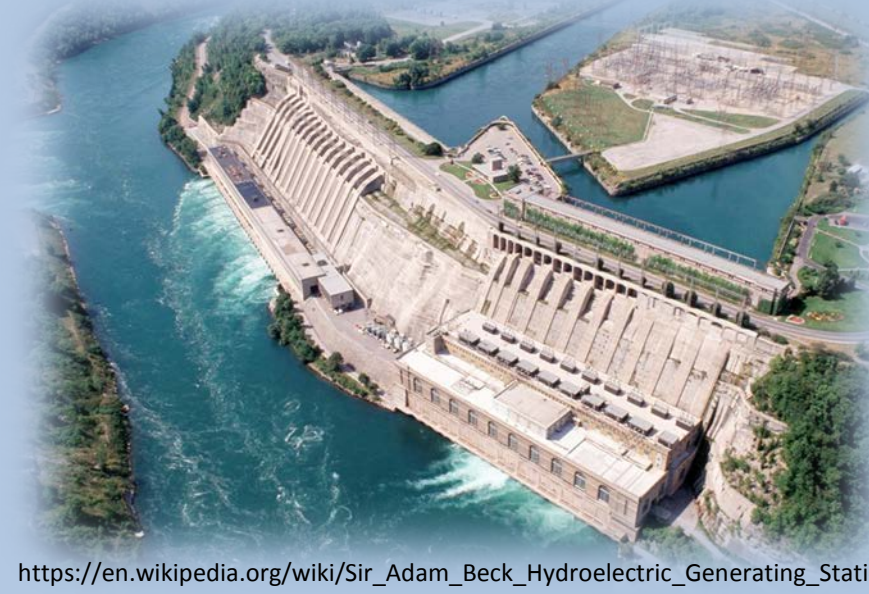


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### Introduction

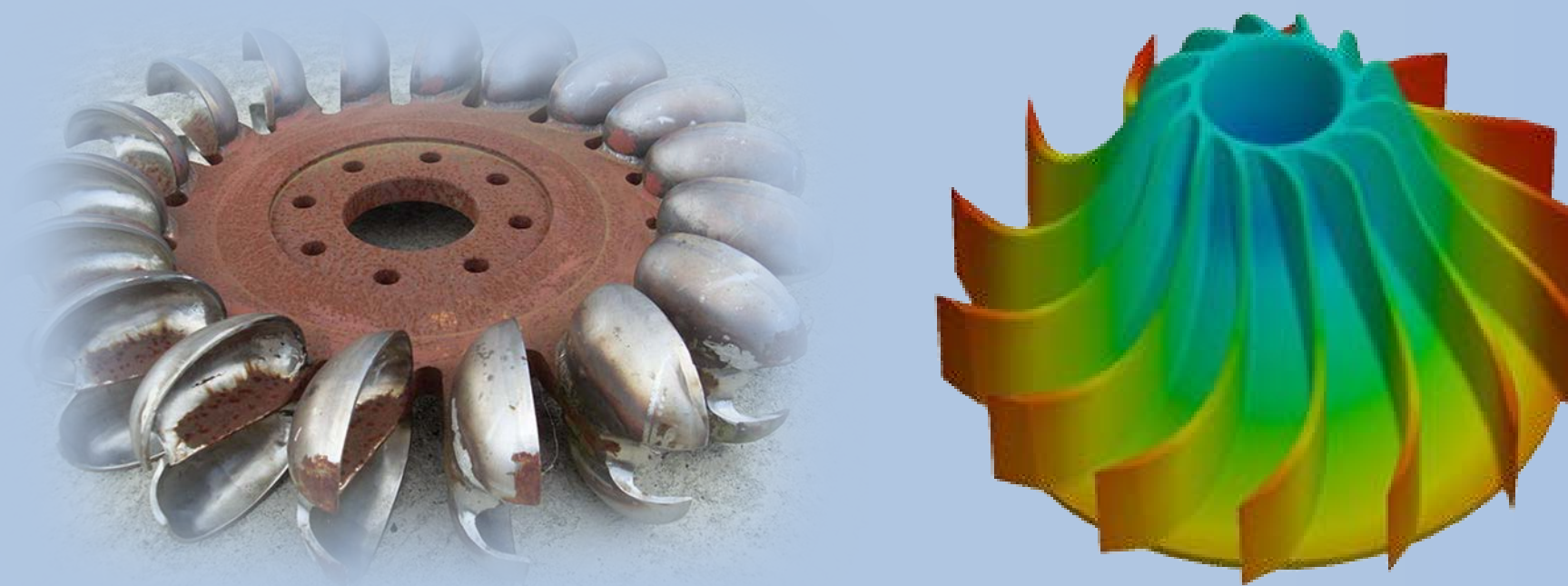
Eighteen percent of the world population does not have access to reliable electricity, even though many of these people live near potential hydro-electric power generation sources. There are several disadvantages to hydro-electric power generation:

- Expensive infrastructure
- Specialized machinery
- Skilled labor to install and maintain
- Disruption of local ecosystems



The PowerPail is a low cost hydroelectric generator that is easy to install. It does not require the creation of expensive infrastructure, does not need specialized machinery or skilled labor and provides reliable power for immediate needs such as lighting, water purification, and charging electronic devices.

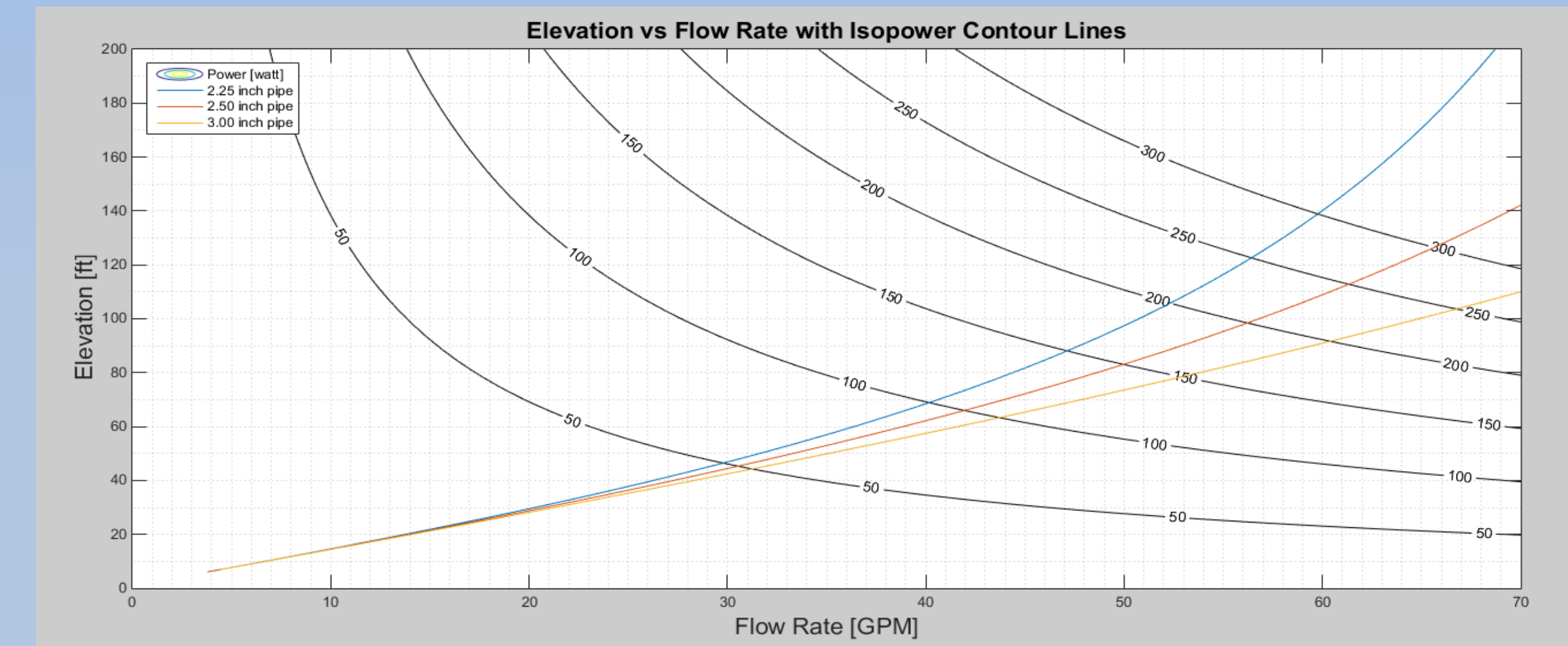
### Turbine Design



Traditional pelton wheel designs (left) require labor intensive assembly and welding that increases the cost of the turbine. PowerPail uses an injection molded turbine (right) which reduces cost by eliminating assembly and using less expensive materials.

