

HydroGrid: Powering the Future from beneath our feet

Hydrogrid redefines renewable power generation transforming utility networks into power grids



innova
— nation

Executive Summary

Problem

Energy inefficiency and climate dependency.

The growing **demand** for **renewable energy** often requires costly infrastructure, extensive land use, and ideal weather conditions.

In Panama, while 46% of electricity comes from **hydropower**, dependency on large reservoirs and stable climates threatens energy reliability. Simultaneously, the energy potential in municipal water pipelines remains **untapped**, representing a missed opportunity for clean, efficient power generation.

Solution

Harnessing and transforming wasted energy from pipelines.

HydroGrid introduces **micro-turbines** installed within existing water pipelines to convert hydraulic pressure into renewable energy.

By maintaining water flow and pressure, these turbines generate electricity without disrupting supply. Equipped with **IoT sensors** and AI technology, HydroGrid ensures real-time optimization, predictive maintenance, and enhanced performance, providing a scalable and cost-effective energy solution.

Impact

Contributions to SDGs and significant savings for clients.

HydroGrid aligns with UN **SDGs** by producing renewable energy (SDG 7), reducing environmental impact through efficient infrastructure use (SDG 11), and combating climate change by lowering carbon emissions (SDG 13).

With **energy savings** of up to \$50,000 annually per turbine, HydroGrid accelerates Panama's goal of 70% renewable energy by 2050, offering a replicable model for **global sustainability**.

A Planet in Energy Crisis

The urgent mission to reduce our carbon footprint

Climate change is the greatest challenge of our era.

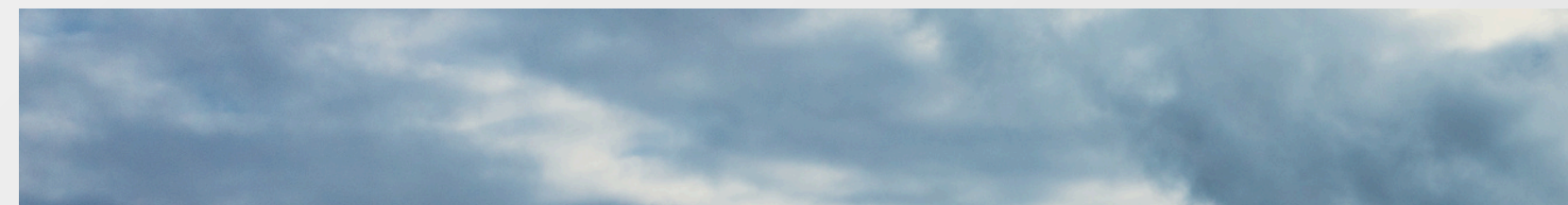
As carbon emissions reach critical levels, nations, companies and communities are desperately seeking **renewable energy alternatives**. But the road has not been easy.



The energy sector contributes **73%** of greenhouse gas emissions.



The most popular renewable solutions are not free of environmental or economic problems.



The Challenges of Current Renewable Energy

What price are we willing to pay for clean energy?

Despite their advantages, the most popular renewable options have significant impacts:

2 Wind Energy



- Initial costs are high, limiting its mass adoption.
- Highly dependent on the weather.
- Without wind, there is no energy.

3 Solar Energy



- It is only efficient during the day and in direct sunlight.
- Its initial production requires expensive materials and often harmful mining.

4

Fossil fuels



- Emit 35 billion tons of CO₂ per year.
- Coal mining devastates landscapes and communities.
- Oil spills destroy marine ecosystems.

1 Hydroelectric dams



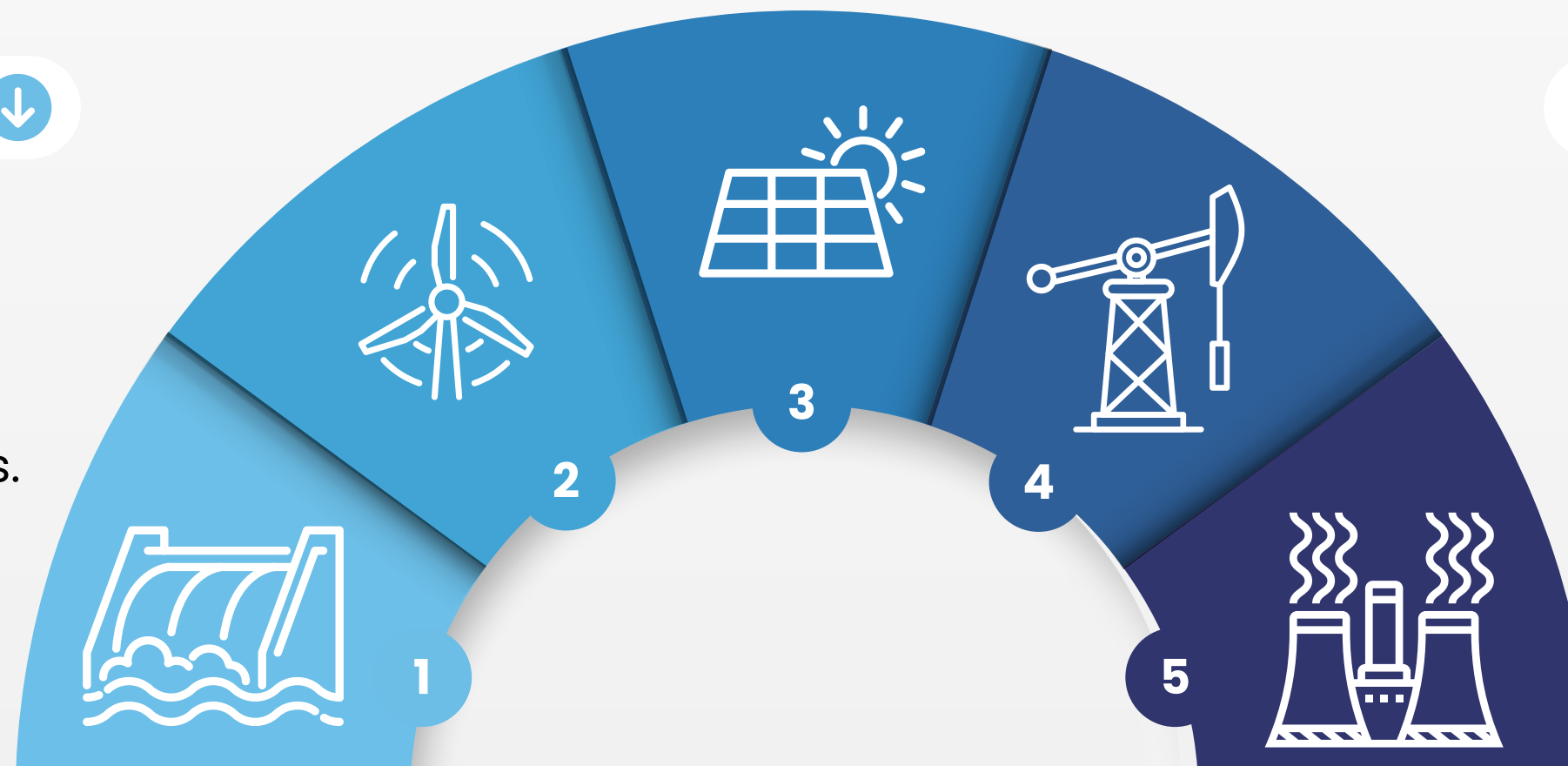
- Destroy entire ecosystems.
- Thousands of species are trapped or displaced.
- Massive floods strip communities of their homes.

5

Nuclear energy



- The radioactive waste persists for thousands of years.
- Building and maintaining nuclear plants requires multi-million dollar investments.

