Features for Optimising a Pico Hydro System for Telecommunications Base Stations in Developing Countries

...ways to make a low-head pico hydroturbine work well

Edward CG Andò   George Hartley
Edward Matos    Hayley Sharp
Huge opportunities for mobile phone market in developing countries

Basestation ->
1.5kW constant power
(<1.5kW = “pico”)

Intro -> Low Head Turbines -> Siphon Turbine
-> Features -> Conclusion
Low-Head Hydropower

- No dominant technology yet for low-head hydropower
“Plug & Play” Picohydro Siphon Turbine
Some Highlights

• Site Biology to Estimate River Flows
• Optimising Size of Ductwork
• Trash Racks
• Simplest Runner
Site Biology to Estimate River Flows
Optimising Ductwork Size

![Diagram showing power vs. flow rate with labels for water power across ductwork, ductwork power losses (test data), and maximum power point.](image)

- Water Power Across Ductwork
- Ductwork Power Losses (Test Data)
- Maximum Power Point
- Water Power Available to the Runner

Trash!
How simple can you make the runner?
Twisted sheet metal blades should be fine....
In Conclusion...

• Lots of interesting ways to optimise low-head pico-hydro turbine design – uncharted waters

• Sam’s PhD! And more ideas in report

• Despite everything, right now solar and wind are still easier for “plug & play”...