### Results

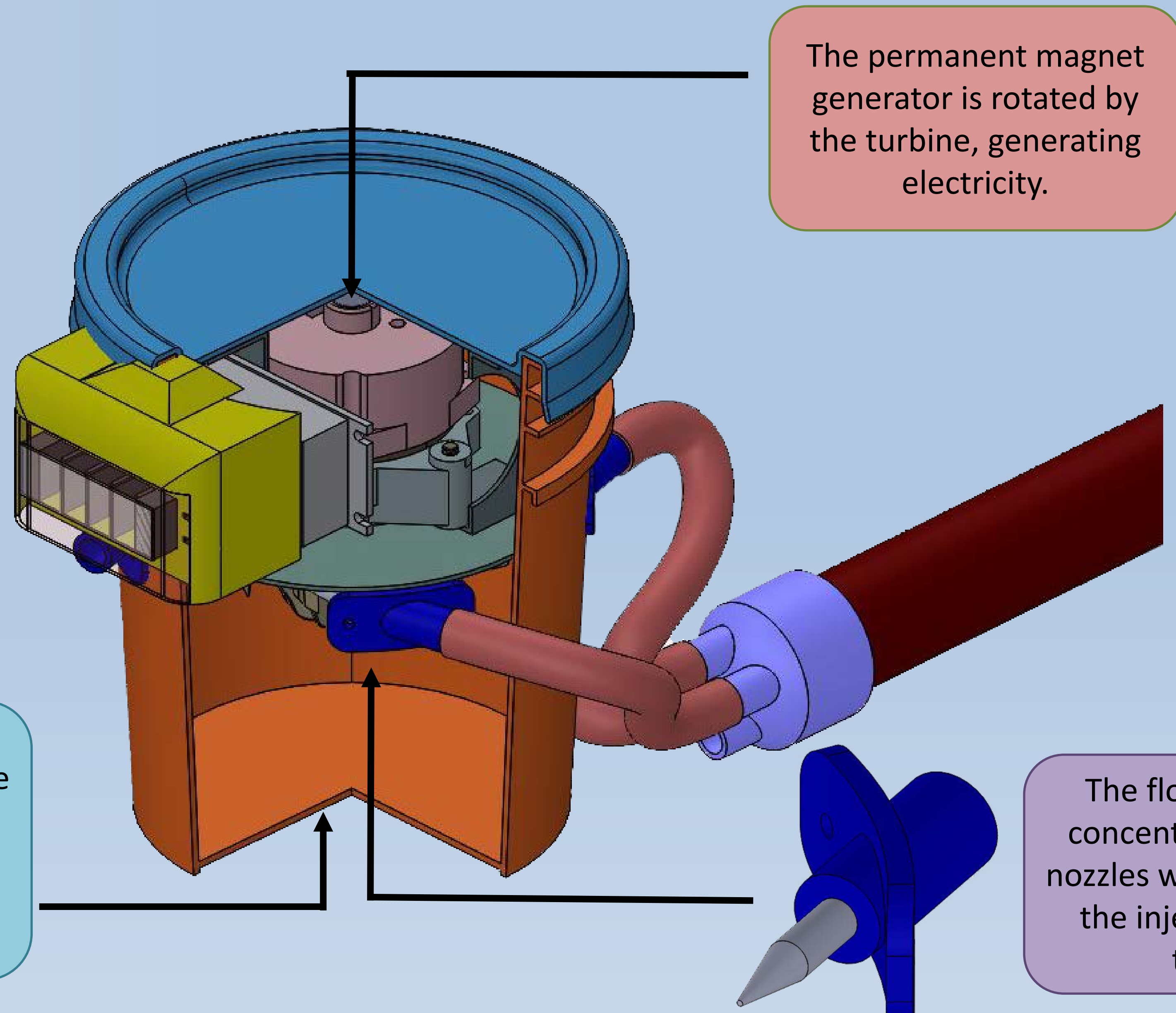
The PowerPail has been successfully designed to generate 300 watts. The final unit cost to the user is \$300. It is lightweight, portable and requires minimal assembly and time to set up. It is also easy and inexpensive to ship the device using the five gallon bucket as the shipping container. The figure below shows lines of constant power (in watts). Overlaid are flow rate curves for three supply line diameters. A supply line of 2.5" in diameter achieves the 300 W operating condition at 130 feet of hydrostatic head.



Water is diverted from a stream to the PowerPail using locally sourced piping.

Protected, user friendly power terminal provides easy access to the power output.

Water exits the bottom of the bucket and can be diverted back to the water source or used for community needs.