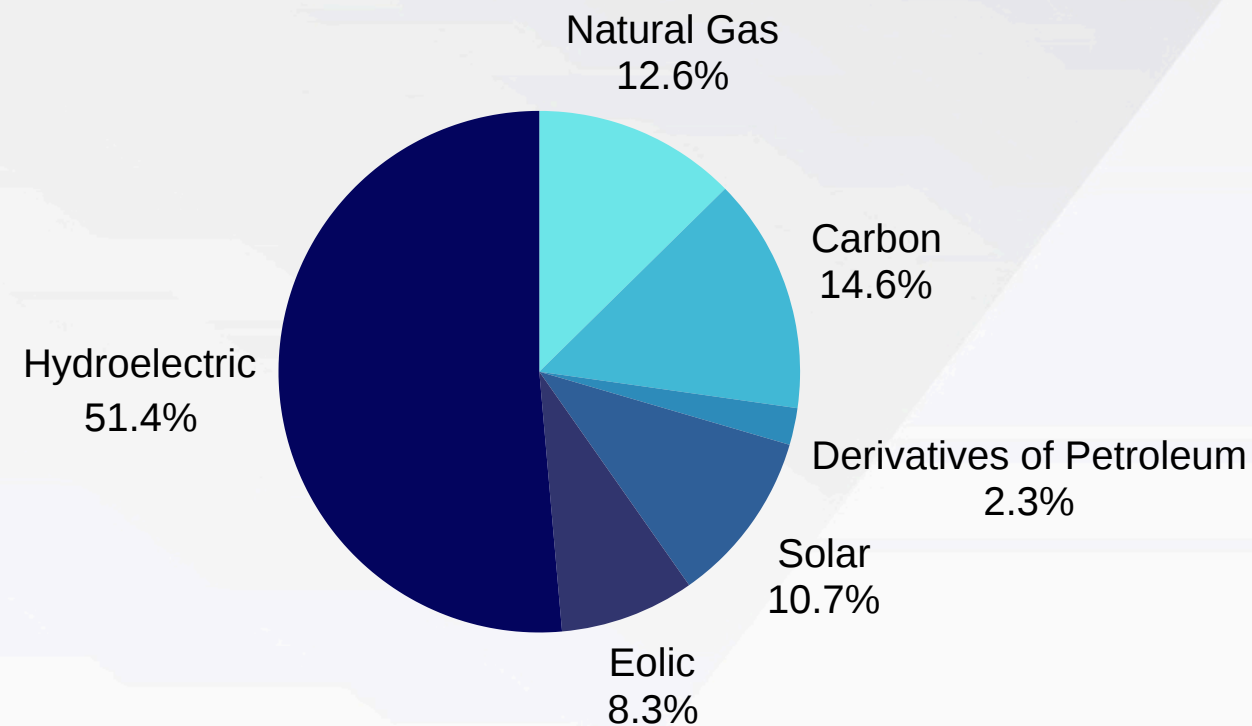


PROBLEM

A System Under Pressure

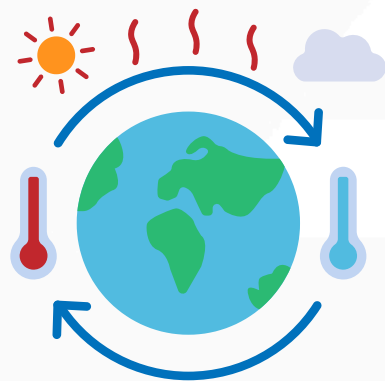
The Risks of Traditional Hydropower in Panama

Hydroelectric Dependence in Panama



Panama's reliance on hydroelectric power, which constitutes over half of its energy mix, highlights the nation's commitment to renewable energy. However, this dependence comes with inherent vulnerabilities.

Climate Change



- The global climate crisis has introduced **unpredictable weather patterns**, threatening the stability of hydroelectric reservoirs.
- These climatic instabilities create a **significant risk for Panama's energy security**, as prolonged dry spells could drastically reduce energy output.

Environmental and Social Costs of Hydroelectric Dams



The construction of hydroelectric dams comes with a steep environmental and social price. These massive structures require extensive land clearance, often flooding large areas to create reservoirs.

This results in the loss of valuable natural habitats, the disruption of ecosystems, and the displacement of wildlife.

Dams Worldwide

- Up to **50,000 hectares** of land are often **flooded** for a single large dam.
- **1,700 species of plants and animals** can be **displaced** in biodiverse regions due to dam construction.
- Over **80 million** people worldwide have been **displaced by dam projects** in the last century.



A System Under Pressure

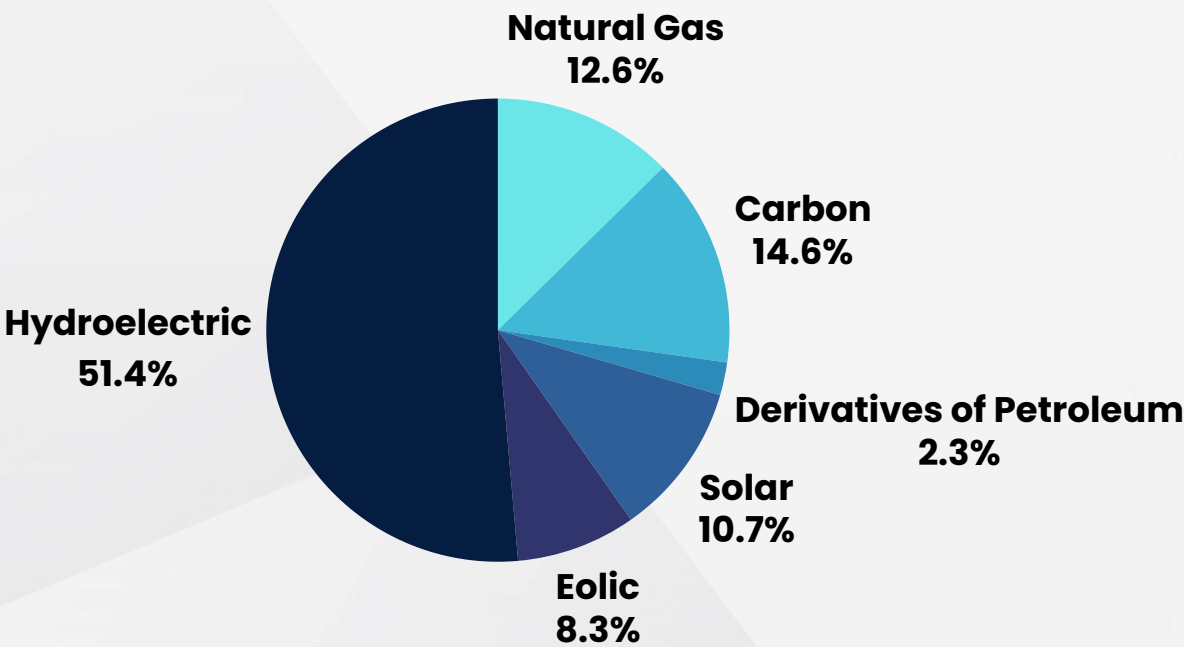
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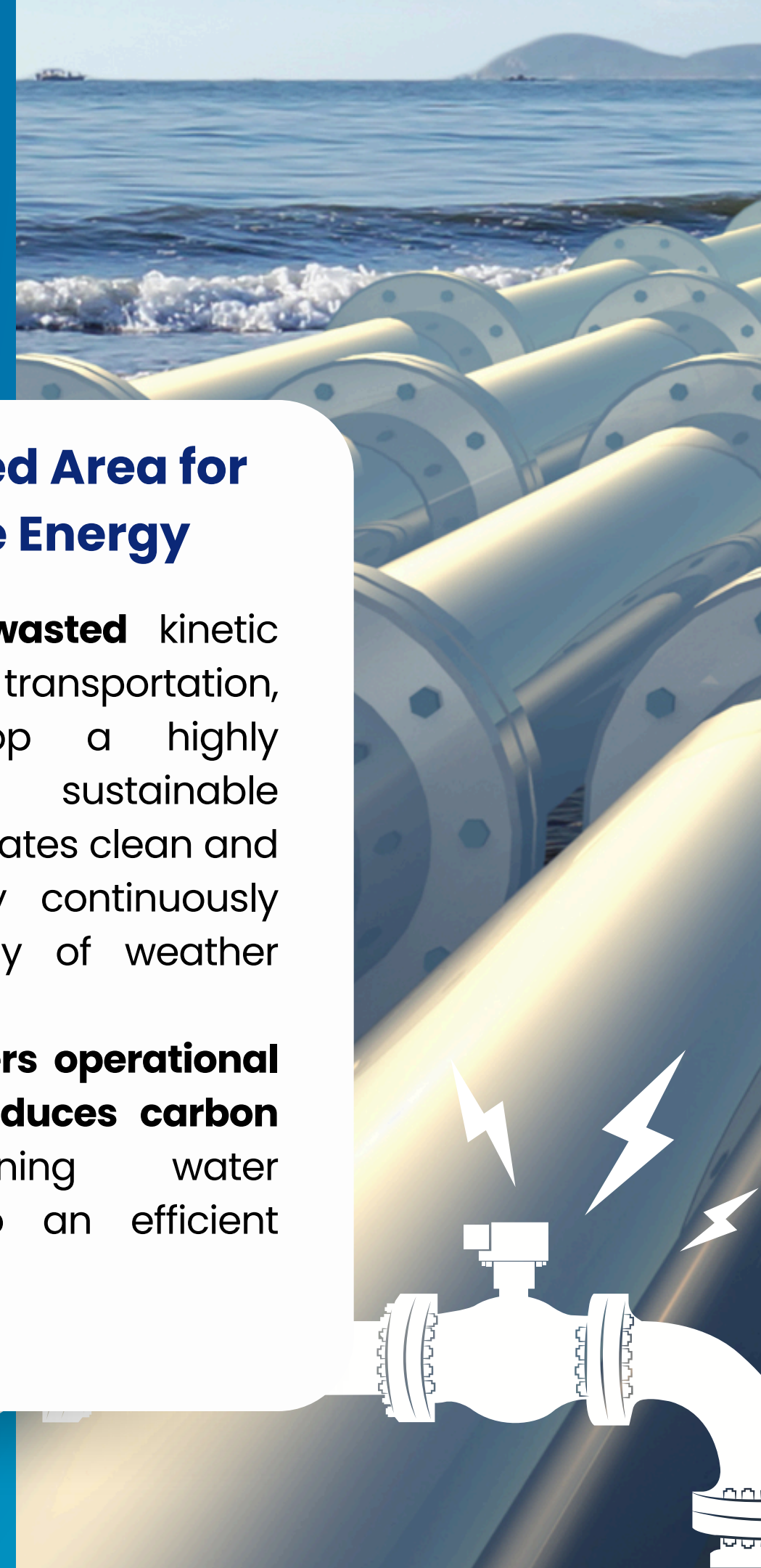
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Lost Energy in Water Systems

An Unexplored Energy Solution



How Water is Transported Through Pipelines

Water can be transported through pipelines in two ways: by **gravity** or by **pressurized pumping**.

In gravity-based systems, water flows from higher areas to lower ones and is usually used in **mountainous regions**.

Pressurized pumping is typically used in **urban areas**, where electric pumps generate the necessary pressure to transport water over long distances and to high-rise buildings.

Energy Waste in Water Infrastructure

In both water transportation systems, a significant amount of **energy** is **lost**.

