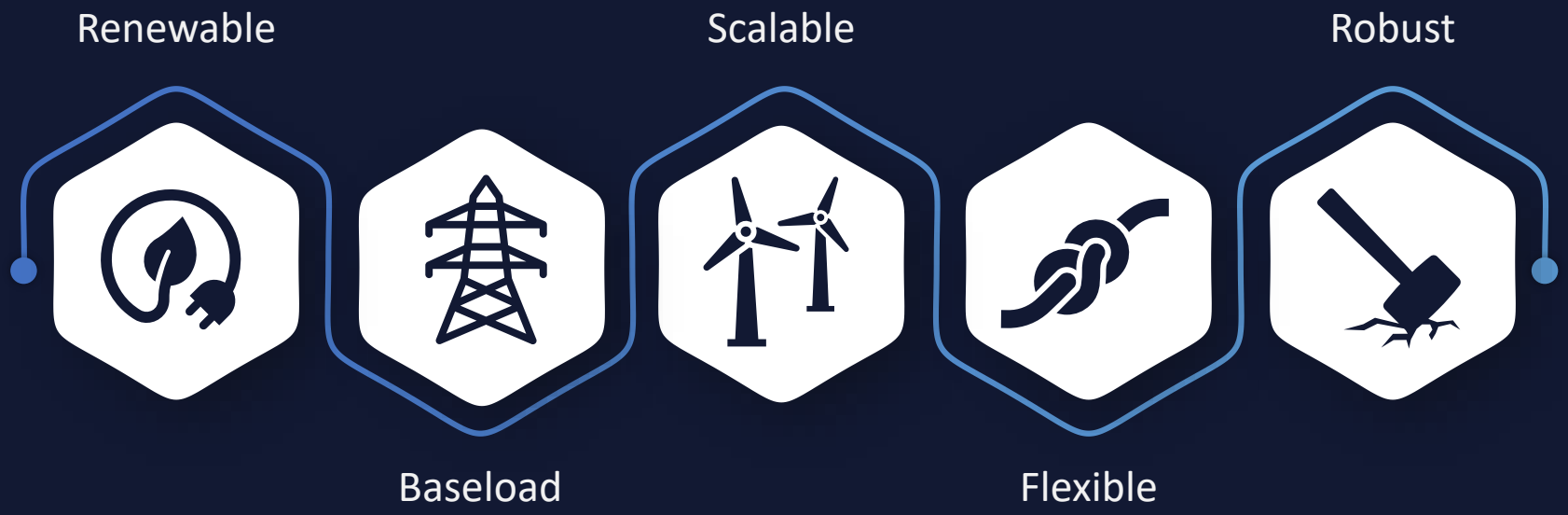
FLOATING INSTREAM TIDAL & SOLAR POWER PLANT – EC7 Midstream Pilot Project
Energy Working Group Presentation

