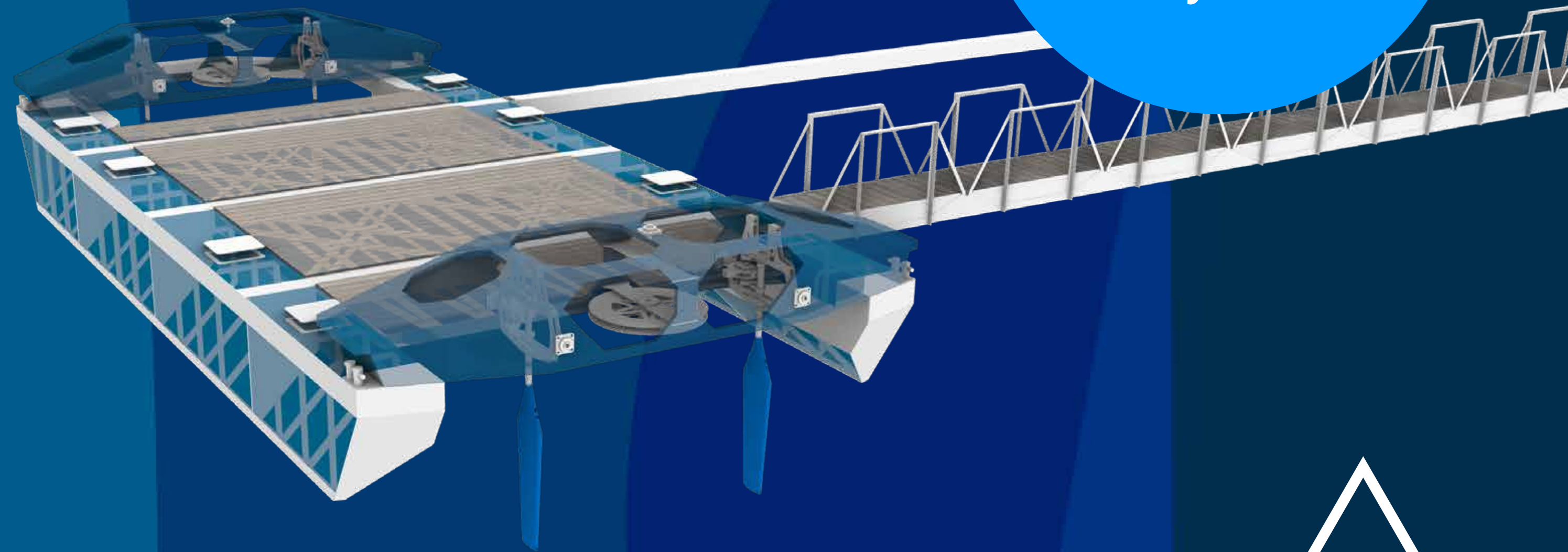


EIC Accelerator Pitch  
Stage 2 / 2023

# SPEAR HYDRO

A renewable energy company  
[spearhydro.tech](http://spearhydro.tech)

Unlocking  
the energy  
of rivers for  
everyone



## PATENTS



## GRANTS



## AWARDS



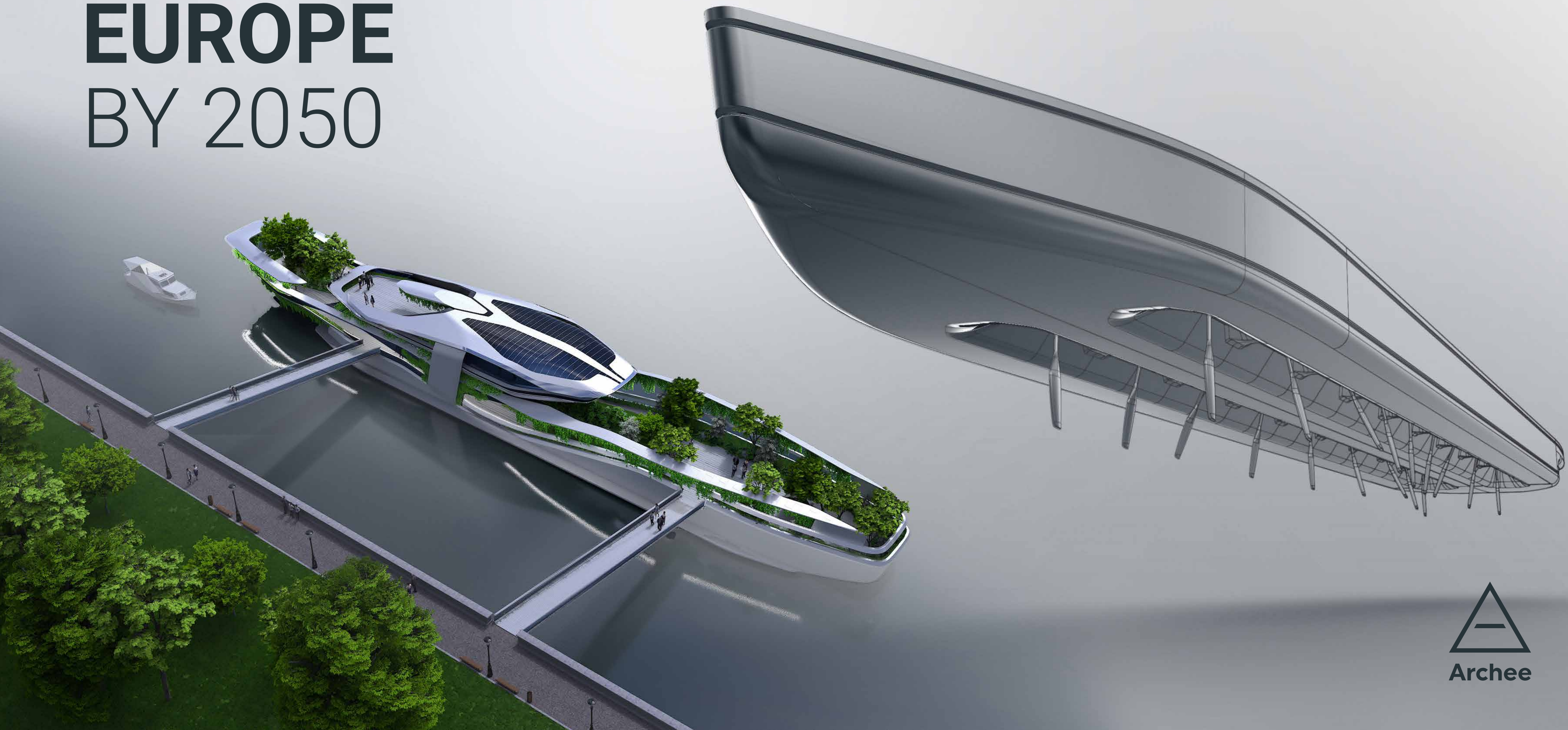
Selected for Slovak Pavilion





# ZERO CARBON EUROPE BY 2050

SPEAR  
HYDRO





# Current Renewable Solutions



## Solar

- Weather dependent
- Requires large effective areas for deployment
- Generates heat islands in cities

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**Average capacity factor 25 - 35%**



## Wind

- Weather dependent
- Not suitable for urban areas
- Visually intrusive

---

**Average capacity factor 20 - 35%**

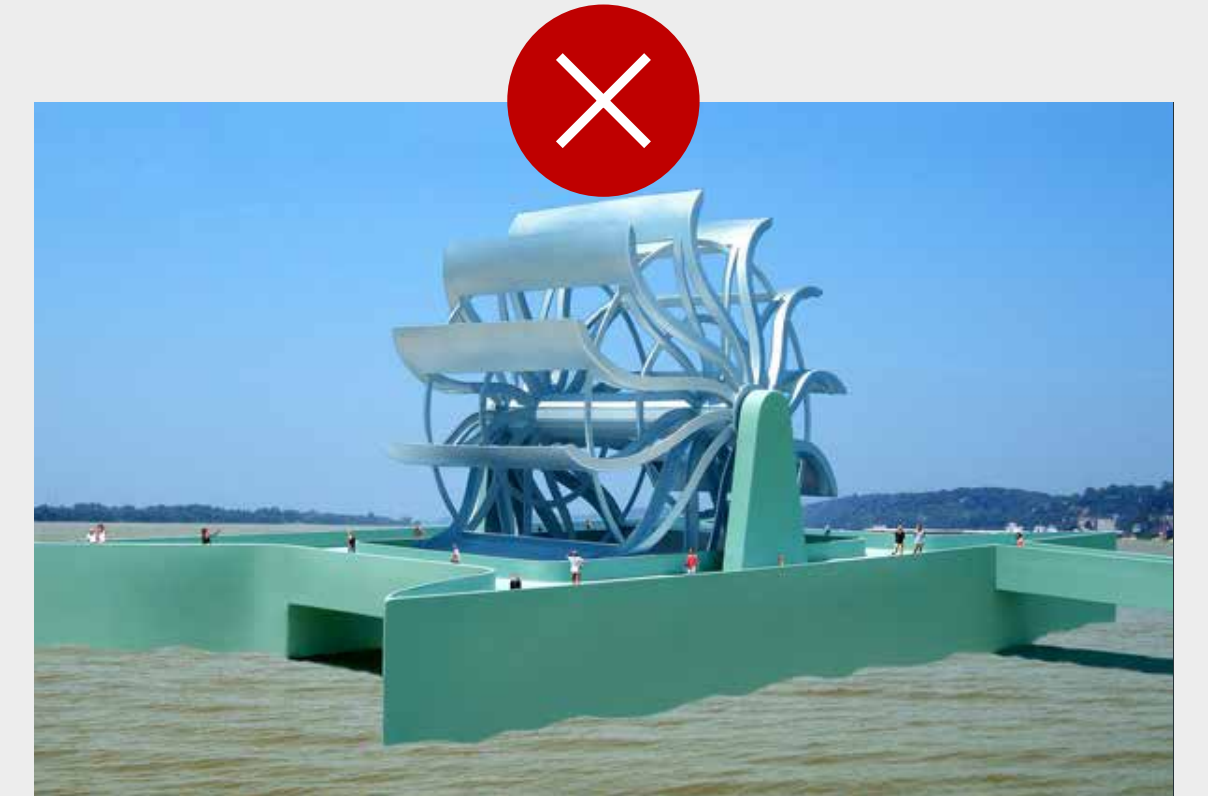


## Small Hydro

- Impacts habitat and local ecosystems
- Blocks river traffic & natural flow
- Requires large infrastructure distant from cities