In gravity-fed systems, although no energy is required for distribution, kinetic energy is **wasted** and dissipated through **pressure valves** instead of being harnessed. Similarly, in pressurized systems, excess pressure is lost through Pressure Reducing Valves (PRVs), which dissipate energy as heat instead of converting it into useful power.

An Unexplored Area for Renewable Energy

Harnessing the **wasted** kinetic **energy** from water transportation, we can develop a highly innovative and sustainable solution that generates clean and renewable energy continuously and independently of weather conditions.

This not only **lowers operational costs** but also **reduces carbon emissions**, turning water infrastructure into an efficient energy source.

02



Solution

HydroGrid: A Smart Solution for Clean Energy

"Water pipelines don't just transport water, they transport untapped energy. HydroGrid captures this lost power, transforming it into clean, renewable electricity without disrupting water supply."

What is Hydrogrid?

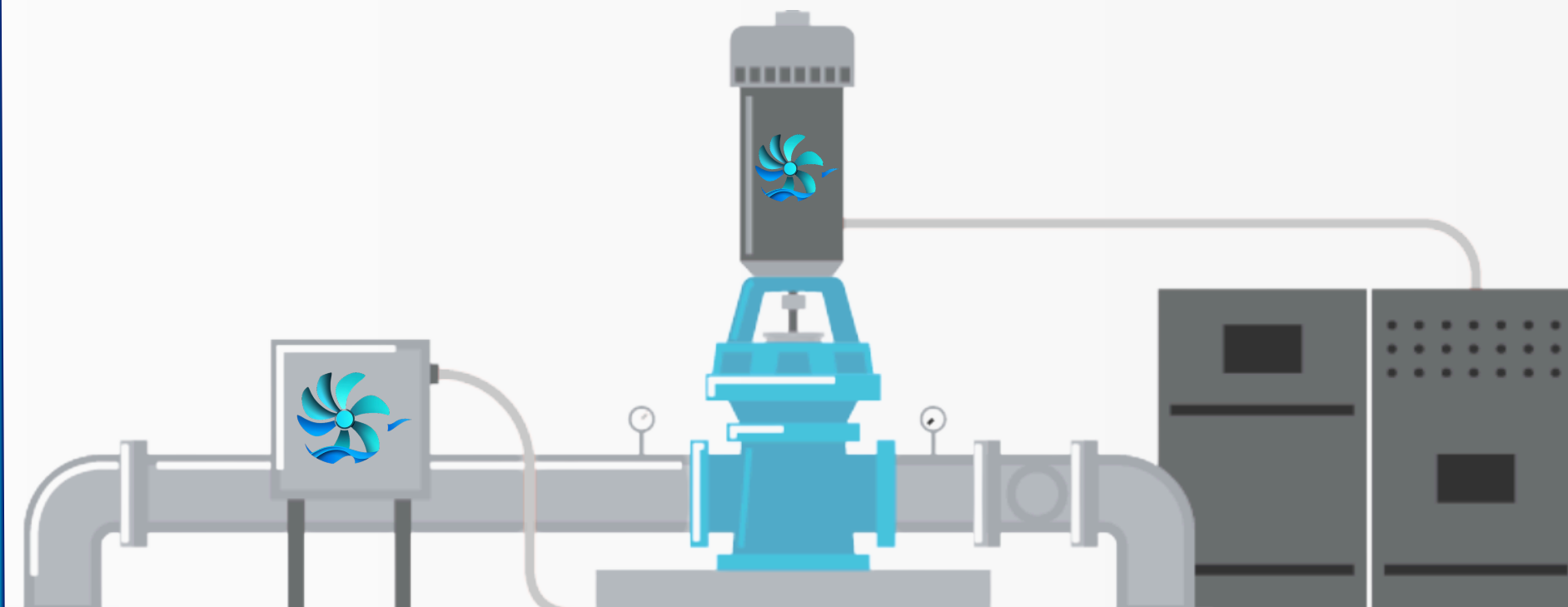
Hydrogrid is an innovative system that harnesses the high water pressure in pipelines to generate energy. By integrating turbines into the pipelines, it efficiently and sustainably produces electricity. Additionally, these turbines are equipped with cutting-edge sensors that monitor critical variables, ensuring optimal performance and providing early warnings of potential issues.

Adaptability of Hydrogrid

HydroGrid is highly adaptable, designed to integrate into any existing pipeline system without requiring modifications. Its range of turbines, from 3kW to 60kW and its ability to operate in parallel with pressure-reducing valves make it a versatile solution for various environments, ensuring that water flow remains unaffected for the end consumer.

What makes HydroGrid unique?

What makes HydroGrid unique is that, unlike other renewable energy sources such as solar and wind, it generates electricity continuously and independently of weather conditions. Its system utilizes an existing resource, the constant flow of water within pipelines. Additionally, it incorporates IoT sensors and artificial intelligence algorithms to monitor its performance in real time and optimize energy production.



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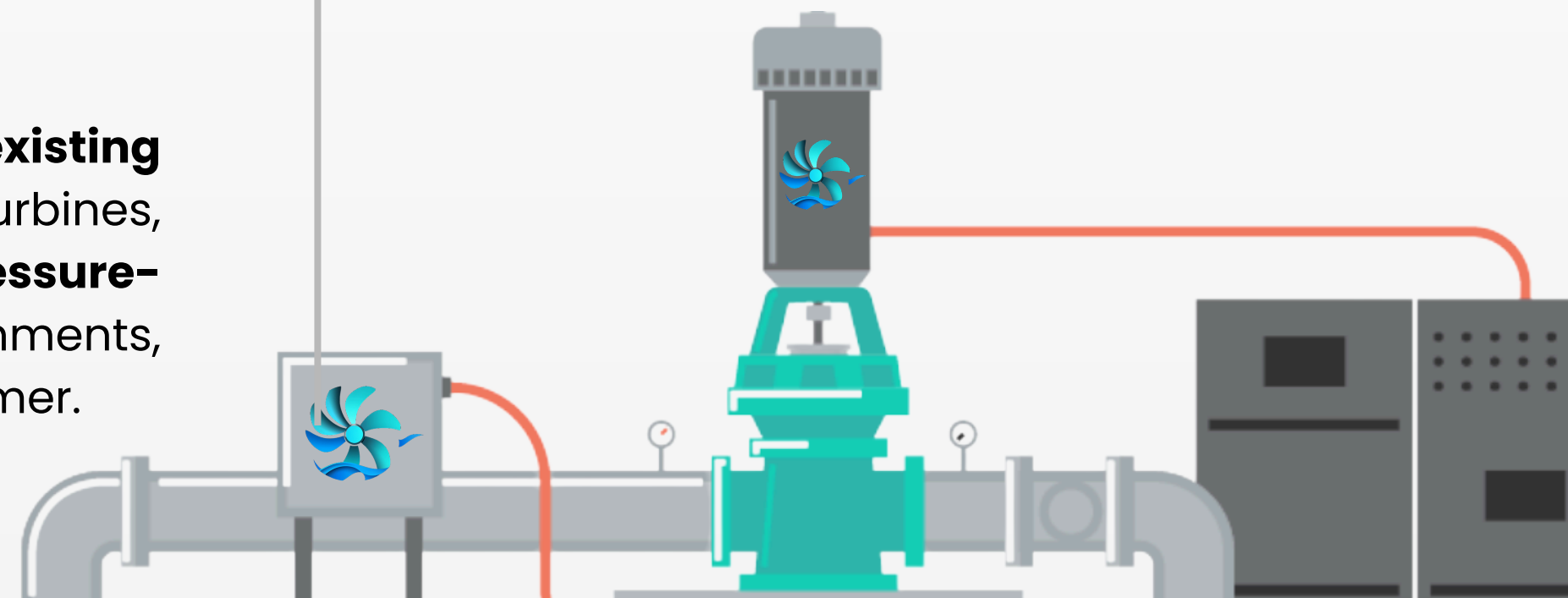
HydroGrid is an innovative system that transforms **water infrastructure** into a source of **renewable energy**. By installing turbines inside pipelines, it captures the energy generated by pressurized water flow and converts it into electricity. This solution enables the generation of **clean, sustainable energy** without the need for additional power plants or disruptions to the water supply for end users.

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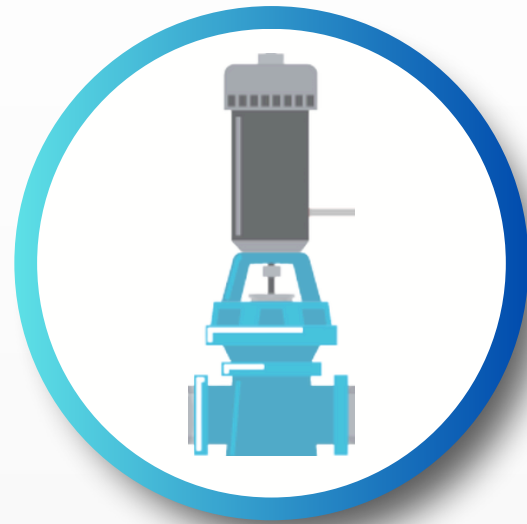
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Components of the Turbine

Casing



The casing is the structure that protects and houses the internal components of the turbine, ensuring optimal operation and extending its lifespan. Its design is engineered to withstand water pressure and minimize energy losses by efficiently directing the flow towards the runner.

Runner



The runner is the component responsible for capturing the kinetic energy of water and converting it into rotational motion. Driven by the water flow, it spins its shaft, which is connected to the generator, thus starting the electricity generation process.

Electric Generator



The generator converts the mechanical energy from the runner into electricity. Through a series of magnets and coils, a magnetic field is created, inducing an electric current that can be used for self-consumption or stored for later use.