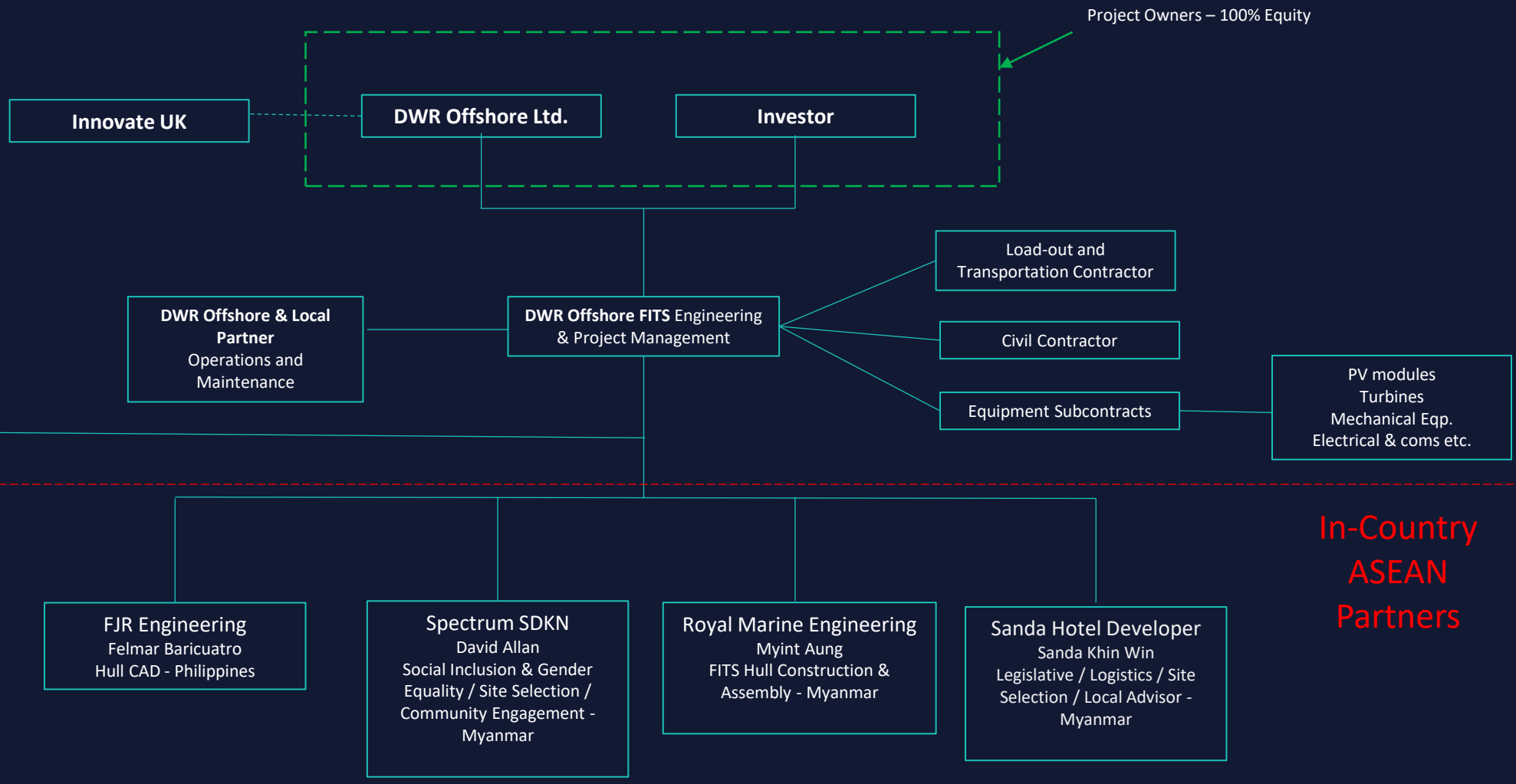
UK Research and Innovation

Concept

Delivery of clean energy to remote / off-grid users



FITS Power Plant – Pilot Project / Phase 1: Organigram



Our Solution – FITS Power Plant

The Floating Instream Tidal and Solar (FITS) Power Plant brings together power generation from two natural and abundant sources found in Myanmar:

- **Instream tidal river flow**
- **Solar**

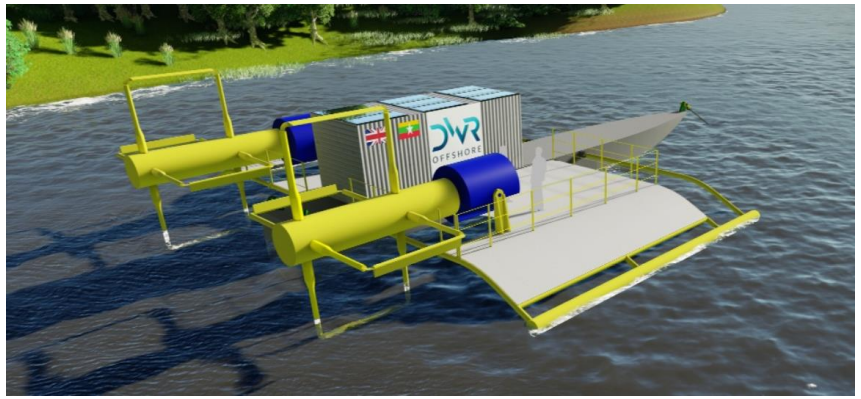
The FITS Power Plant is robust and easily maintainable and can deliver consistent energy 24/7.

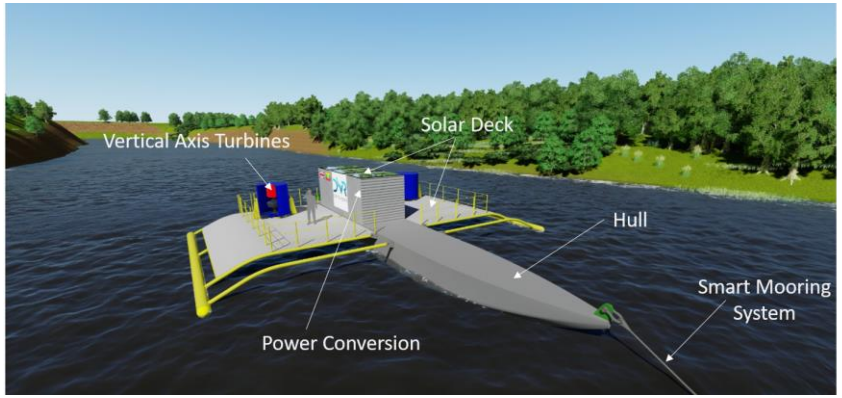
DWR shall develop a pilot project through the Innovate UK Energy Catalyst Round 7 fund, before commercial roll-out.

Designed as either a main source of power for off-grid communities or as supporting generation to existing village mini-grid systems.

Can also be adapted to generate power and use this onboard to provide alternative services to the community, including **fresh water generation**.

Prototype economic model - Competitive, and this will only improve with time, providing off-grid communities with energy security, affordability and certainty for generations to come.