---

**Average capacity factor 40 - 50%**



## Free flow systems

- Solutions not market ready yet
- Small power generation <10 kW
- Do not support any real estate
- Development requires waterproofing of machinery

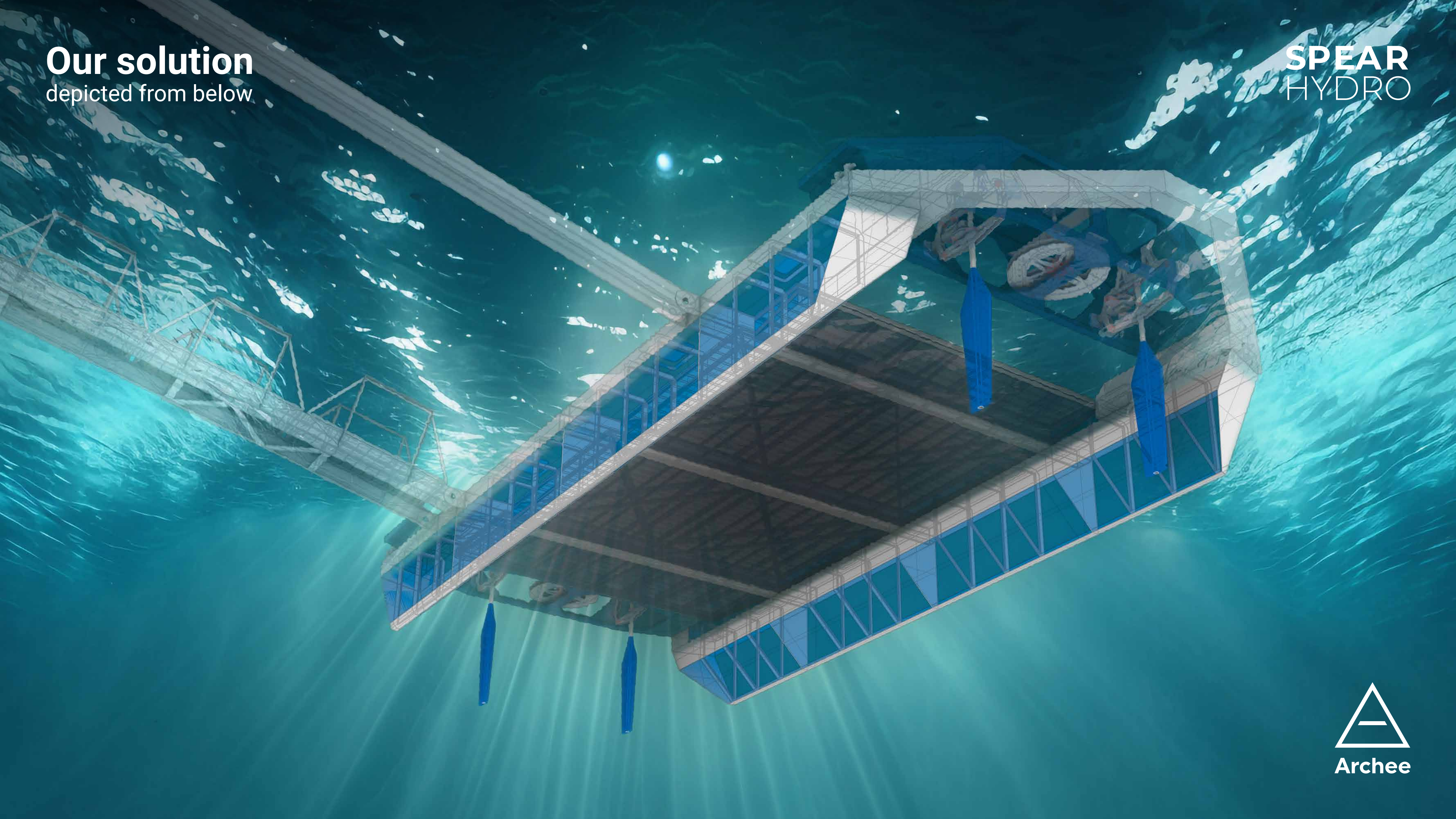
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**Average capacity factor > 50%**



**Our solution**  
depicted from below

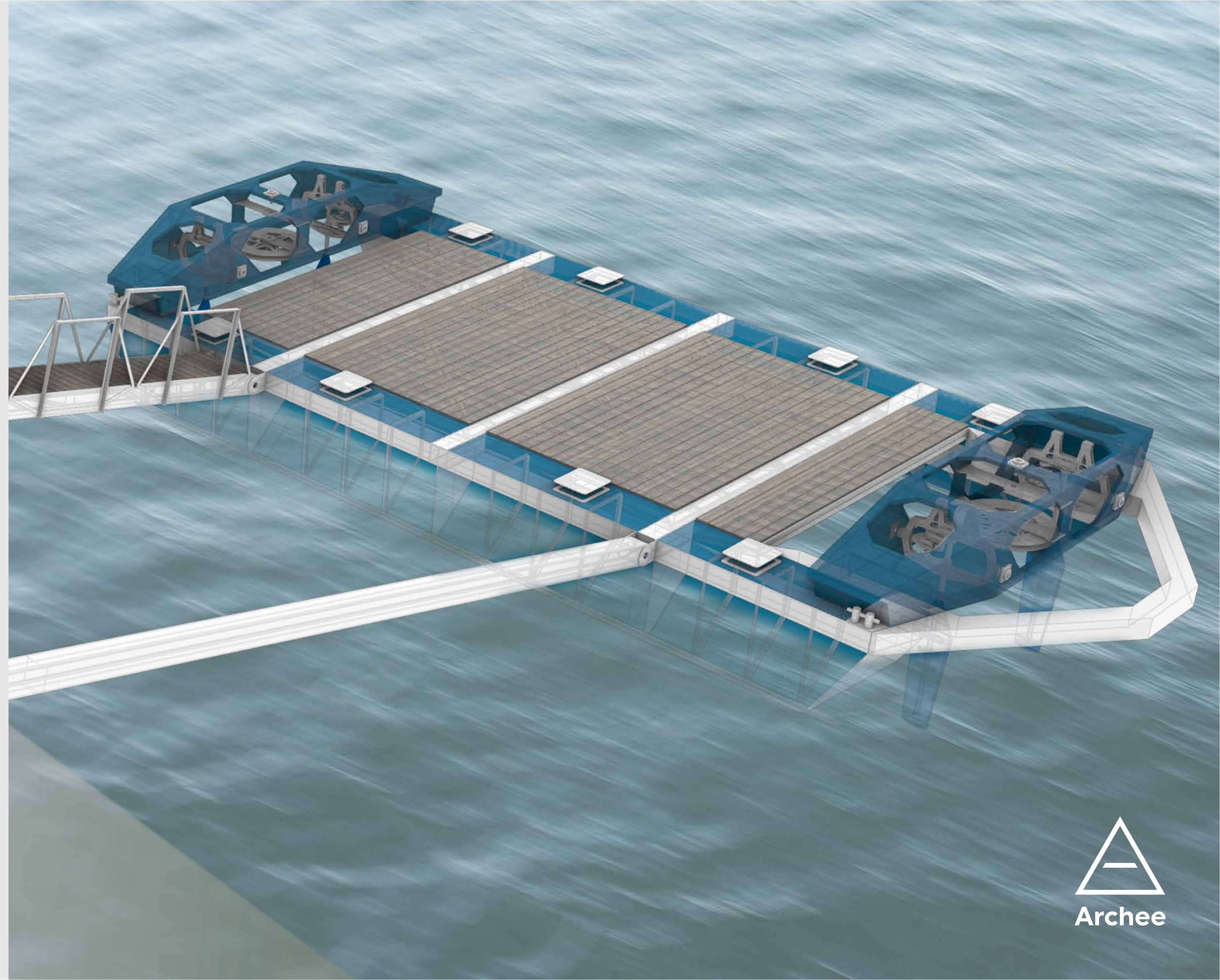
**SPEAR**  
HYDRO





# Introduction

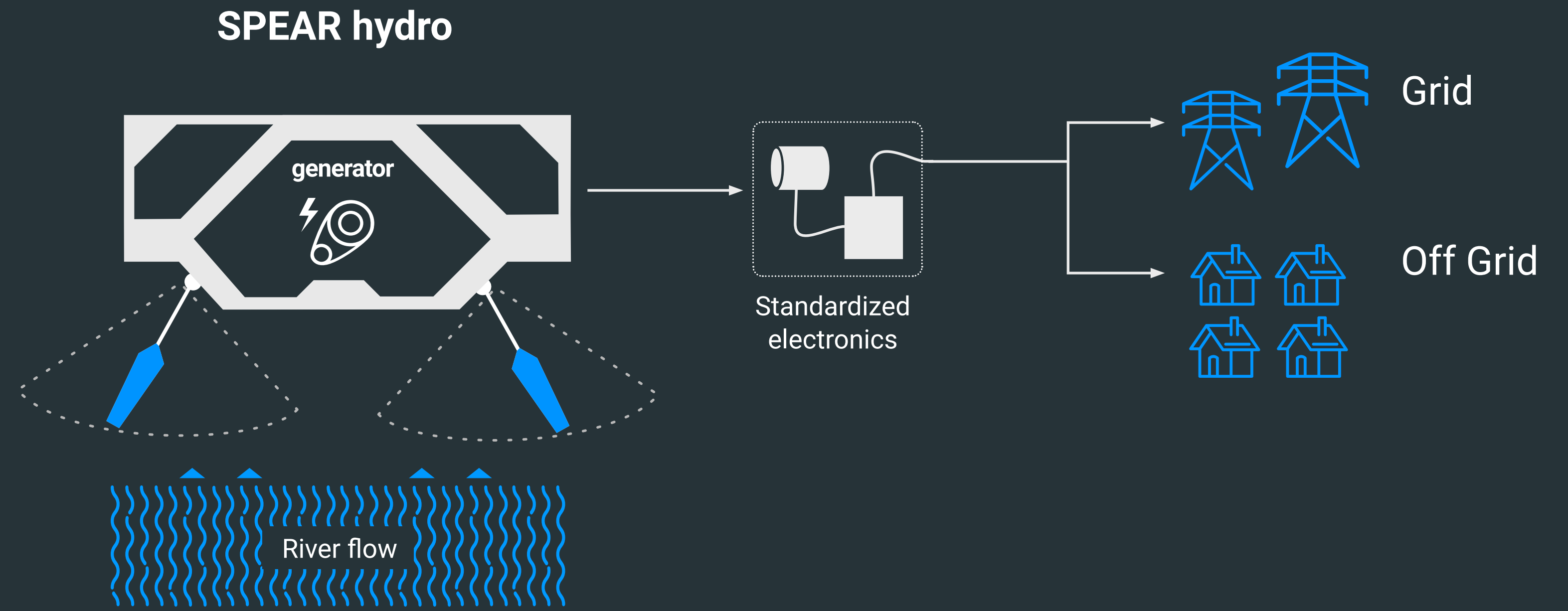
- **SPEAR hydro is a floating hydro power plant technology.**
- SPEAR technology is owned by Archee Ltd., registered in Slovakia since 2016.
- SPEAR hydro AGIS is developed to power riverside real estate developments.
- SPEAR hydro AGIS can also provide power to existing floating structures.