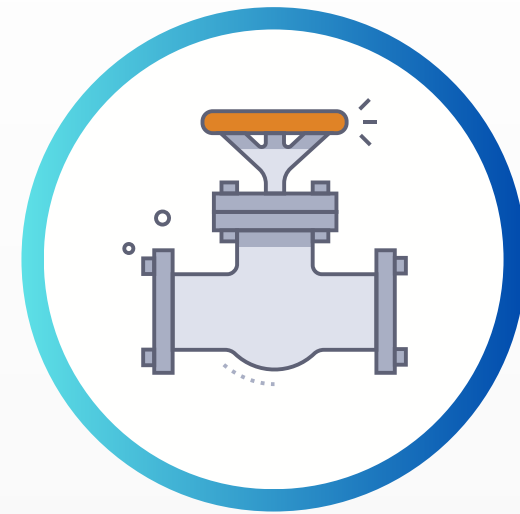
Components of the Turbine

Grid Inverter



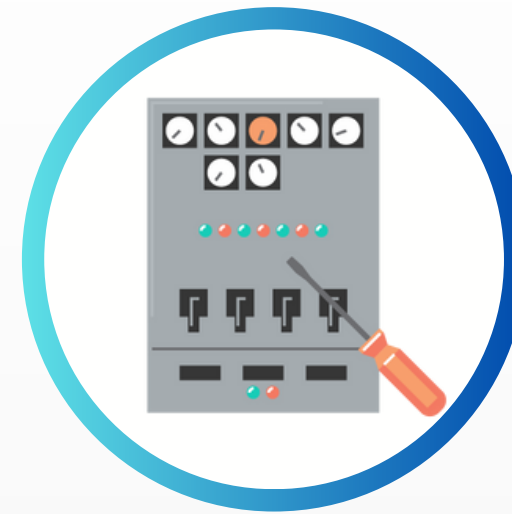
The grid inverter is responsible for converting the direct current produced by the turbine into alternating current, making it compatible with household electrical grids, institutions, or storage systems. Additionally, it regulates the voltage and frequency to ensure a stable and efficient power supply, preventing fluctuations that could damage connected

Automatic Valve



It is a safety component that is crucial for system regulation. It automatically shuts off the water flow in the event of a power failure, preventing turbine malfunction. Additionally, when battery storage reaches its maximum capacity, the valve temporarily closes to avoid unnecessary energy generation, optimizing the use of available resources.

Control Panel



It continuously monitors the turbines and the energy generated. It collects real-time data on energy production, efficiency, and system status. Additionally, it can be integrated with IoT technology to enable remote supervision and automatic adjustments, ensuring optimal performance and early detection of potential failures.

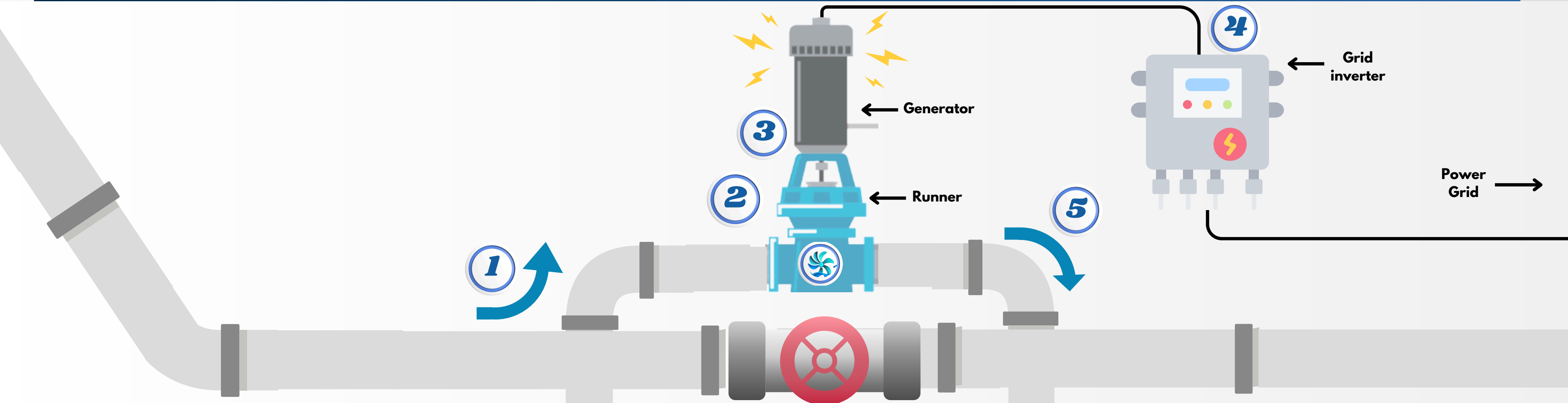
Braking Resistor



This critical safety mechanism is activated in the event of a grid failure. When electricity cannot be transferred to the grid or stored, the braking resistor dissipates excess energy as heat, preventing overloading and potential damage to the turbine and electrical components. It ensures the system remains safe under all conditions.

How Hydrogrid Works

- 1** High-pressure water flowing through the pipeline enters the turbine, which is installed in parallel with the pressure-reducing valve, ensuring that the water flow remains unaffected.
- 2** Inside the turbine, the force of the water spins the runner (impeller), which is connected to the shaft of the electrical generator.
- 3** As the shaft rotates, it transfers mechanical energy to the generator, where a magnetic field created by magnets induces an electric current.
- 4** The generated electricity then passes through a grid inverter, where it is converted into alternating current, ready for use in homes and other applications.
- 5** Finally, the water exits the turbine and returns to the pipeline, maintaining the original flow without affecting the supply to the end consumer.



How HydroGrid Works

From Water Flow to Power Supply

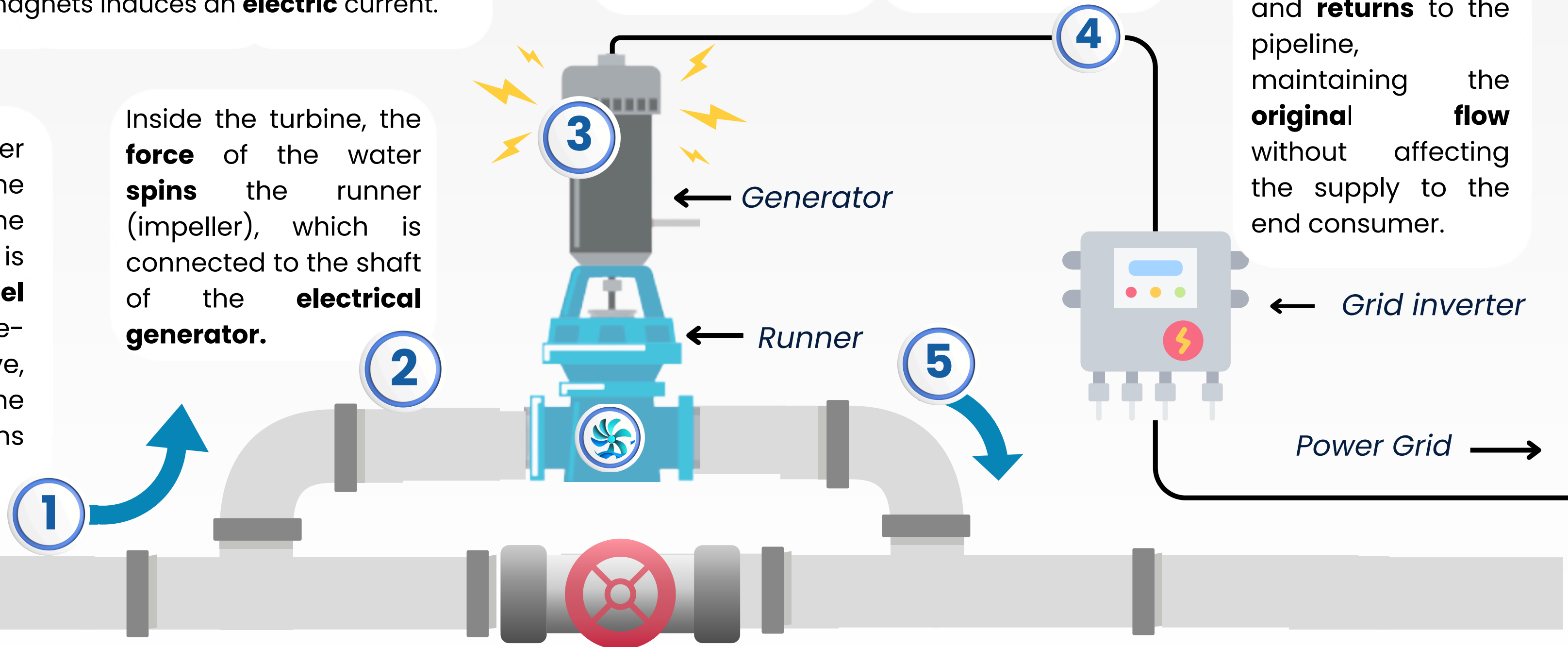
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Implementing a Safe Alternative To Produce Hydropwer Energy in Panama

Why Hydrogrid?

01

Feasibility Study: Before any installation, we conduct a thorough feasibility study. We assess the potential of each location, ensuring optimal energy output while complying with all regulations.

02

Engineering & Design: Personalizing our turbines with every project is our priority. Ensuring compatibility and minimum disruption to the existing pipelines.

03

Pilot Installation & Testing: We believe in testing before scaling. When the turbine is deployed, it is monitored to validate performance, efficiency, and reliability. This allows us to ensure a secure ecosystem for other turbines to be deployed.