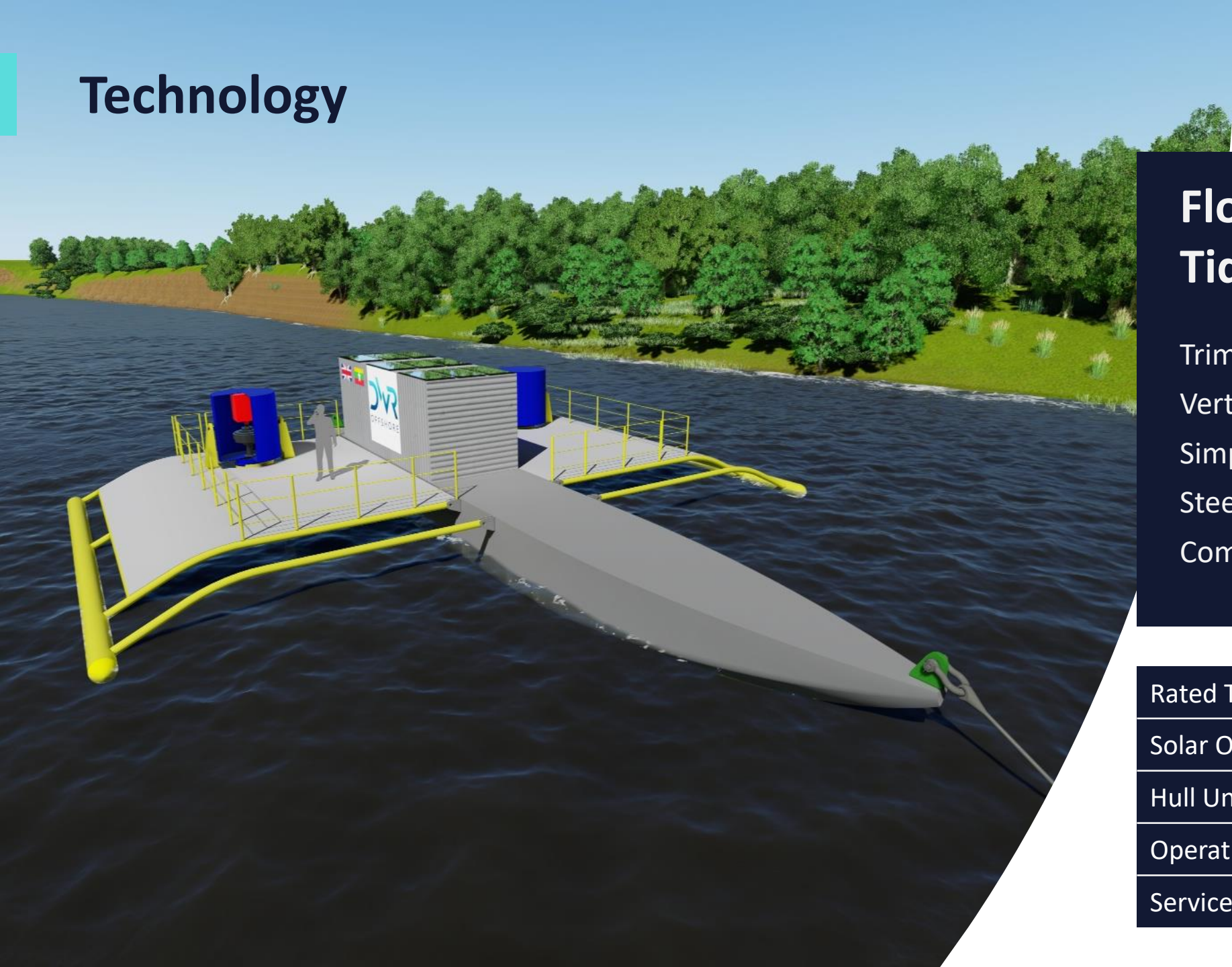


Run of River
200KW/p

Solar Deck
10KW/p

Base Load
210 KW hr

Technology



Floating Instream Tidal and Solar

Trimaran “Banca-style” hull

Vertical-axis instream turbines

Simple modular construction

Steel hulls

Composite turbine blades

Rated Turbine Output	200kW
Solar Output	10kW
Hull Unit Size	20m x 18m x 3m
Operational Water Depth	4m
Service Life	25 years