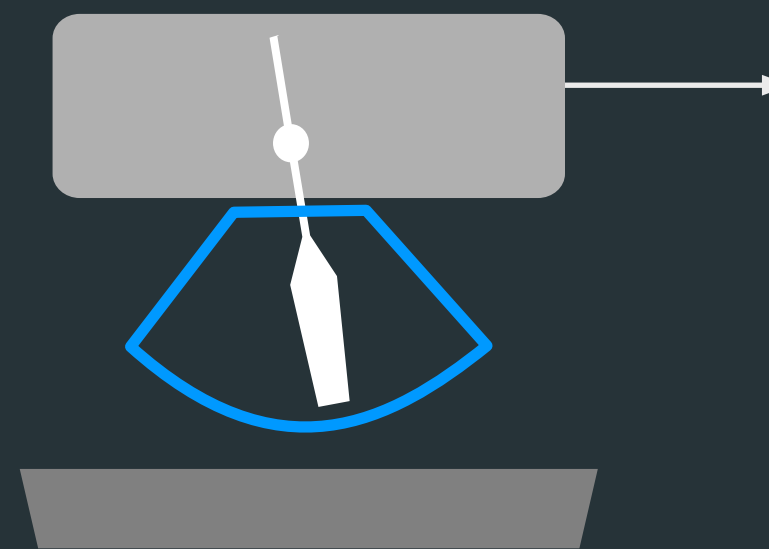


# Technology

- First-of-its-kind solution.
- Suitable for urban centres.
- Open deck space available for real-estate.
- Cost effective production and maintenance.

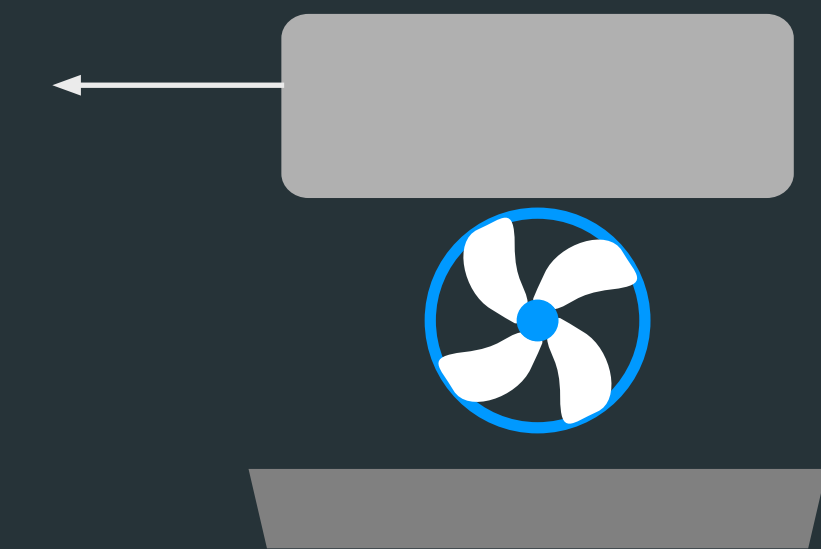


## SPEAR hydro fin



- |   |                     |   |
|---|---------------------|---|
| ✓ | Withstands debris   | ✗ |
| ✓ | Safe for ecosystems | ✗ |
| ✓ | Effective area      | ✗ |
| ✓ | No clogging         | ✗ |

## Standard propeler



# Certified and patented

Power Output  
Model certified by:



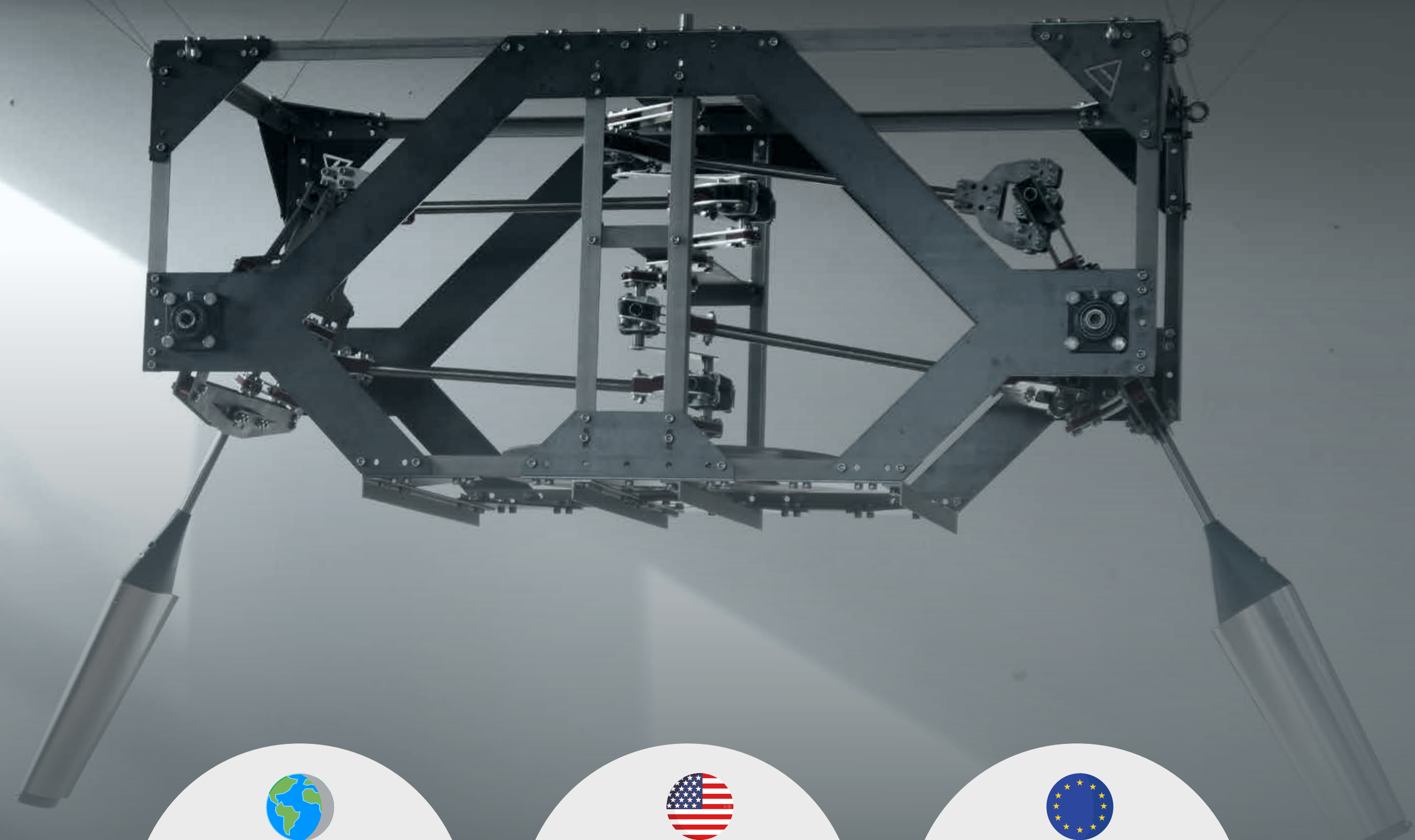
15 kW

Scaled prototype power  
output measured on the  
river Danube by the Slovak  
Academy of Sciences.