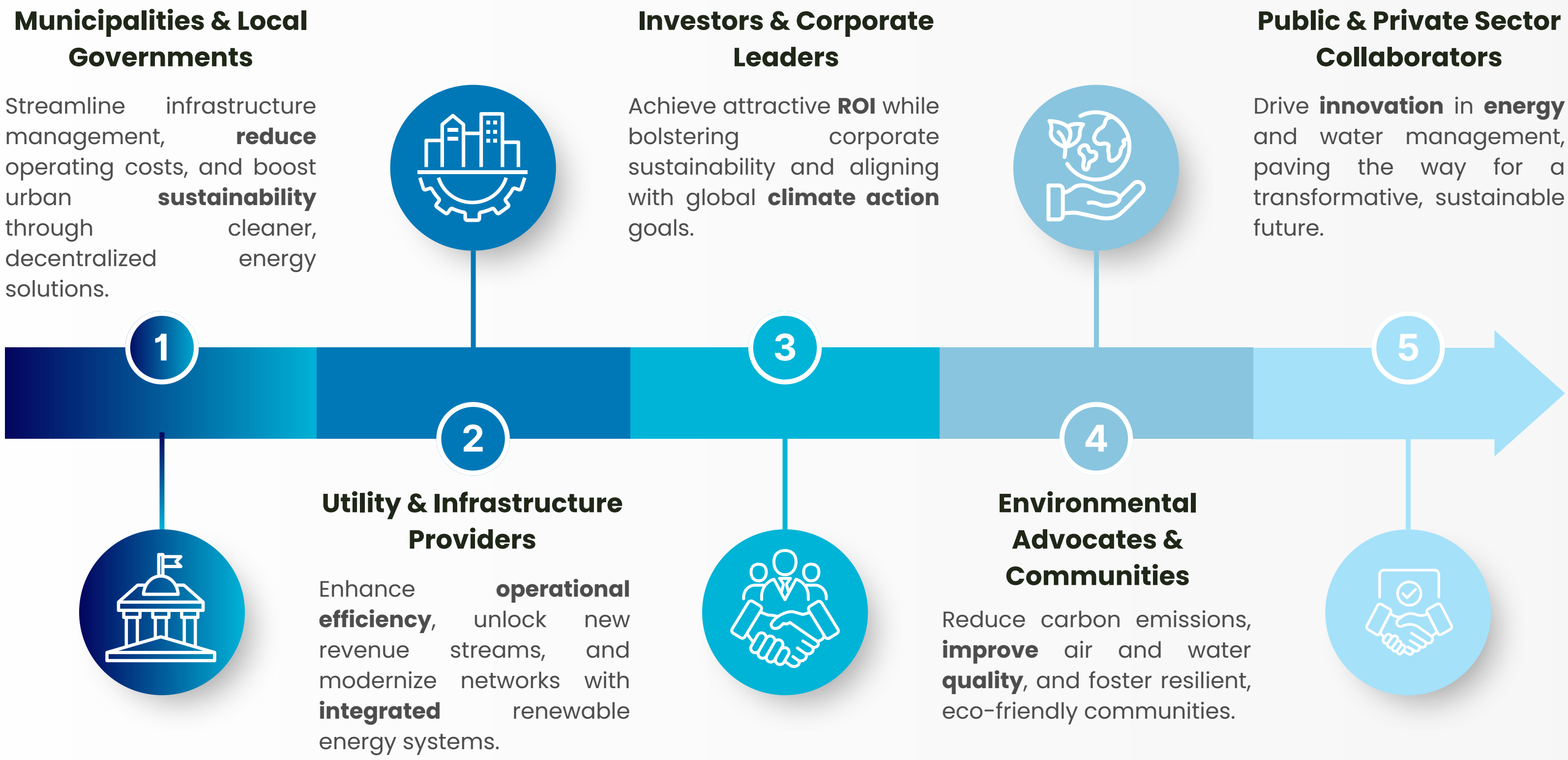
04

Pilot Installation & Testing: Our remote monitoring system ensures peak performance, while proactive maintenance guarantees efficiency. This approach minimizes operational risks and maximizes long-term sustainability.



Who Will Benefit from This Solution?

Empowering Stakeholders Across the Board



Factories

Factories use large volumes of water for cooling, cleaning, and production processes. By installing HydroGrid in their distribution systems, they can reduce operational costs.



Hotels

Hotels consume significant amounts of water for guest rooms, pools, and laundry services. HydroGrid allows them to transform this constant flow into renewable energy, reducing electricity consumption.



Hospitals

Hospitals require a continuous water supply for laundry, HVAC systems, and medical equipment. By integrating HydroGrid into their hydraulic network, they can generate a sustainable energy source.



Residential Buildings

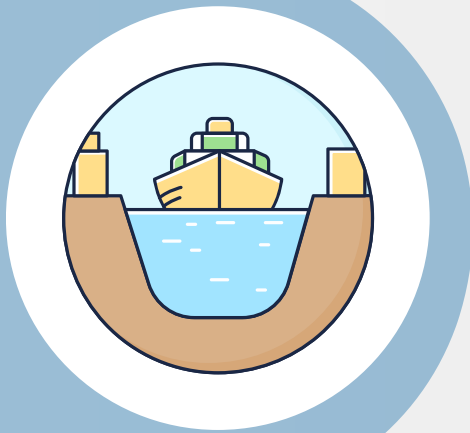
In residential buildings, a significant amount of energy is used to pump water to different floors due to the height. With HydroGrid, part of the energy consumed in this process can be recovered.



Target customers

Panama Canal

The Panama Canal moves massive amounts of water through its locks to enable ship transit. By installing HydroGrid in strategic locations, clean energy can be generated without disrupting canal operations.



Water Treatment Plant

These plants handle large volumes of moving water, from treatment to distribution. HydroGrid can harness the pressure in pipelines to generate electricity without affecting operations.



Intelligence at the Service of Energy

Integration with IoT sensors and AI-based software

Hydrogrid transforms pressure into energy, revolutionizing the management of urban water systems. Using a combination of smart sensors and software complemented by artificial intelligence (AI), we ensure that each component operates with **maximum efficiency** and **minimum impact**.

01 Real-time monitoring

Connected IoT sensors:

- They constantly measure the flow, pressure and energy performance of each turbine.
- They generate accurate and real-time data, accessible from anywhere through a digital platform.

03 Continuous optimizations

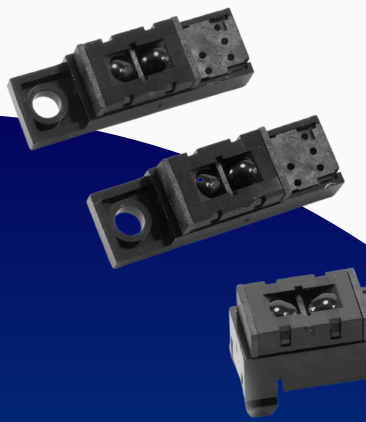
Machine learning algorithms:

- Automatically adjust turbine operation to maximize energy efficiency.
- Adapt the system to changes in flow conditions and energy demand.

02 Predictive maintenance

Predictive analytical AI:

- Detects patterns in the behavior of the data collected by the sensors.
- Predict when a turbine or pipeline might need maintenance, before critical failures occur.



Empowering Change Through Our Website



Driving Global Awareness



- **Showcasing Solutions:** Highlights HydroGrid's alignment with SDG goals, showcasing its potential to revolutionize water and energy management.
- **Educational Impact:** Resources explaining the intersection of water, energy, and sustainability, inspiring communities and stakeholders to act.



Fostering Collaboration



- **Interactive Platforms:** Connect policymakers, researchers, and investors with live data and insights from HydroGrid's simulations.
- **Global Network:** Acts as a hub for partnerships, sharing innovations, and scaling solutions across regions.



Accelerating Change



- **Open Data Access:** Provides transparency with real-time dashboards, case studies, and pilot project projections.
- **Call to Action:** Encourages visitors to contribute—whether through funding, research collaboration, or advocacy for clean energy policies.