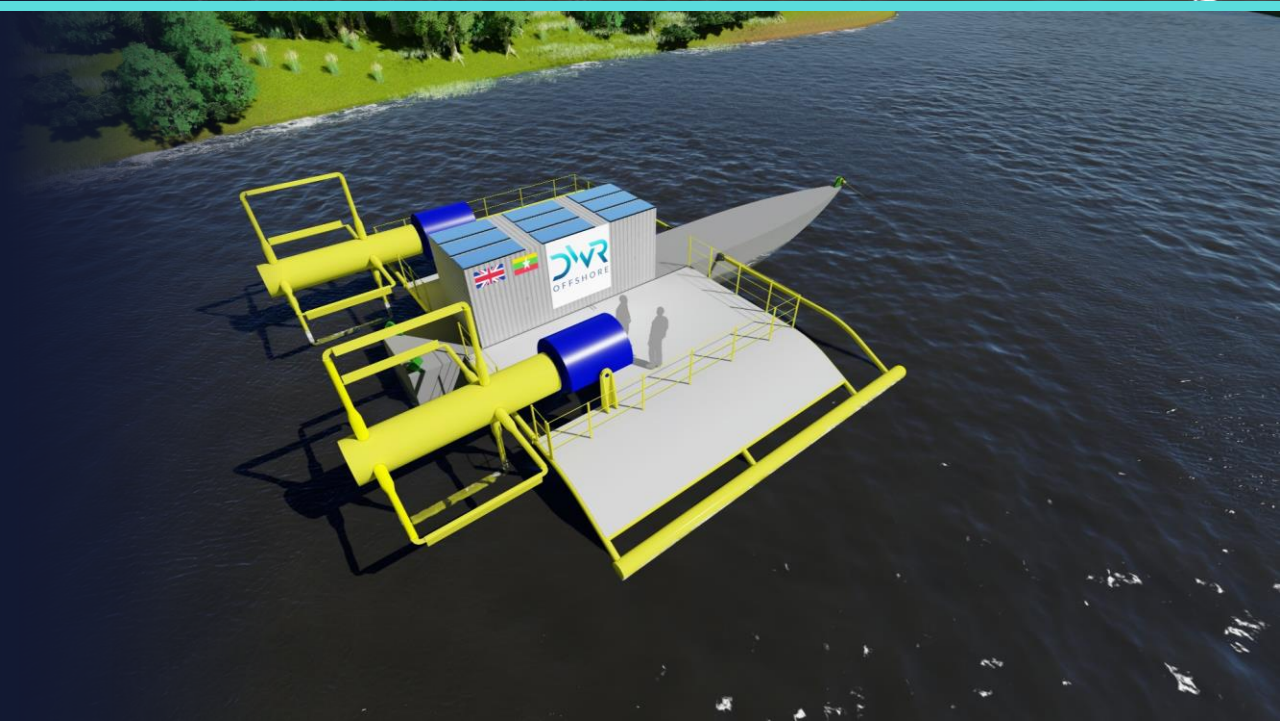
Technology

Above-water machinery
Increased system reliability
Facilitated maintenance

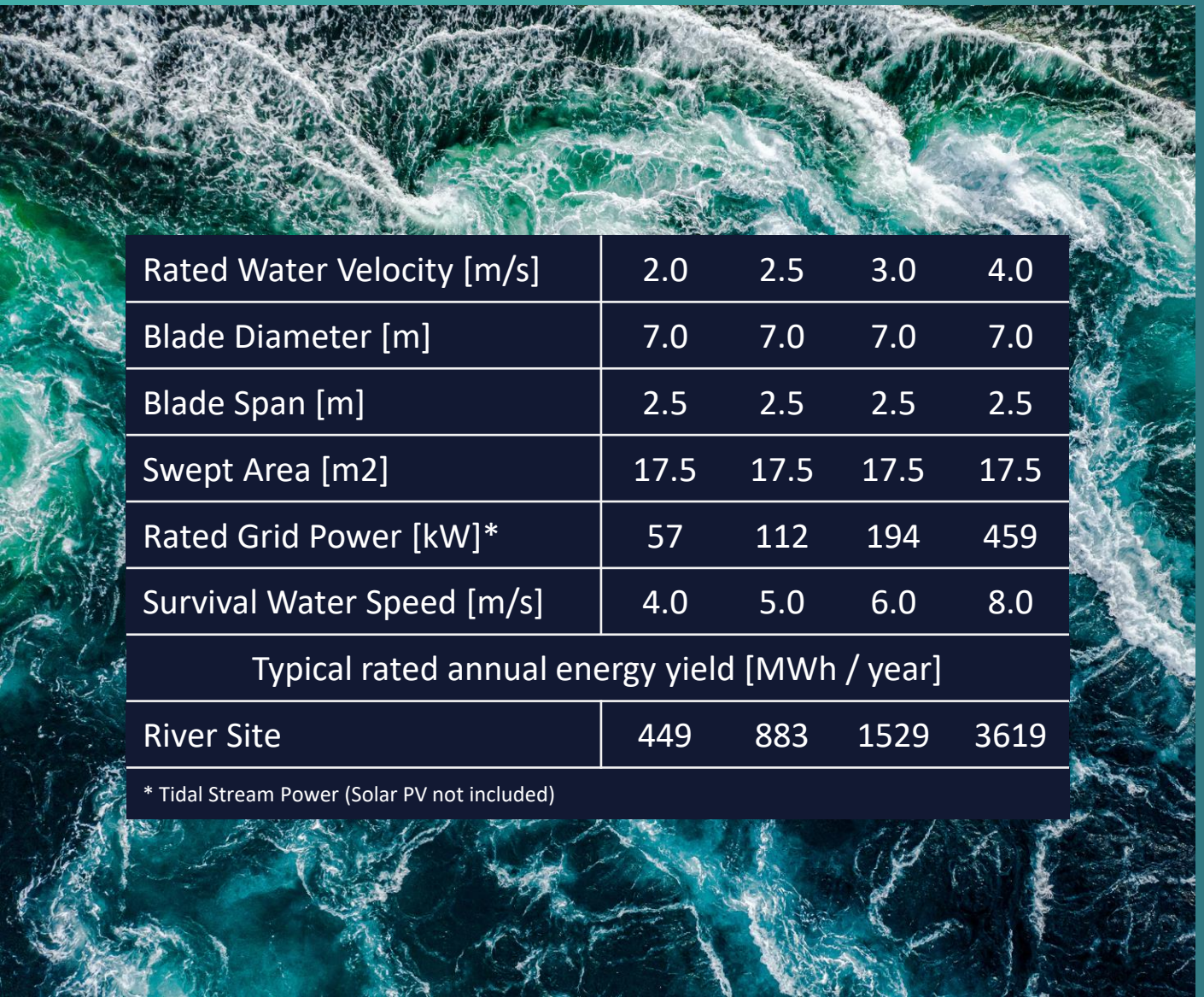
Retractable turbine system
Easy turbine blade replacement
“Flood-safe” mode

