023, **241.5 thousand tons of coal** were supplied to public secondary schools nationwide.
- Local context (Qo‘ng‘irot District): Over **50 secondary schools and 3 technical colleges** rely mainly on coal for heating.
  - Annual consumption: Approximately **2,320 tons of coal used annually** in the district’s school buildings.

- **Location:** Kongrad Region and Amudrya degion in Karakalpakistan (schools and Technikum)
- **Stakeholders:** Municipality , Ministry of Environment, Agency for Vocational education, Ministry of Investment, Ministry of Finance
- **Potential partners**: Bell Energy, NCI, Clean Air Asia

Expected air quality and climate co-benefits:

- **Reduced air pollution**: Significant decrease in $PM_{2.5}$, PM_{10}, CO, and NO_2 emissions up to 5000 tons from replacing coal-based heating in Qo‘ng‘irot district, leading to cleaner indoor and outdoor air.
- **Health benefits**: Lower risk of respiratory and cardiovascular diseases for students, teachers, and nearby communities.
- **Climate mitigation**: Reduced 4000 tons of CO_2 emissions through lower fossil fuel use and improved energy efficiency.

Project Seed 2: Low-Carbon Waste-to-Energy System for Kungrad City



- Waste volume: **23,406 tons of solid household waste** collected and sent to landfill in 2025.
- Regional share: Equivalent to about **10% of total waste in Karakalpakstan region**.
- Infrastructure gap: Limited waste management infrastructure.

- **Stakeholders:** Municipality , Ministry of Environment, Agency for Vocational education, Ministry of Investment, Ministry of Finance
- **Potential partners**: Bell Energy, NCI, Clean Air Asia

Presidential Decree PF-56 (24 March 2025) Waste Processing & Circular Economy Reform – Uzbekistan

- Goal: Cut landfilling and scale up recycling & waste-to-energy (WTE) under a “Zero Waste” model by 2030
  - Reduce landfills by ≥50%
  - Prioritize recycling & thermal treatment
  - Establish Eco-Industrial Zones (EIZs) nationwide

Components:

- Assessment of landfill capacities, baseline emissions, and waste composition
- Waste-to-energy facilities (e.g., waste incineration plants, anaerobic treatment systems, filtration systems)