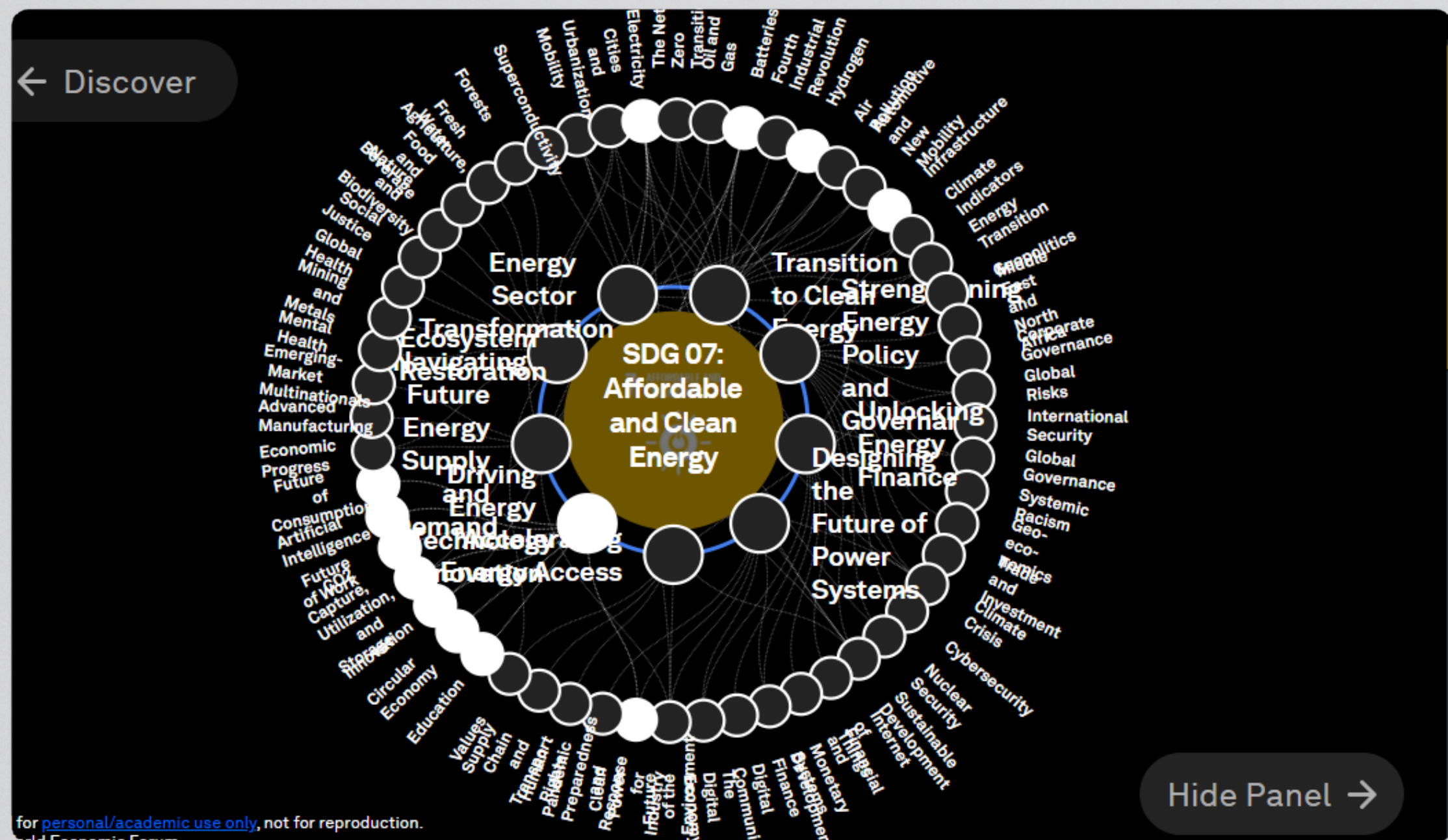
03



Impact

By leveraging IoT, AI, and advanced analytics,
our solution:

- 
- The infographic features a light blue background with a subtle grid pattern. On the left side, there are three blue circles containing the numbers 01, 02, and 03 in white. To the right of each circle is a bold blue heading followed by a paragraph of black text. The headings are 'Enhances Clean Energy Access', 'Optimizes Resource Utilization', and 'Strengthens Climate Adaptation'. The text describes how smart water management integrates renewable energy, reduces waste, and promotes resilience.
- 01 Enhances Clean Energy Access**
Decentralized, efficient microturbines generate renewable energy within existing water networks.
 - 02 Optimizes Resource Utilization**
Smart water flow management reduces waste and enhances efficiency.
 - 03 Strengthens Climate Adaptation**
Promotes resilience by integrating sustainable energy into urban and rural environments.



Impact: Unlocking Sustainable Value

- ⬆️ Maximize Gains,
- ⬇️ Minimize Footprint

HydroGrid doesn't just solve problems; it creates opportunities.

By tapping into the untapped potential of water pressure, we are unlocking a new era of **energy independence**, where consumers no longer rely solely on costly, centralized power grids or weather-dependent renewables. Instead, they become **active participants** in a decentralized, resilient energy ecosystem.



*HydroGrid reduces operating expenses by generating on-site renewable energy, cutting electricity costs by up to **30-40%** for our clients.*

Economic Benefits:



- **Cost Savings & Revenue Generation:**

Reduce operating expenses with on-site renewable energy generation and unlock new revenue streams from energy surplus.



- **Resource Optimization:**

Enhance operational efficiency by integrating smart water and energy management systems that lower maintenance and utility costs.

Environmental Benefits



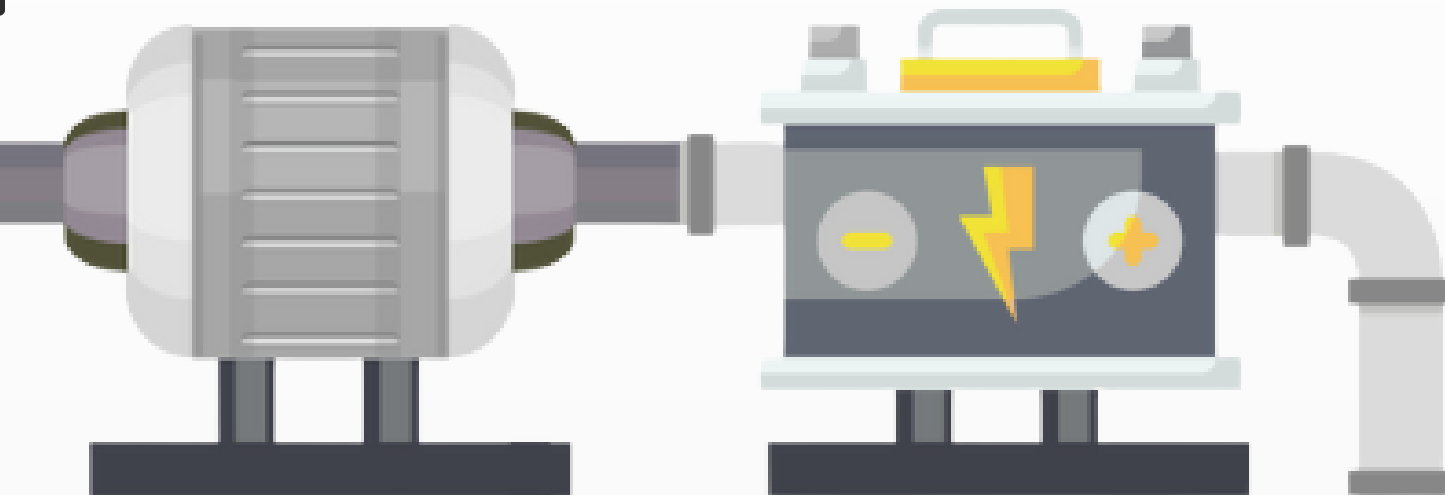
- **Carbon Footprint Reduction:**

Cut greenhouse gas emissions significantly by transitioning to clean, decentralized energy.



- **Climate Resilience & Sustainability:**

Support urban sustainability and resilience by contributing to cleaner air, water, and greener communities.



Economic Gains with HydroGrid

HydroGrid: Transforming Water into Wealth

Discover how HydroGrid turns every **pipeline** into a source of **economic value**, delivering significant savings and revenue opportunities for your business.



Electricity Cost Reduction

Each HydroGrid turbine can reduce electricity costs by **30–40%**, saving businesses up to **15,000–20,000 annually** depending on energy consumption and local tariffs.



Maintenance Cost Savings

With predictive maintenance powered by IoT and AI, HydroGrid reduces maintenance costs by up to **25%**, saving an additional **2,000–5,000 per year** per turbine.



Energy Surplus Sales

By selling surplus energy back to the grid, businesses can generate **5,000–10,000 annually** per turbine, creating a new revenue stream while contributing to a greener energy mix.



Monitoring App ROI

Our AI-powered monitoring app ensures optimal turbine performance, delivering **10–15% higher energy efficiency** and generating **2,000–4,000 in additional savings** annually per turbine.

03



Execution

A Dual Approach:

B2B & B2C Growth Strategy

B 2 B *Business-to-Business*

Target Markets

- Municipalities & Local Governments
- Utility & Infrastructure Providers

Key Value Propositions

- **Operational Efficiency:** Seamless integration with existing infrastructure reduces costs.
- **Scalable Innovation:** Modernize performance.
- **Strategic Partnerships:** Enhance public-private collaborations to drive sustainable urban development.

B 2 C *Business-to-Consumer*

Target Markets

- Eco-conscious Consumers
- Commercial Enterprises with Sustainability Goals

Key Value Propositions

- **Affordable Clean Energy:** Enjoy cost-effective, renewable power solutions.
- **Long-Term Savings:** Experience reduced energy bills and enhanced system resilience.
- **Energy Independence:** Achieve self-reliance through locally managed energy systems.



Navigating Obstacles, Driving Impact

Challenges & Next Steps

Our journey has not been without obstacles. We faced **technical integration challenges** when aligning our microturbine systems with existing infrastructure, had a lengthy vetting process of **regulatory complexities**, and managed **market uncertainties** as we structured innovative renewable solutions. Each hurdle encouraged us to **rethink** and **refine** our vision.

Through these challenges, we learned the importance of **agile iteration**, **collaborative problem-solving**, and **proactive stakeholder engagement**. Looking ahead, we are poised to:



Accelerate pilot programs

Refine our solutions with real-world testing.



Forge strategic partnerships

Deepen collaboration with industry leaders and regulators.



Invest in ongoing R&D

Continue to innovate to ensure long-term sustainability and market adaptability.



ROADMAP

From Concept to Global Impact

1 Concept Validation

- Develop a prototype of microturbine and IoT sensors.
- Establish collaborations with academic mentors and industry experts for technical guidance.
- Conduct a pilot study on a small-scale water network.

3 Initial Deployment

- Install turbines on high-pressure pipelines within metropolitan zones.
- Integrate AI-based monitoring via HydroGrid's mobile app.
- Launch a marketing campaign emphasizing energy cost savings and environmental impact.