Quick-connect mooring system
Reduced hook-up time
Easy disconnection

Optimised for different flow regimes
Suitable for slow and fast river flows
Suitable for coastal deployment



Typical Energy Yield



Rated Water Velocity [m/s]	2.0	2.5	3.0	4.0
Blade Diameter [m]	7.0	7.0	7.0	7.0
Blade Span [m]	2.5	2.5	2.5	2.5
Swept Area [m2]	17.5	17.5	17.5	17.5
Rated Grid Power [kW]*	57	112	194	459
Survival Water Speed [m/s]	4.0	5.0	6.0	8.0
Typical rated annual energy yield [MWh / year]				
River Site	449	883	1529	3619

* Tidal Stream Power (Solar PV not included)

General Information

- No. of turbines: 2
- No. of blades per turbine: 4
- Power regulation: Variable speed
- Directionality to water speed: Omni-directional
- Solar PV: Mono-crystalline 10KWp

Generator Information

- Type: 10-Pole variable low speed permanent magnet generator with planetary gearbox

Power Conversion

- Power conversion house onboard
  - Space LxWxH: 6.1m x 2.5m x 2.6m
- Converter Type: Solid state AC-DC-AC Conversion
- Feed-in Voltage: 400V
- Feed-in Frequency: 50Hz

Why FITS?

Reliable and robust off-the-shelf technology

Consistent baseload energy output 365 days of the year

Scalable solutions to fit any site (shallow, deep, river, tidal)

Unmanned / monitoring systems in place

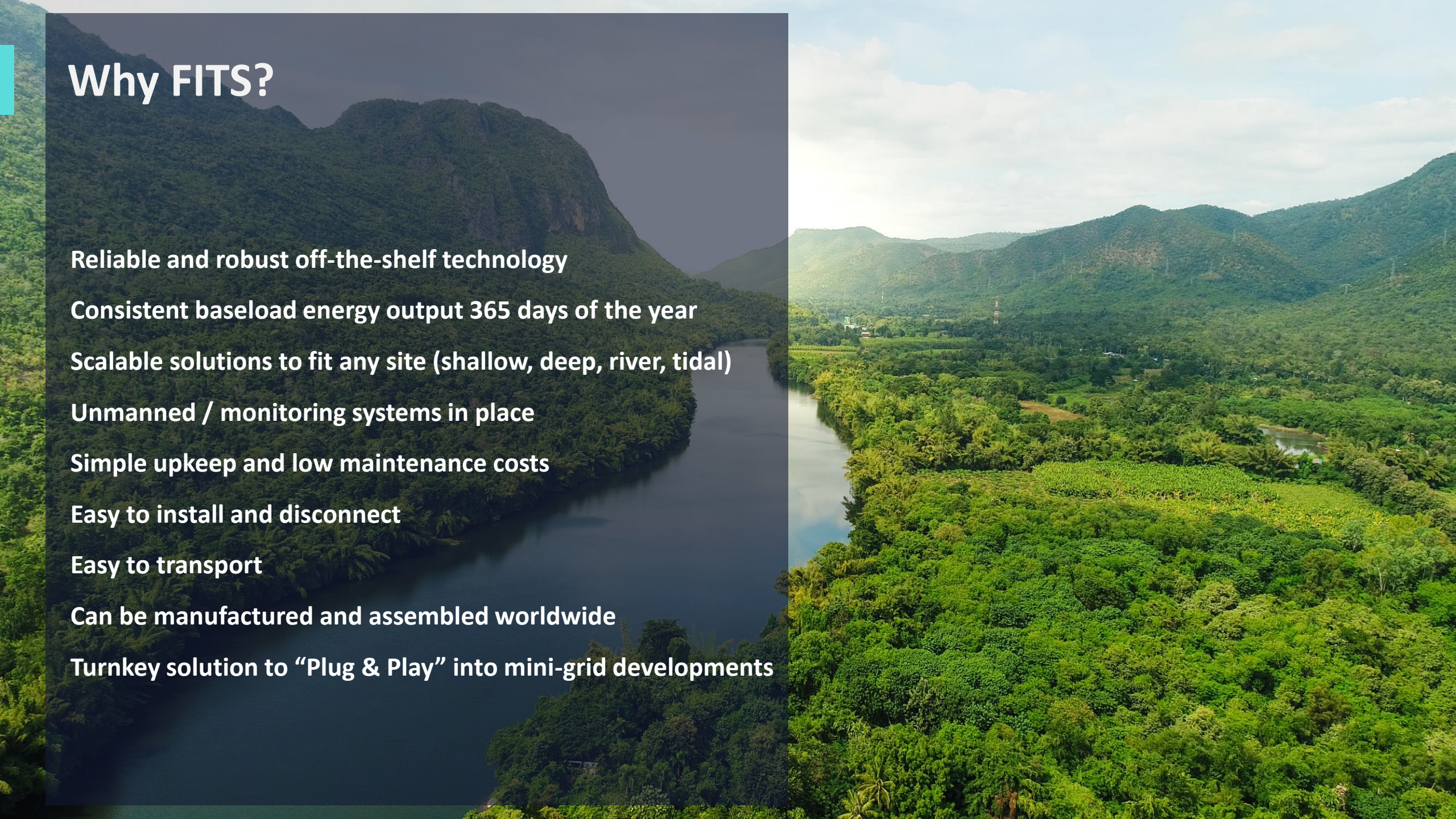
Simple upkeep and low maintenance costs

Easy to install and disconnect

Easy to transport

Can be manufactured and assembled worldwide

Turnkey solution to “Plug & Play” into mini-grid developments



IMPACT

1 FITS will provide clean, secure energy to at least 1000+ households with a population > 5,000 people

Step towards climate change targets – rapid reduction in dirty fossil fuels

Enablement of education and skills building boosted by improved lighting in homes and schools