SLOVAK DESIGN  
AWARD 2021

MAIN AWARD  
NEW HORIZONS



  
**WIPO PCT**  
SINCE  
2017



  
**USA**  
GRANTED  
2020



  
**EU**  
GRANTED  
2023



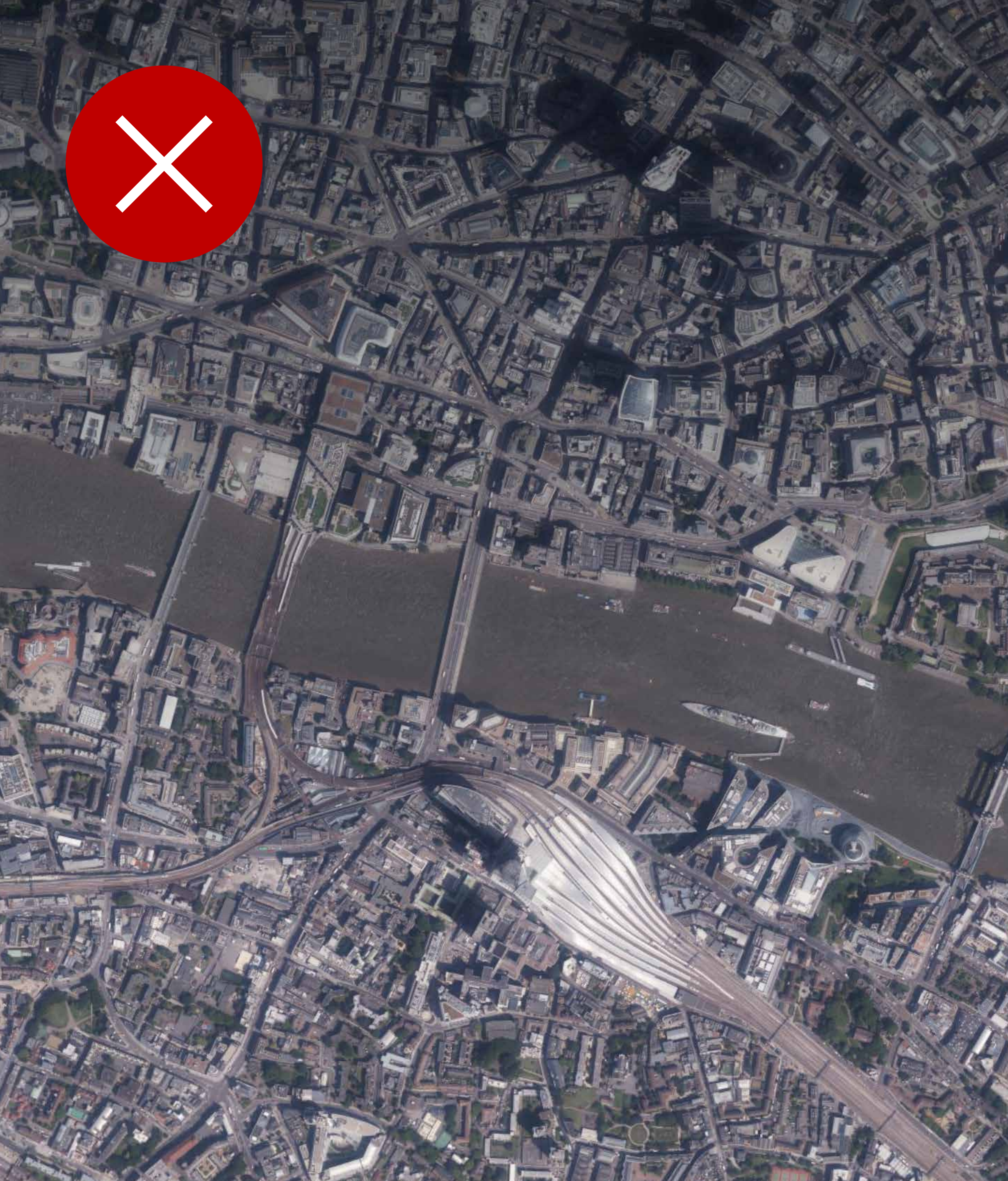
 Ecofriendly  
Nanocoat:



 Impact  
Certification:







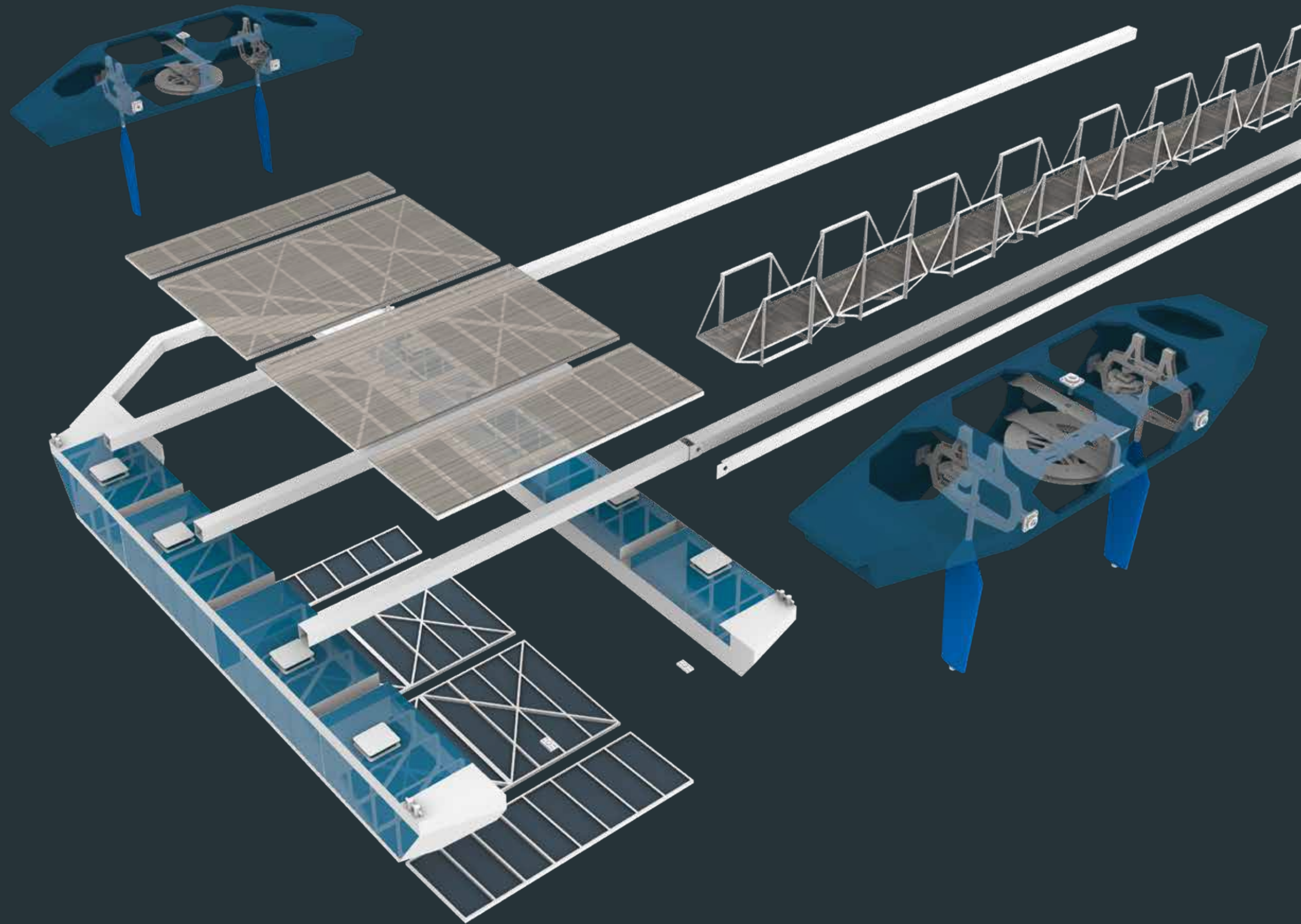
## Current Challenges

1. **Riverside buildings with high-energy demand** must comply with the Directive 2010/31/EU (EPBD).
2. **No free flow** power plants because of clogging.
3. **Centralized electricity production** is often distant from consumers causing transmission losses and higher costs.
4. **Underutilized energy potential** of rivers narrowed down to turbine-based solutions that damage ecosystems, require massive infrastructure and hinder river traffic.
5. **Limited potential of current green solution** in the cities due to low capacity factor and additional social and tech requirements on deployment.
6. **Port infrastructure needs to be electrified** with shore-side electricity supply to comply with the Directive 2014/94/EU aiming to lower emissions and promote clean air and water.





**SPEAR hydro** challenging the world standard in riverside real estate and infrastructure.



## Solution

1. **Cutting down distribution fees** by generating electricity directly in urban centers.
2. **Patented mechanical system** of slow-moving, durable fins that do not clog and can withstand debris impact.
3. **Suitable as a power generating ad-on** to power anchored vessels or riverside real estate.
4. **Versatile deck utilization** ranging from commercial or public space, up to energy storage or hydroponic gardening.
5. **Nature based visually non-disturbing design** and eco-friendly slowly moving technology allowing for city center deployment.



# Target market

## PRIMARY MARKET

Riverside real estate developers to power their buildings.

62.400 km of suitable river banks worldwide.

Aggregated market potential estimated at 133.2 billion €, go-to-market strategy aimed at early adopters on Rhine-Main-Danube waterway (est. at 131.2 million €).

## SECONDARY MARKET

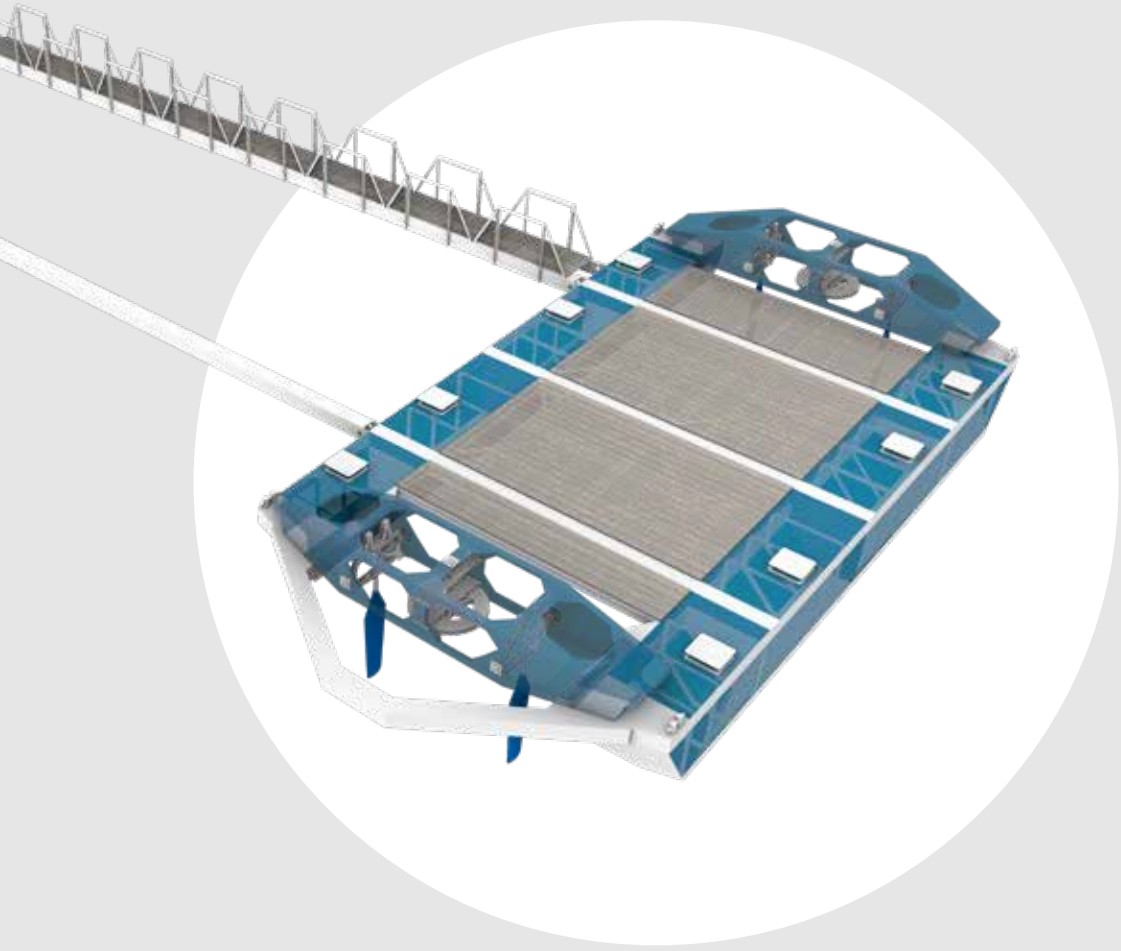
Owners of anchored river vessels and berths for own electricity consumption and selling to the grid.