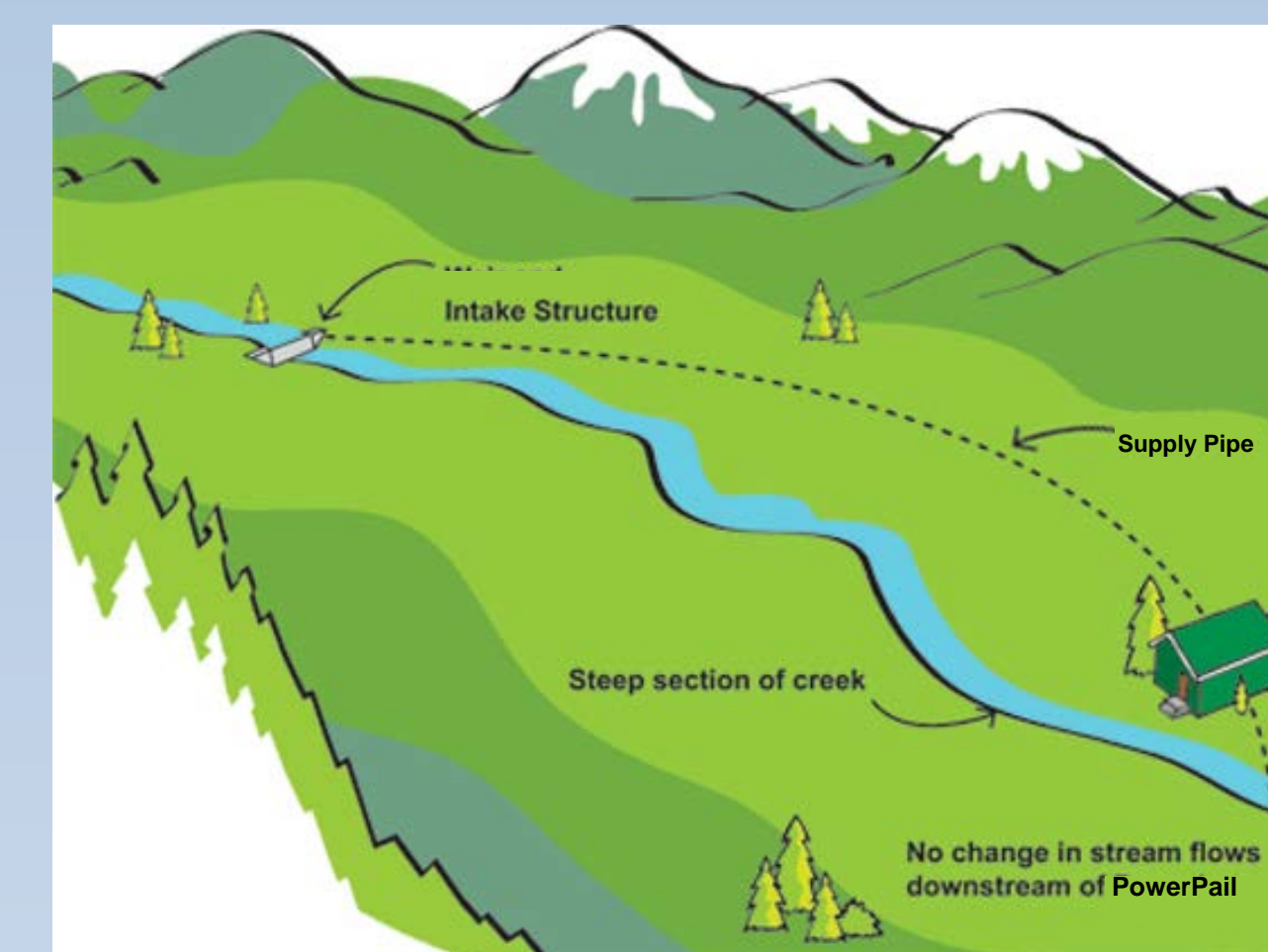


The permanent magnet generator is rotated by the turbine, generating electricity.

The flowing water is concentrated into four nozzles which impinge on the injection molded turbine.

### PowerPail Benchmarking

	PowerPail	Rainbow Power Hydroelectric Generator	Five Gallon Bucket Hydroelectric Generator	Water Buddy
Power Output	300W	300W	90W	189W
Install Hours	2	72-168	168+	10
Cost	\$300	\$2400	\$400	\$695
Weight	20 lbs.	31 lbs.	22 lbs.	8lbs.
Knowledge Required	Basic Assembly	Basic Construction, Plumbing, Electrical	Basic Construction, Plumbing, Electrical	Plumbing, Electrical



Recommended Operating Conditions	
Head Height	40-200 ft.
Flow Rate	30-70 GPM
Supply Pipe Diameter	2-3 in.
Slope	1-10°