1000 mt CO2 emission equivalent avoided

Improvement in healthcare - cold storage for medicines, use of equipment; extension of operating hours

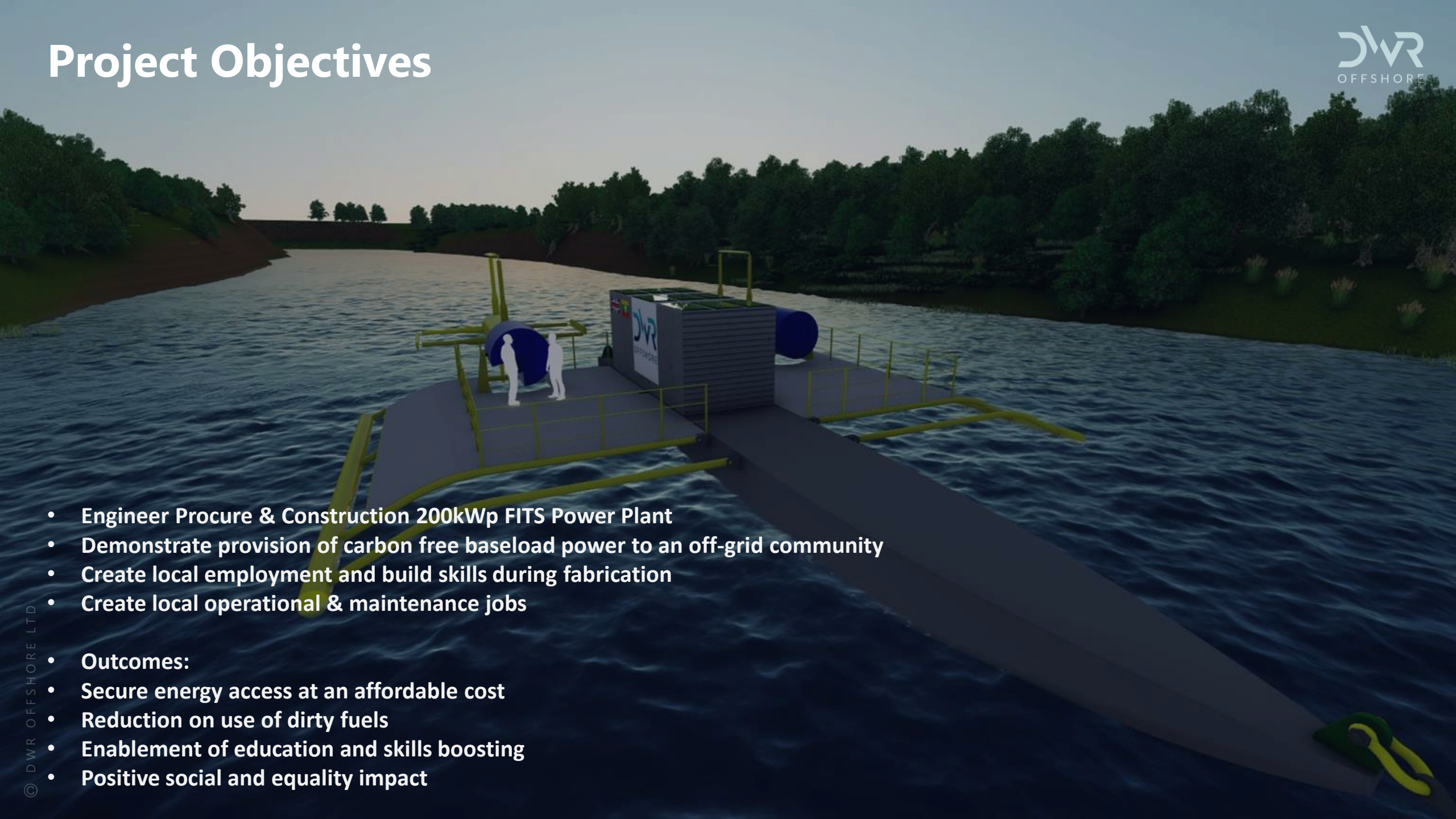
Increase in local economic growth: Direct and Indirect employment

Opportunity for local FITS O&M employment

Diversify a country's skillset – fabrication and supply of FITS Power Plants amongst others

Clean potable water – Drinking / Sanitation (future variant)