2 Strategic Partnerships

- Partner with Panama's water utility to integrate into existing pipelines.
- Secure partnerships with IoT providers for real-time monitoring infrastructure.
- Present results to attract investors.

4 Regional Scaling

- Target countries with similar water infrastructure challenges.
- Establish regional partnerships to reduce production and deployment costs.

5 Global Integration

- Collaborate with international organizations for funding and adoption.
- Expand HydroGrid technology to industries,

ROI in 2-3 Years, Benefits for a Lifetime

Turning pipelines into sources of accelerated profitability and sustainability.

Accelerated Payback: The HydroGrid Advantage

Return on Investment (ROI) Period:

With a competitive upfront cost and annual savings of 15,000-\$50,000, HydroGrid ensures a return on investment in just **2-3 years**, outperforming technologies like solar and wind.

Energy Form	Payback
 Solar	7-10 years
 Wind	5 -15 years
 Hydrogrid	2-3 years

Breakdown by Sector

When Will You Break Even?

Customer Sector	Annual Savings per Turbine (\$)	Payback Period
 Water Treatment Plants	50,000-100,000	1.5 - 2 years
 Hotels/Resorts	20,000-40,000	2 - 2.5 years
 Heavy Industries	80,000-150,000	1.5 - 2 years
 Panama Canal	\$200,000+	1 - 1.5 years

Long-Term ROI: Beyond Payback

After recovering the initial investment, each turbine generates 15,000-50,000 in **net annual savings** over its

20+ year lifespan.

Total ROI over 10 years: 300-400% (vs. 120% for solar energy)

The Economics of Innovation

Budget Breakdown

Detailed Budget Breakdown	Price
Initial Investment	
Research & Development	\$1,500 per unit
Turbine Costs	\$18,000
Legalization & Permits	\$1,500 per unit
Installation	\$1,500 per unit
Total Initial Investment	\$22,500
Monthly Operational Costs	
Turbine Maintenance	\$20 per unit
Web Hosting & Services	\$10
Technical Support	\$5.50 per hour
Marketing & SEO	\$700
Total Monthly Operational Costs	\$2,735.50
Total Annual Cost	\$32,826.00

HydroGrid is at the **forefront** of sustainable energy innovation, our cutting-edge technology offers a **cost-effective, environmentally friendly** solution to meet the growing demand for renewable energy.

Cost-Benefit Analysis

Production Cost

\$22,500

- Initial investment recoverable within a 2-year timeframe.

Selling Price

\$29,700

- A competitive margin of 32%.

Profit Margin: **38%**

Funding Strategy

HydroGrid has developed a comprehensive funding strategy that combines diverse sources of resources to ensure the **deployment** and **scalability** of our technology. This strategy includes venture **capital** and **private investments**, government grants, strategic partnerships, green bonds, crowdfunding, and reinvestment of proceeds. These funds will **support** research, development, and initial deployment, while **fostering** the **adoption** of our sustainable technology.

Our Team

Team Achievements:

- > Competed against more than 25 innovative projects and won the Dell award.
- > Created a sustainable way to produce water-based energy.
- > Shared and presented HydroGrid in events of wide coverage like TEEN4STEAM and the 2024 Innovanation summit.



Victoria Vargas

CEO – Strategic leadership and vision.

Leads strategic decision-making, builds partnerships, and drives the mission of revolutionizing water-powered renewable energy.



Verdi Villanueva

COO – Operational oversight & efficiency.

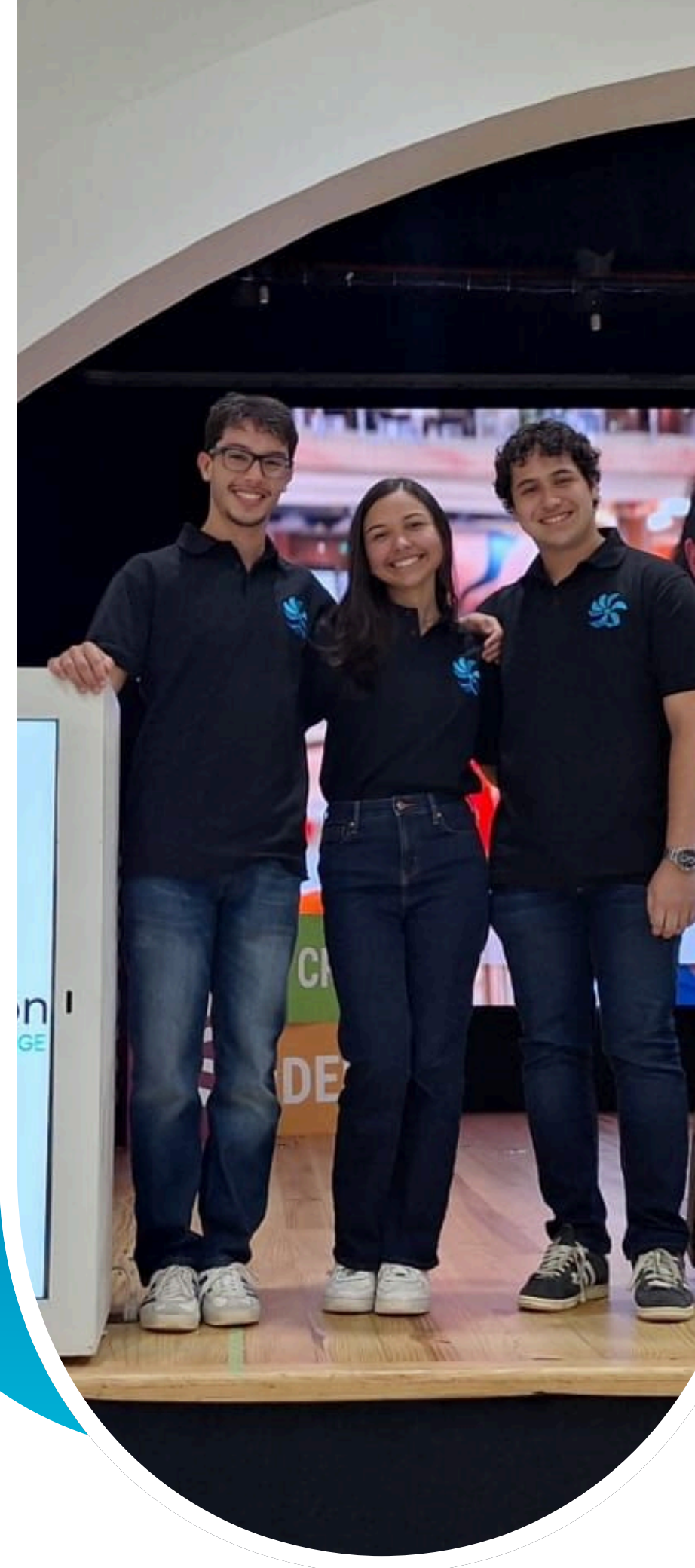
Manages daily operations, oversees feasibility studies, supervises installation processes, and ensures the turbines integrate efficiently into existing water systems.



André Ruiz

CTO – Monitoring of Systems and Innovation

Focuses on R&D, turbine optimization, and smart monitoring solutions.



Key Pillars for a Better Energy Tomorrow

To assess the success and real impact of our project, we have identified key performance indicators that reflect both **technical efficiency** and economic, environmental and social **outcomes**. These **KPI** will guide our progress and ensure that each milestone contributes to a more sustainable and profitable future..



01

Energy Efficiency: Maximizing Every Drop

Harness the full potential of water systems like never before.

Vision: Unlock remarkable efficiency gains, slashing energy waste while driving intelligent, resource-conscious solutions.

02

Cost Reduction and Economic Benefits

Boost profits while cutting down expenses.

Goal: Deliver game-changing cost savings per installation, making sustainable energy accessible even for regions with tight budgets.

03

Sustainability & Environmental Impact

Protect the planet, one drop at a time.

Commitment: Drastically reduce CO₂ emissions and conserve water, advancing global climate action efforts.

04

Seamless Infrastructure Integration

Inspiring change beyond technology.

Promise: Engage and educate local communities, sparking a movement toward renewable energy and sustainable water practices.

05

Empowering Communities

Future-ready technology for today's systems.

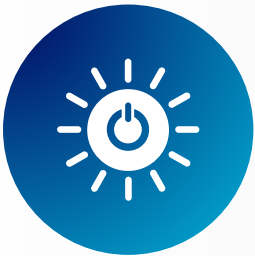
Approach: Designed for versatility, ensuring smooth integration with existing water infrastructures—lowering both costs and complexity.

Measurable Change Across Systems

HydroGrid's Impact: Advancing Energy, Water, and Climate Goals

Hydrogrid applies **Systems Thinking** to address energy, water, and climate challenges, reducing carbon footprints and enhancing resource efficiency.