374.700 current and future vessel owners on suitable river banks.





# Business model



We manufacture, sell, deploy and service standardized **SPEAR hydro AGIS** modules for both real estate developers and anchored vessel owners. Later, we intend to offer SPEAR technology for licensing and joint venture scale-up production.

## Simplified Economics (per unit of SPEAR AGIS)

<b>Economics for the Customer</b>	Yearly Revenues from Electricity	18 964 €	
	Yearly Revenues (combined: electricity, deck rental, goodwill value)	48 257 €	
	Yearly Operation Costs	23 250 €	
	Yearly EBIDTA	25 007 €	
	ROI (years)	14,2	
	Net lifetime gain for the customer (over 25 years)	217 886 €	
<b>Economics for Archee</b>	Production costs*	252 000 €	
	Price	355 499 €	
	Margin	103 499 €	29%
	Break even point (years)	4	
	Royalties from licensing	5 %	

\*Archee estimates the production cost can be decreased by 30-40% in 3 years



# Market Traction

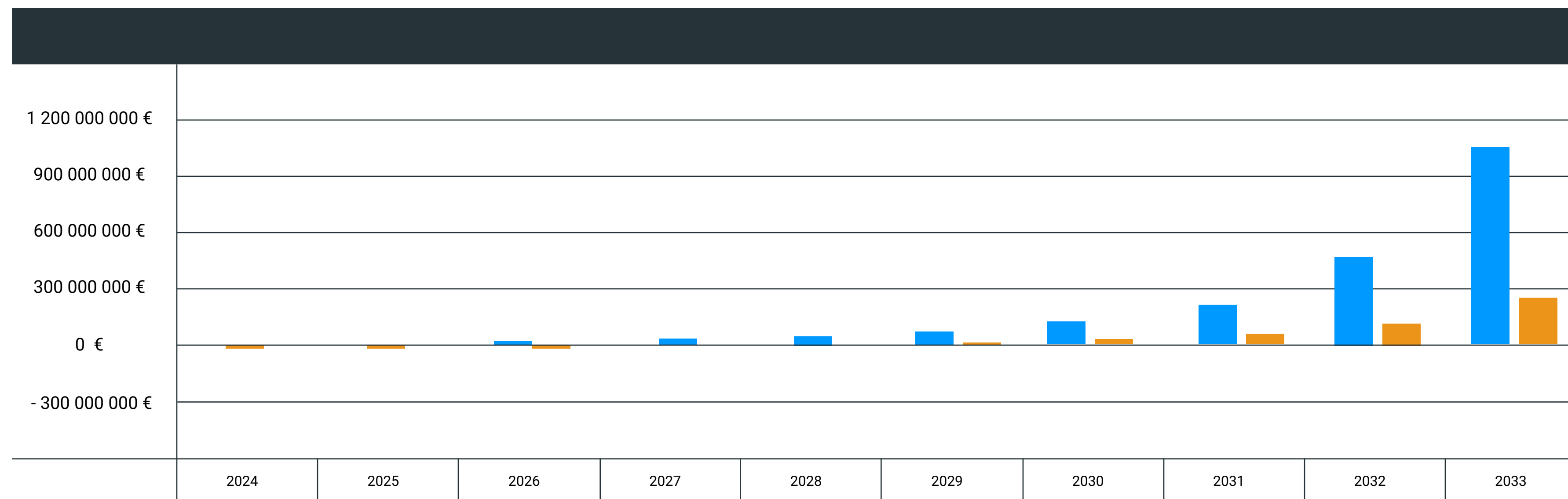
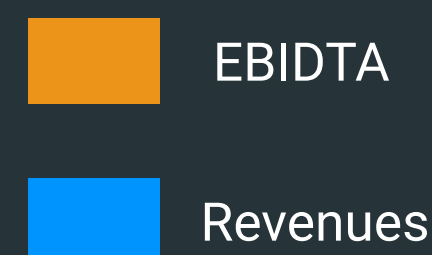
- Traction in both customer segments supported by LOIs from market leaders.
- First units to be deployed for landmark projects in Slovakia.
- Unique international consortium in R&D and manufacturing.
- Awarded grants, prizes, investor LOIs, media attention and goodwill.



Interested City	Interested Clients: Real Estate	Interested Clients: Vessel Owners & Port Operators	Interested Co-Investors and Financial Partners
 <p>BRATISLAVA Capital of Slovakia</p>	 <p>CRESCO REAL ESTATE</p>  <p>JTRE</p>	 <p>verejné prístavy</p>  <p>RIVER'S CLUB</p> <p>LAYUCH</p>	<p>IPM GROUP</p> <ul style="list-style-type: none"> <li><span style="color: red;">■</span> VENTURE</li> <li><span style="color: blue;">■</span> TO FUTURE</li> <li><span style="color: grey;">■</span> <span style="color: blue;">■</span> <span style="color: red;">■</span> FUND</li> </ul>  <p>ProPartners</p>  <p>cb ESPRI</p>  <p>G-FORCE. HELP THE PLANET</p>



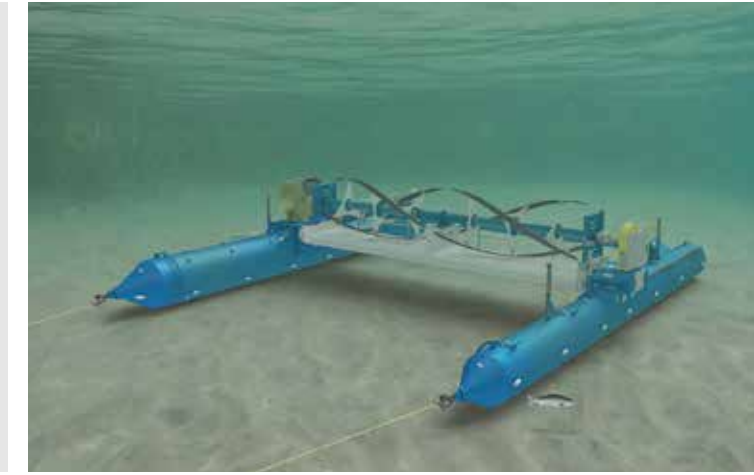
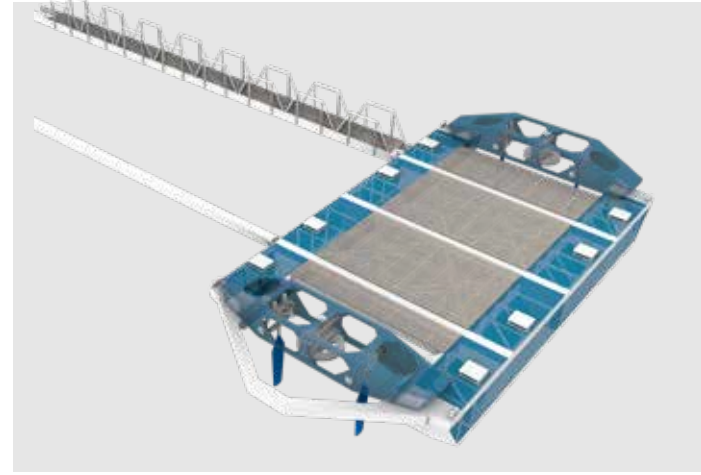
# Financial Projections







Revenues	-	540 000 €	3 172 000 €	8 472 000 €	18 167 000 €	37 061 000 €	79 649 000 €	178 656 000 €	419 367 000 €	1 026 535 000 €
EBIDTA	(1 160 000) €	(1 322 000) €	(929 000) €	479 000 €	2 881 000 €	6 987 000 €	17 058 000 €	41 868 000 €	101 195 000 €	249 599 000 €
	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>	<b>2031</b>	<b>2032</b>	<b>2033</b>
Units sold by Archee and Partners	-	2	8	21	43	86	181	398	915	2 196
Licensed production & sales							5	12	52	123



# Competition



Free-flow solutions comparison	SPEAR hydro AGIS	ORPC RivGen	Idénergie river turbine	Waterrotor
Market established product	no	partially	partially	no
Origin				
Power output in kW (nameplate capacity)	15 kW (at 2 m/s)	40 kW (22.9 kW at 2,25 m/s)	0.5 kW (0,23 kW at 2 m/s)	10 KW (at 1,8 m/s)
Price in Euro	€ 355 000	€ 1 083 411	€11,000	€47 000 *
<b>Price in € per installed kW at ~2m/s waterspeed</b>	<b>€/kW 23 667</b>	<b>€/kW 47 310</b>	<b>€/kW 47 826</b>	<b>€/kW 4 700</b>
Technology applied	<b>fins</b>	<b>rotor</b>	<b>rotor</b>	<b>rotor</b>
<b>Do the solutions address the following customer needs?</b>				
• decreasing CO2 emissions	yes	yes	yes	yes
• reducing cost of electricity distribution	yes	partially	yes	partially
• low maintainance costs	yes	no	no	no
• suitability for urban centres	yes	partially	no	partially
• modular use of the deck	yes, 60 sq m	n/a	n/a	n/a

The comparison is based on publicly available sources and Archee takes no liability for the accuracy of the data.

\* Estimated price of product under development. Expected to be higher for a commercial product.