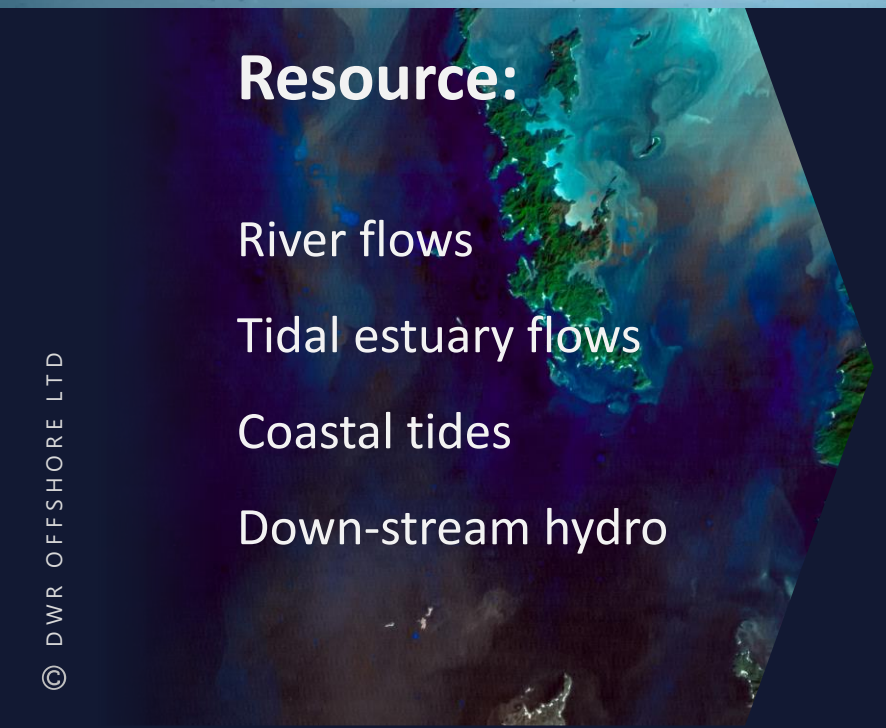
Project Objectives



- Engineer Procure & Construction 200kWp FITS Power Plant
- Demonstrate provision of carbon free baseload power to an off-grid community
- Create local employment and build skills during fabrication
- Create local operational & maintenance jobs

- Outcomes:
- Secure energy access at an affordable cost
- Reduction on use of dirty fuels
- Enablement of education and skills boosting
- Positive social and equality impact

Resource & Applications



Resource:

River flows

Tidal estuary flows

Coastal tides

Down-stream hydro

Application:

Baseload Power

Fresh Water

Disaster Relief

Users:

Off-grid communities

Remote / island resorts

Telecommunications

Fisheries / fishing production

Rice mills

Mini-grid developers

Project Schedule

Contract Start Date: 01.04.20
Contract End Date: 30.09.2021

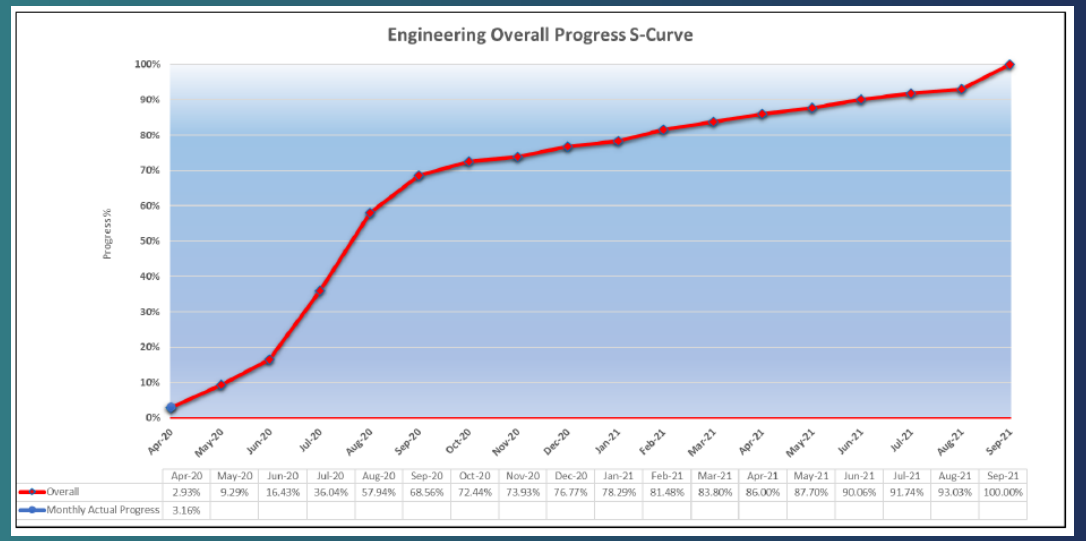
Overall Timeline:

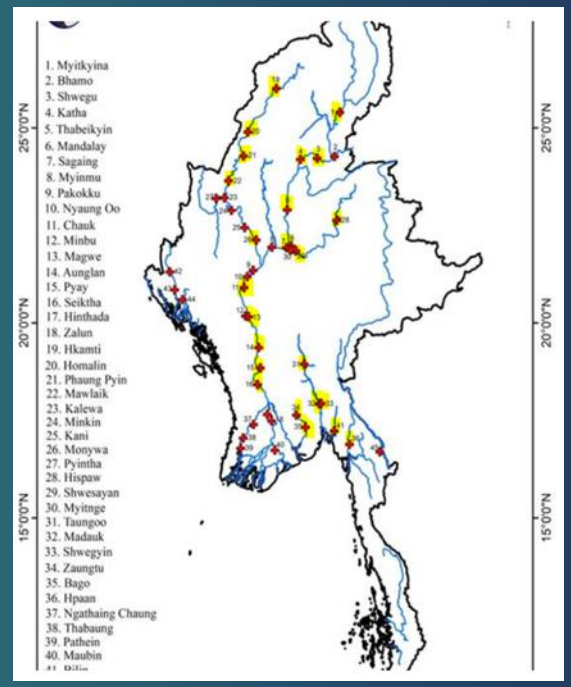
1. Detail Engineering: 6 months

Milestones

- Complete detail design & Issue AFC Dwgs
- Select Region and Site
    - River hydrology data required for detail engineering
    - Existing archive data / site surveys
    - Site measurements – flow velocity

