Aqua Flow Energy Lite White Paper: Powering Data Centres and Island Growth
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Concept Summary Flowing water is a reliable, constant (24/7) "base-load" source of power that can rapidly replace fossil-fuel systems while reducing the need for large-scale batteries. This paper outlines our approach to mass-producing **small-scale machines (2–10 metres across)** built from **commercially available, low-cost materials**.
Our focus is on providing high-volume, reliable power to **Data Centres** and enabling rapid development for **Island Communities** currently struggling with expensive, unreliable energy.
Urgency With global commitments to achieve net-zero emissions by 2050, the need for scalable, green baseload power is critical. Using existing technology and manufacturing plants, many cities and remote regions can eliminate their reliance on coal, diesel, and gas before 2030.
What is Aqua Flow Energy? We harness **horizontally flowing water**—rivers, tidal currents, and ocean streams. Unlike intermittent solar or wind, water flow is predictable and constant. We focus on "low-hanging fruit": rivers running through cities and energetic currents near island chains.
The Problem with Current Designs Most current hydrokinetic experiments are "IBM Mainframes"—huge, complex, and expensive machines built by firms that favour complication. They are often difficult to transport, expensive to maintain, and can be hazardous to marine life.
The AFE "Volume" Formula: Simple & Small-Scale Our "iPhone" of water flow units is defined by:

- **Compact Size:** 2–10 metres across, allowing for **shipping container transport** and easy export.
- **Off-the-Shelf Components:** Built using **proven, low-cost parts** (e.g., from Caterpillar or Cummins) to ensure quick, cheap replacement.
- **Mechanical Simplicity:** Very few moving parts—often only the shaft—reducing maintenance costs and increasing reliability in adverse conditions.
- **Low-Cost Materials:** Utilizing recycled plastics, and stainless steel or aluminium tubing.

Primary Market: Data Centres Data centres are a vital and demanding sub-market. They require **massive volumes of 24/7 power**, consuming an **average of 1.5 MW per hour**.

- **Reliability:** Data units risk "melt down" if not properly powered; they cannot rely solely on intermittent renewables.
- **Proximity:** By installing our units in rivers near major cities, we provide power close to the "use" location, reducing the energy leakage and high costs associated with long-distance transmission.
- **Scalability:** A small "farm" of AFE units on bridge pylons or riverbeds can deliver the consistent multi-megawatt capacity these centres require.

Secondary Market: Island Communities Island communities are notoriously difficult and expensive to power, often relying on imported diesel.

- **Development Catalyst:** Cheap, reliable power is the foundation for economic development in these disparate, far-apart locations.

- **Local Maintenance:** Our units are designed to be **locally maintained** with standard equipment, providing jobs and self-sufficiency for island populations.
- **Predictability:** Tidal and ocean currents near islands provide a continuous energy stream, unlike the variable weather that affects island solar arrays.

The Physics of Small-Scale Success Water is roughly **800 times denser than air**. Kinetic energy is directly proportional to mass ($K.E.=1/2 \times mv^2$); therefore, a machine just a few metres across in moving water can generate the same power as a wind turbine with 100-metre blades. This "sweet spot" of 2–10 metres allows us to pack units into shipping containers for global deployment.
Ecological Safety AFE units are designed to be **fish and sea-life friendly**. Our blades move at the same speed as the water, allowing sea creatures to swim through or past them without injury. This is critical for gaining community and regulatory acceptance in sensitive riverine and island environments.
Deployment and Service

- **Easy Installation:** Units can be bolted into the grid and installed using standard workboats or cranes.
- **Maintenance:** We target a 6-month service interval, utilizing local labor and "winch-up" mounting structures to avoid the need for expensive, specialized marine vessels.

Cost of Power Our target is to construct 1 MW in generation capacity for less than **$1,000,000**. With low running costs and high reliability (20–24 hours of production daily), with only servicing as an on-going cost, the amount per Megawatt over 10 years is about 1/10th the cost of the lowest of fossil-fuel alternatives.
Summary and The "Ask" Aqua Flow Energy offers a logical, logically scalable solution to the world's baseload power needs. We are seeking Tranche A - **US $2 million (5%)** to complete prototyping, identify the most efficient final designs, to begin commercialization. Tranche B of **US $20 million (20%)** for show-case factory and first orders. No more dilution is anticipated as deposits will fund on-going operations and unit builds.

We can soon power the planet—and its Data Centres & Islands—with low-cost, green 24/7 reliable technology.