Aligned with the World Economic Forum vision, our solution:



Enables clean, decentralized energy

SDG 7



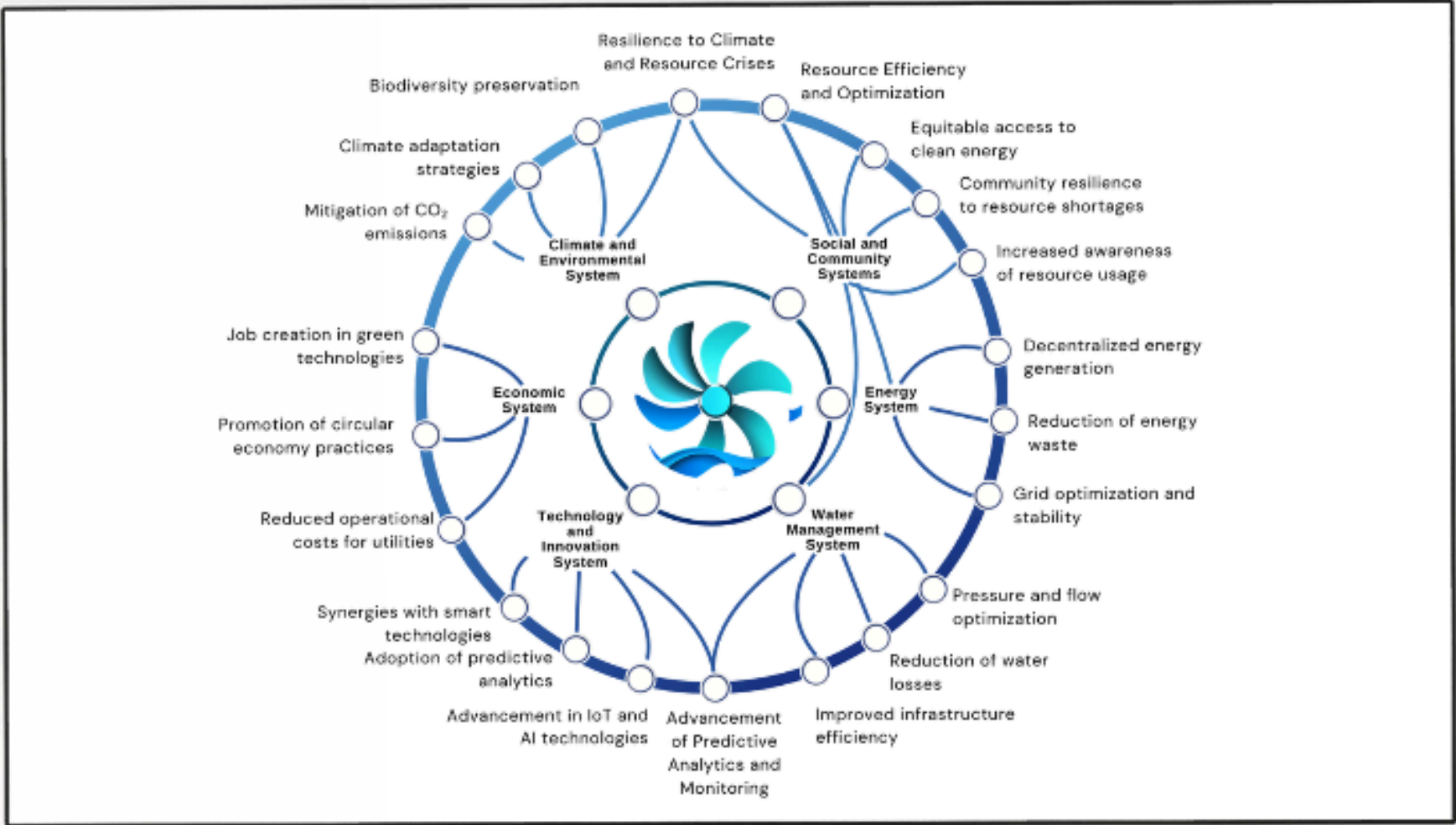
Optimizes urban water and energy systems.

SDG 11



Reduces emissions and boosts climate resilience.

SDG 13



Catalyzed by Innova-Nation



*From Bold Ideas to
Transformative Impact*



KEY LEARNINGS & TOOLS

01

Innova Nation encouraged us to **explore** and acquire basic knowledge in sustainable energy and smart infrastructure, perfecting our business model with cutting-edge agile and strategic **methodologies**.

MENTORSHIP & RESOURCES

02

The program connected us with **industry experts** and gave us access to advanced workshops and training, opening up new **opportunities** and making our perspective more valuable.

THE EXPERIENCE

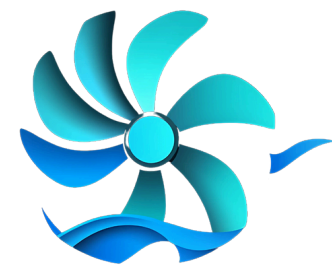
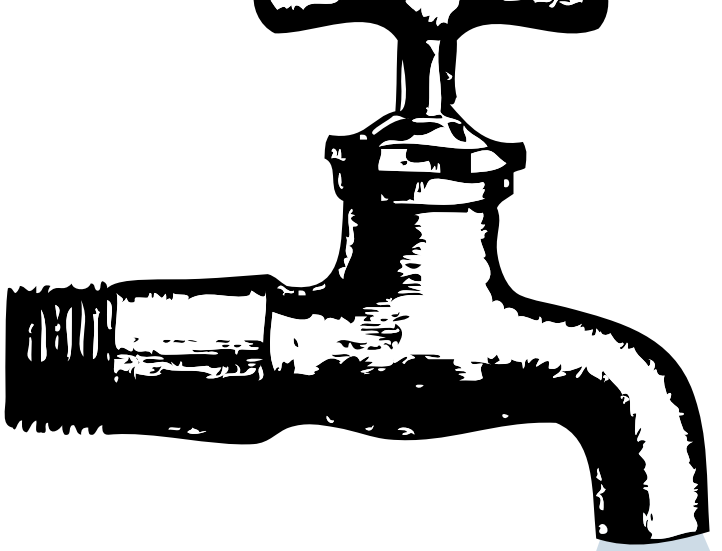
03

Thanks to a **practical** and **collaborative** experience, we transformed bold ideas into effective, market-ready strategies, driven by constant feedback and an innovative spirit.

Testimony:

"Innova Nation transformed our approach. The mentorship, resources, and dynamic workshops enabled us to turn our ambitious ideas into a clear, impactful strategy for sustainable energy."

— THE HYDROGRID TEAM



HYDROGRID

A Call for Action

**Together we can Power the Future,
One Drop at a Time.**

Water has always been essential for life—but with HydroGrid, it becomes essential for powering the future. Every drop that flows through our pipelines carries not just water, but the potential for clean, renewable energy.

By harnessing this untapped resource, we turn everyday infrastructure into a source of innovation, efficiency, and sustainability.



Help us Create a Better Future

Scalable Impact

- HydroGrid isn't just a project, it's a movement. A solution that adapts, grows, and scales to meet the world's increasing demand for clean energy.



Revolutionizing Water & Energy

- We are redefining how we use water not just as a resource, but as a powerful force for sustainable energy. Every pipeline becomes an opportunity, every flow a source of innovation.



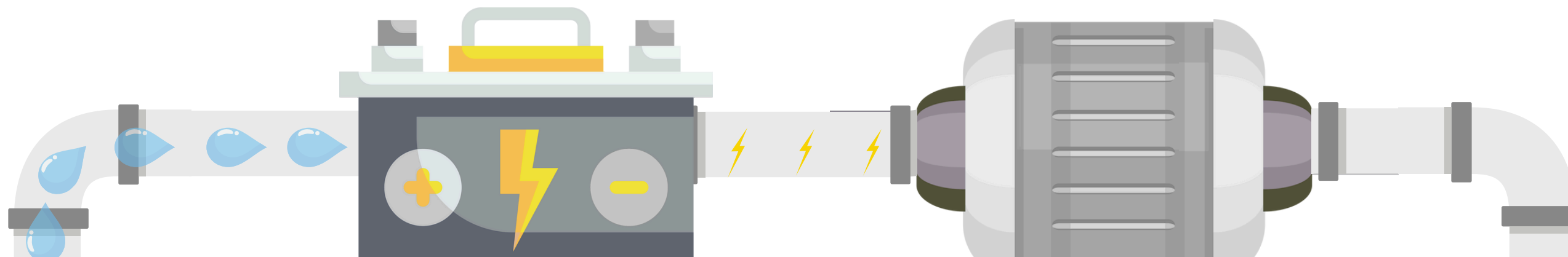
Efficiency Without Compromise

- Unlike traditional hydroelectric plants, HydroGrid delivers renewable energy with a fraction of the investment and nearly zero environmental footprint. No dams, no deforestation—just smart, seamless integration into existing infrastructure.



Hydrate. Illuminate. Transform.

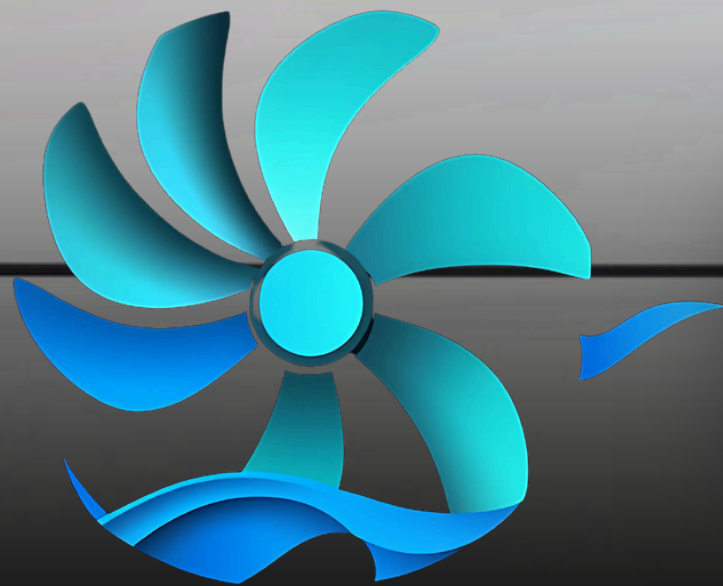
- With HydroGrid, every drop of water not only hydrates but also lights up a greener future for Panama and the world. Join us in revolutionizing energy because sustainability starts with innovation.



Website Prototype



App Prototype



HydroGrid