

SMALL HYDRO

From flowing rivers to dirty water

Water is a well-known power source: in many parts of the world, the utility grid is fuelled by electric dams. But for remote mines, there is a less invasive solution: small hydro. It consists of turbines that can be installed on almost any body of water near the mine, providing reliable renewable power. Compared to solar or wind power, hydroelectricity generation is more stable and can be used for baseload, though seasonality is a factor.

Mining energy consultancy THEnergy is currently working with two German universities on the SmartH2O Energy Project in Peru, where the feasibility of small hydro solutions to displace diesel in remote mines is being tested. Managing Director Thomas Hillig explains that while hydropower has typically been installed on rivers in the past, the technology is evolving.

“The project is about applications that have never been used before, so for groundwater, process water, water that is in the pit. The system could also be used as an alternative for storage. We’re looking at the technical aspects of that.”

In 2018, Gilkes installed a hydropower system at Anglo Gold’s Sadiola Mine in Mali. It is made of a containerized turbine that replaces the

Compared to large hydro schemes, small hydro doesn’t require big construction work or human displacement.

function of a pressure-reducing valve, extracting energy from the raw water supplied to the mine and village. Because of its small size and ability to be packed into a shipping container, the system was mostly built before being installed on site, reducing installation time.

“That was a very small project, around 150 kW,” says Gilkes head of sales Andy Eaton. “They put it in because they were

pumping water from a reservoir some 100 km away. They realized they could put a small hydro unit on the end of it, and that's what we did." He adds that in this case, water quality does not matter, because the turbine installed can handle sand and filthy water. This means that in the future, mines could even use their tailings to produce electricity.

It's actually more expensive than solar per kW capacity, but then you get more stable generation

"The tailings are more rocks than actual water, but again, we believe that the Turgo Impulse machine would be a good solution for that. In order to bring it to market, we would need to trial it, put it on a mine and see how it works, so we need to do a partnership with somebody to move forward with it," Eaton says.

Compared to large hydro schemes, small hydro doesn't require big construction work or human displacement. While each site is specific, Eaton notes that payback varies between two and seven years, and can displace diesel completely throughout the mine life.

In fact, the long-lasting character of small hydro could even be seen as an obstacle by miners: "With the limited lifetime of the mine, there can be a bigger conflict than for solar or wind power, that's the downside. But there's already a good business case today. It's actually more expensive than solar per kW capacity, but then you get more stable generation," Hillig points out.

Of course, a thorough environmental assessment must be conducted, and hydropower is more site-specific and may require more planning than other renewable options. But it could be a worthwhile investment, replacing diesel as the baseload power provider and even presenting storage capacity.

Hydroelectricity has suffered a drop in interest in the past few decades, but as miners start to focus more and more on holistic and sustainable energy generation, small hydro schemes could become instrumental in the journey to zero-emission power.



GHG REDUCTION:
100%

FEASIBILITY:
Highly dependent
on location

**EQUIPMENT
NEEDED:**
Hydropower turbines

**SAFETY
CONSIDERATIONS:**
Low risk

**FINANCIAL
VIABILITY:**
Proven