# Team



**Martin Sichman**  
CEO, Founder, Inventor



**Michal Kovacs**  
CBO, Co-Founder,  
Regulatory Affairs



**Julia Molcanova**  
Chief Marketing Officer



**Adrian Vycital**  
Business Development  
Advisor  
IPM



**Mario Vircik**  
Financial and  
Business Advisor  
IPM



**Marek Dorda**  
COO, Project & Grant  
Manager



**Jan Mazur**  
Co-Funder, Business  
and IPR



**Josef Cerny**  
Designer



**Roberth Both**  
Shipbuilding  
Engineer



**Maria Bielikova**  
Machine learning, AI  
KInIT



**Peter Veres**  
Senior Power  
Management Specialist



**Antonin Samal**  
Engineer



**Lubos Zalibera**  
Mechanical &  
Electrical Engineer



**Fedor Gomory**  
Electrical Engineer  
Slovak Academy  
of Sciences



**Milota Sidorova**  
Urban & Smart City  
Specialist

## Advisory Board



# Partnership

## BUSINESS PARTNERS



Municipal partner interested in our Smart City solution



Real estate developer ready to deploy SPEAR as part of the RiverPark II landmark project



Real estate developer ready to deploy SPEAR as part of the RiverPark II landmark project



Public port operator interested utilizing SPEAR for electrified berthing space



Advisory partner for grants and financing



Advisory partner for financing



Co-funding partner

## R&D PARTNERS



Fluid dynamics and mechanics expert



Vessel Design and Hull Optimization



CFD Simulations, Power Output Physics



Hydrophobic and Biofouling Nanocoating development



Electrical engineering and measurements



Energy Data Analytics

## MANUFACTURING PARTNERS



Hydro power manufacturing company



Shipbuilding, Heavy engineering and Construction



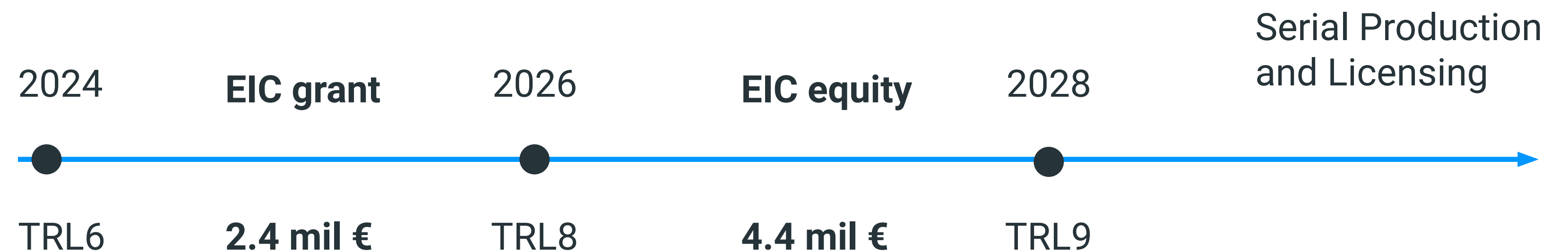
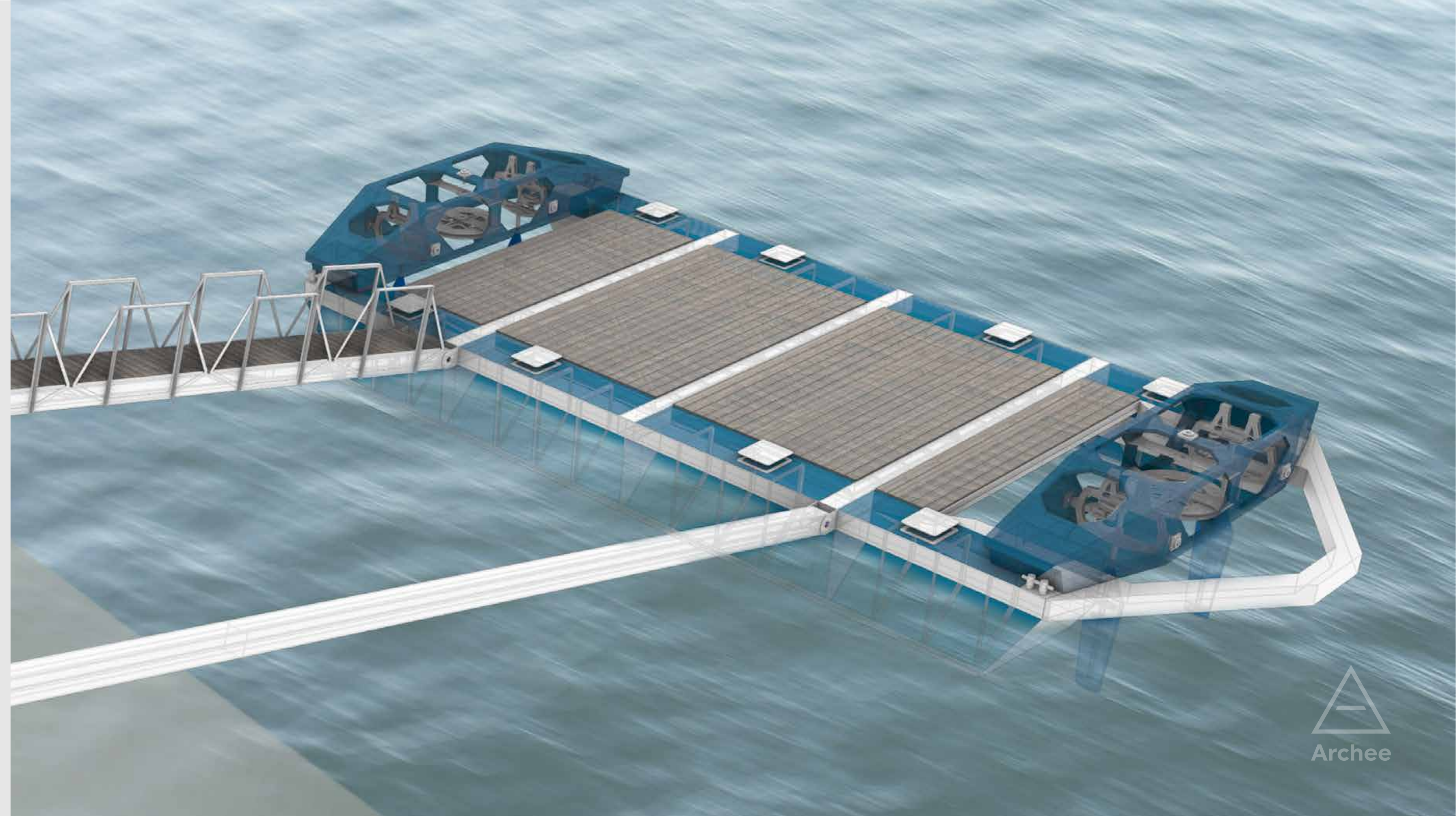
# EIC Financing Request

## Why Grant now, Equity later?

- Technical and Commercial Milestones required
- Establishing the team
- The right stage of technology development
- De-risking the project

## Use of the Grant:

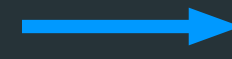
- Moving from TRL6 to TRL8
- Expanding the team
- Research, optimization and technological development
- Pilot product manufacturing
- Field tests with validators
- Business and sales scale-up





# Environmental Impact

1 SPEAR hydro AGIS

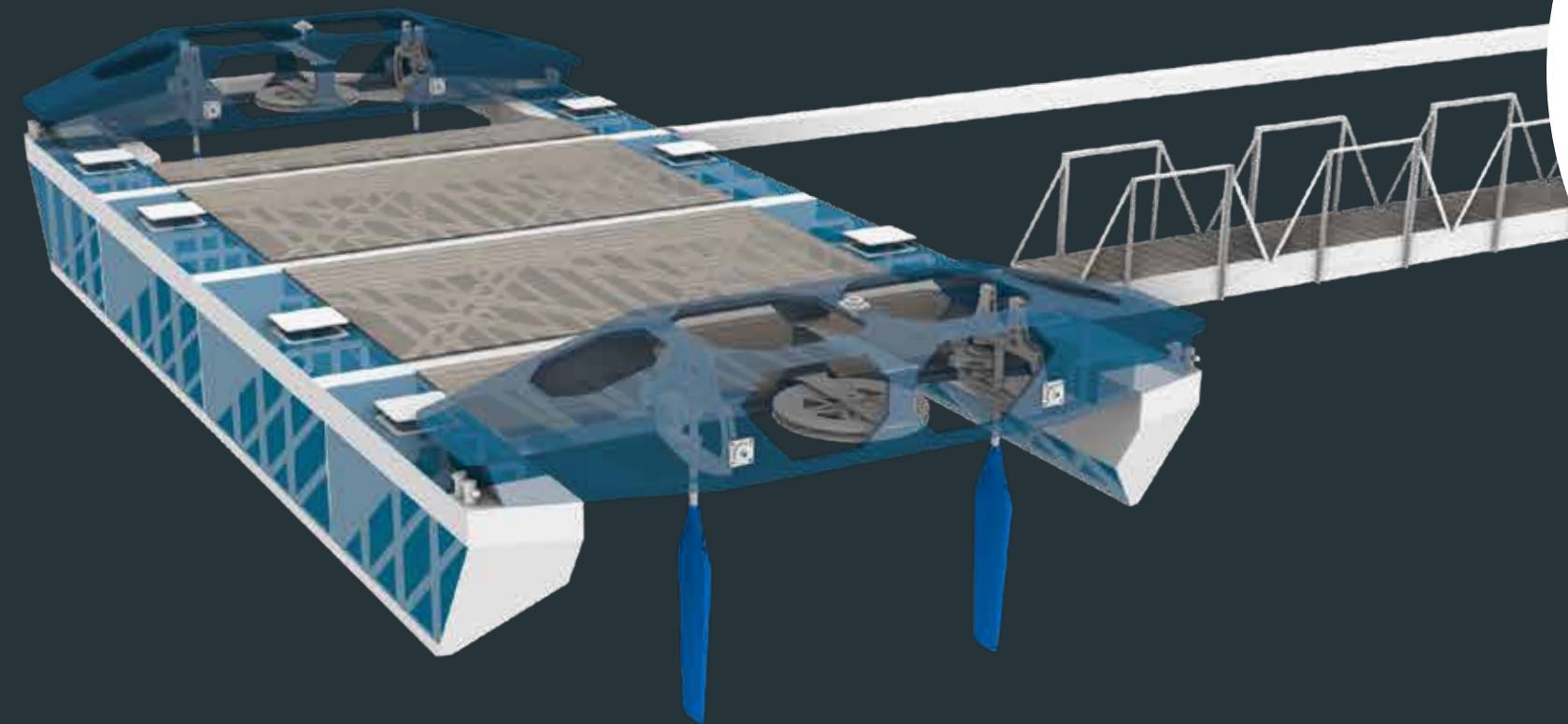


Saves  
700 tons of CO<sup>2</sup>  
in 10 years



Equals planting  
300 trees  
(0.25 sq km)

- ✓ Verified
- ✓ Certified
- ✓ Patented
- ✓ Recognized



Unlocking  
the energy  
of rivers for  
everyone



## PATENTS



## GRANTS



## AWARDS



Selected for Slovak Pavilion



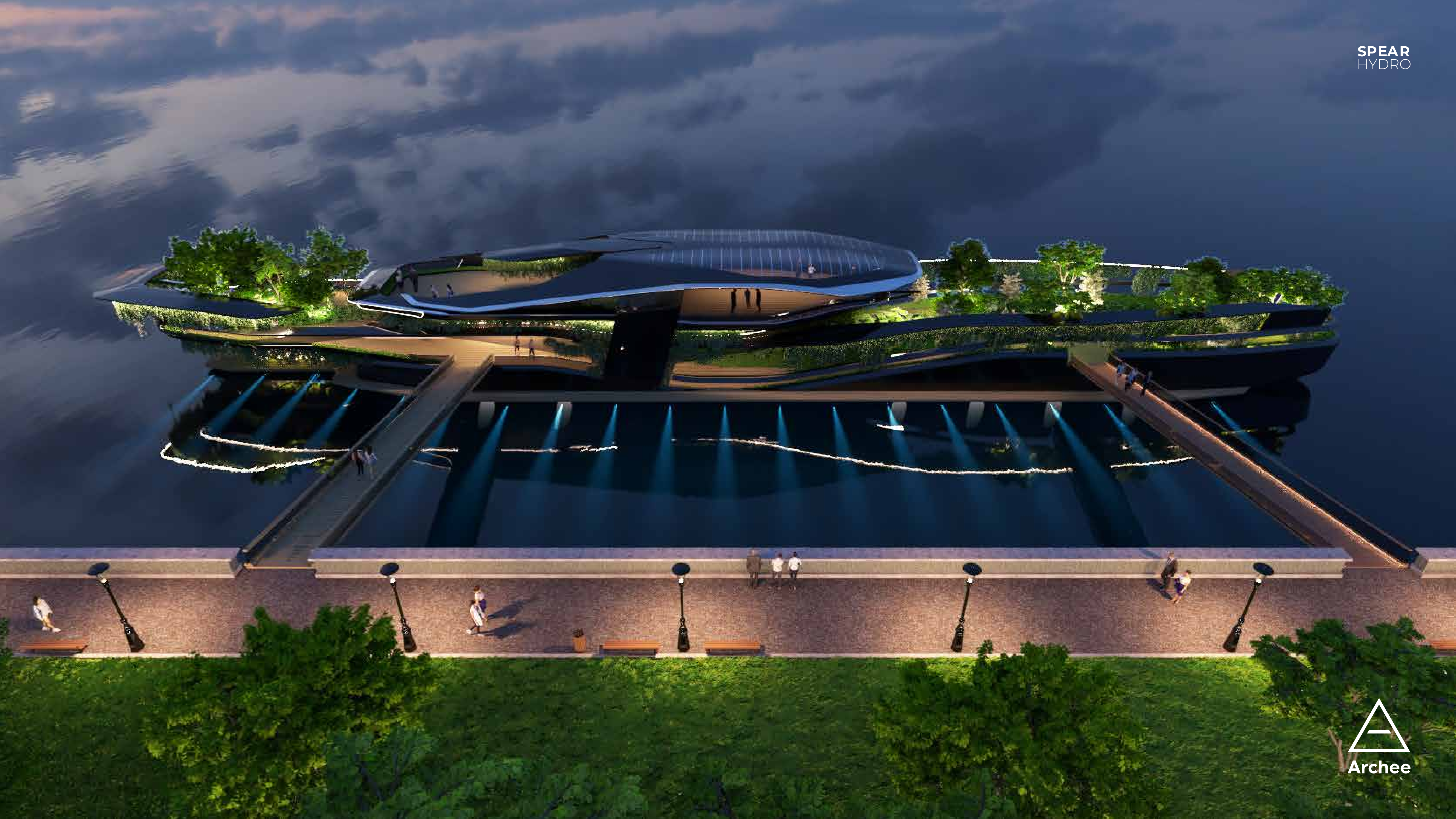


BACKUP



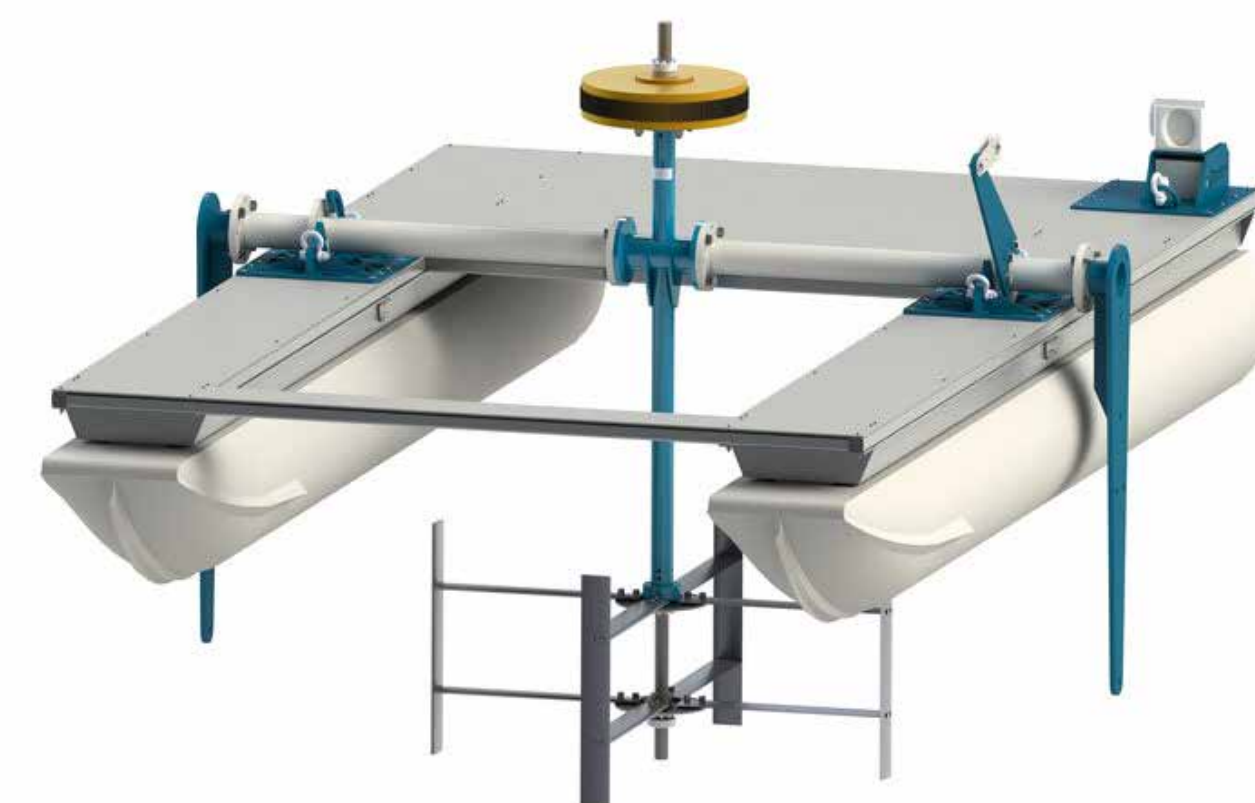
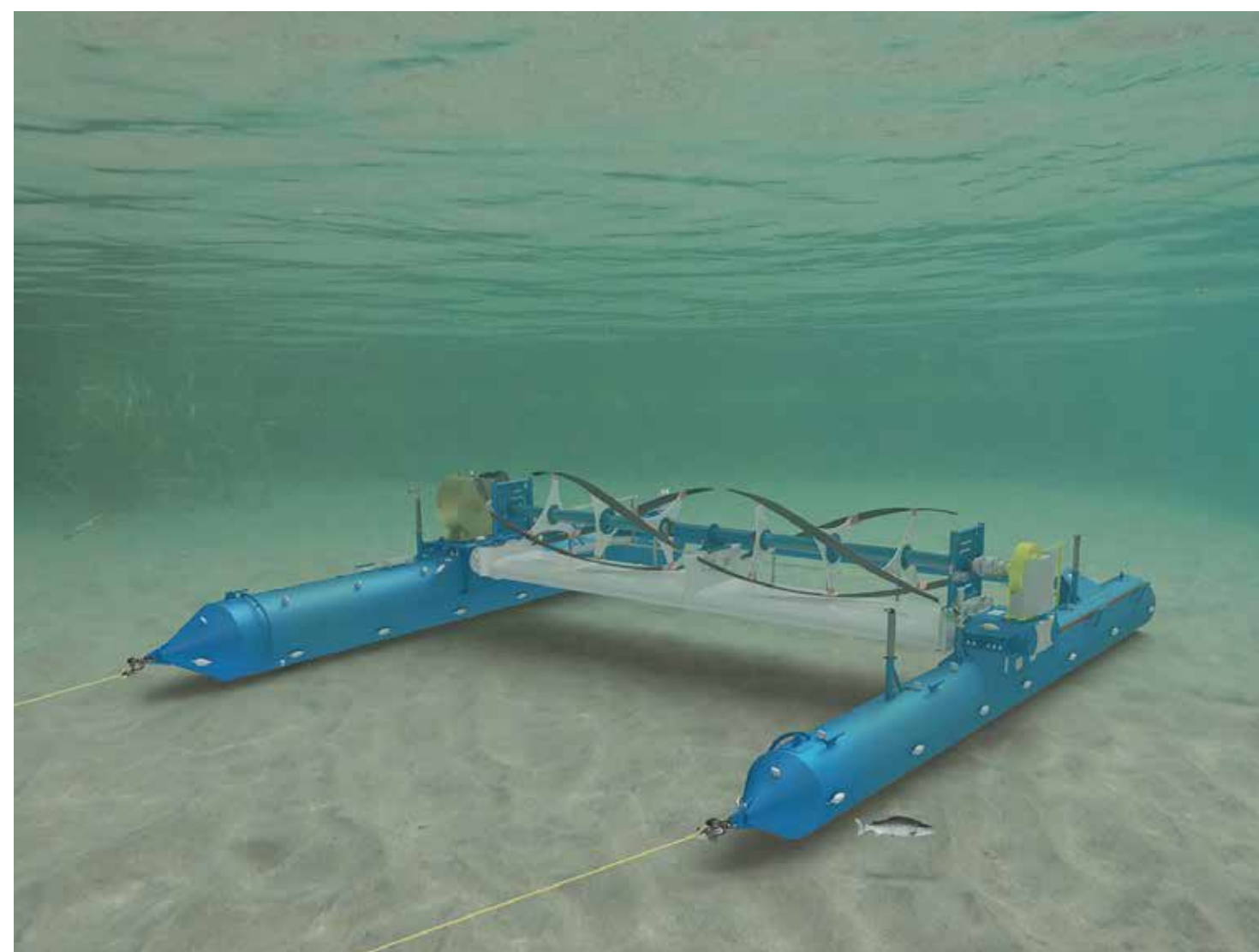








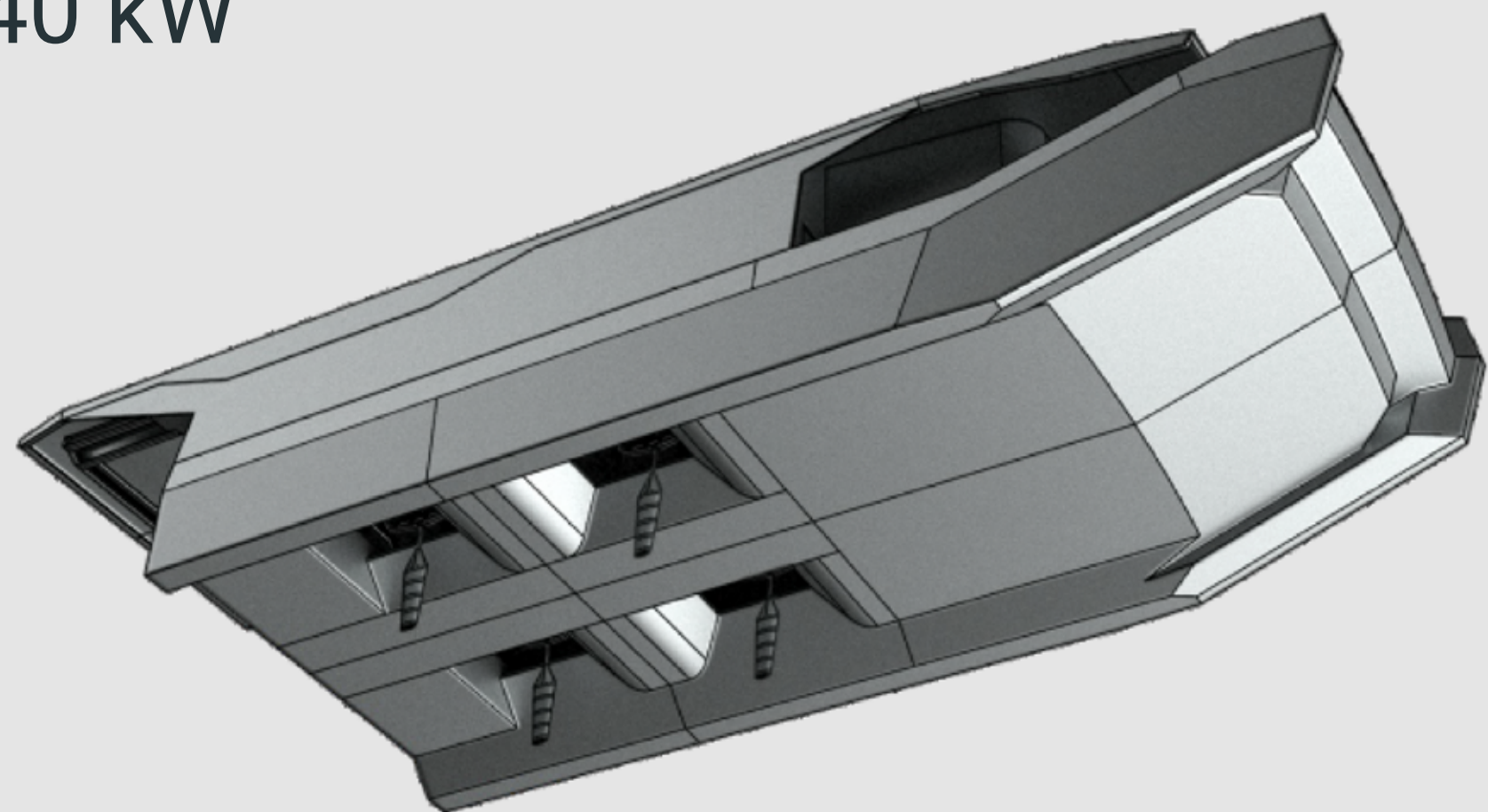
# Experimental Free-flow Systems





# SPEARhydro

Ares 40 kW

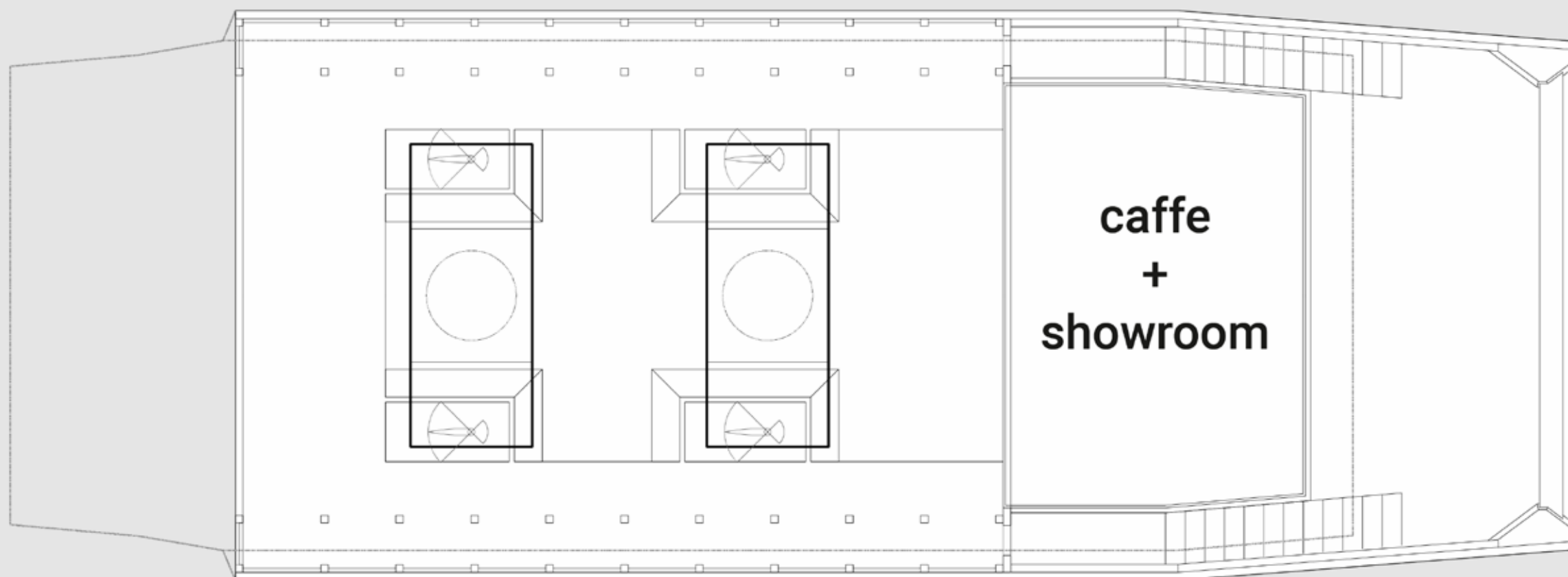


96 tons

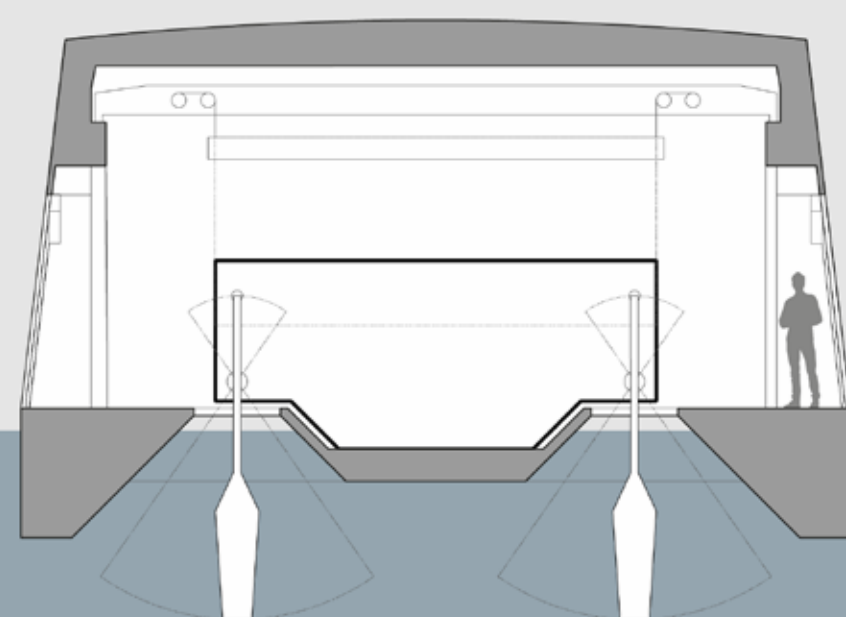
11.4 m

power output 40 kW

180m<sup>2</sup> floor space  
not including powerplant



31.45 m



7.11 m