2. Fabrication: Start October: 7 Months
    - DWR Construction team to be deployed for the entire build period
3. Transportation and Installation: Start May - 0.5 Month
4. Operational Testing: Start: May/June – 4++++ Months
    - Employ local community to assist in operational testing | training will be provided





Project Site Selection

Possible Locations are currently undergoing various site assessments

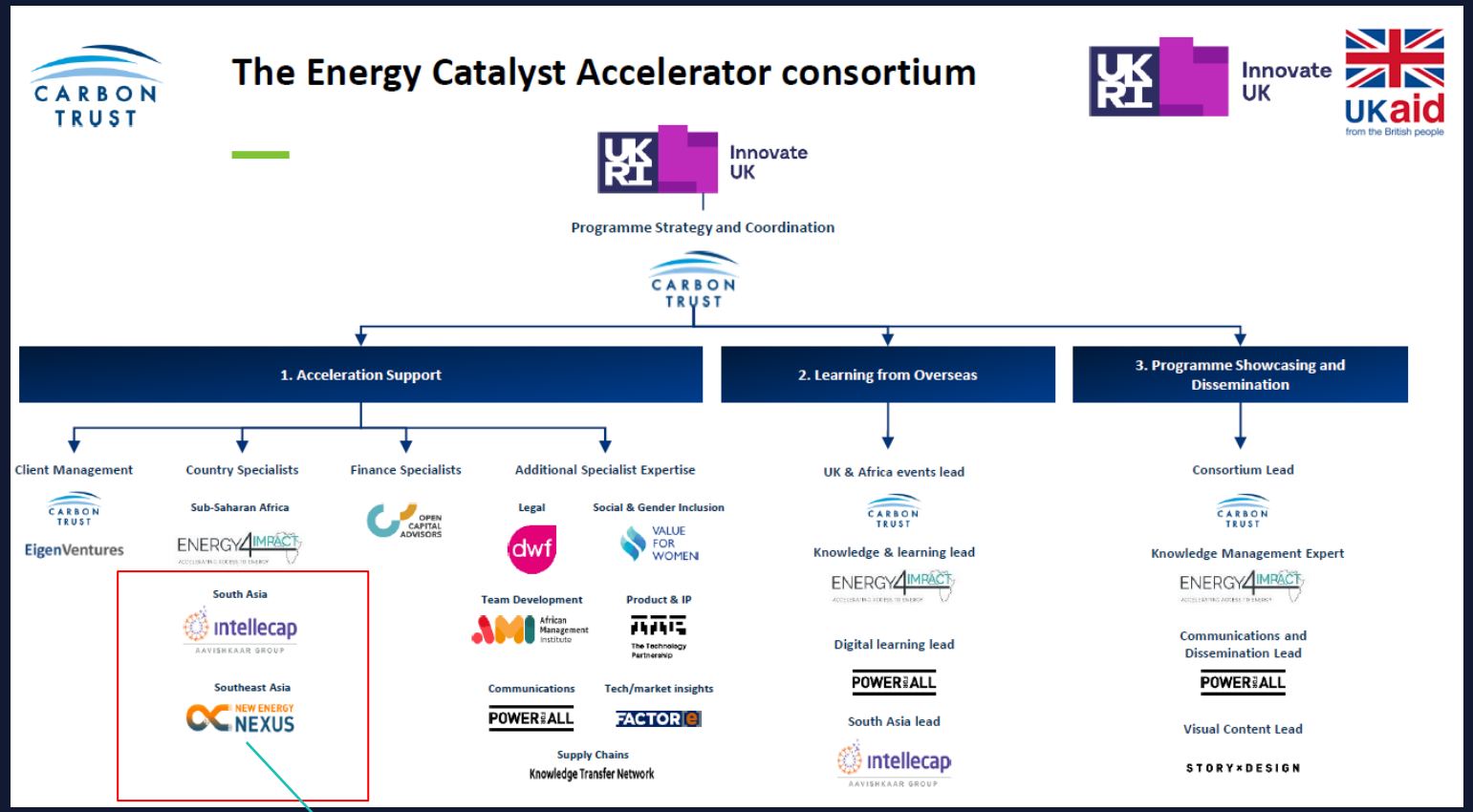
- Desktop studies
- Ranking assessment
- In-country expertise - Spectrum

Preferred locations:

- Ayeyarwady Region
- Mon Region
- Kayin
- Tanintharyi

- WHAT IMPRESSIONS MIGHT GROUP MEMBERS HAVE REGARDING SUITABLE LOCATIONS?

- Factors to consider:
  - Potential Hydrology resource
  - Off-grid communities
  - RE Policy | Governance |Acceptance
  - Ease of access
  - Risks



Supporting DWR venture

- Development of Acceleration Plan & Coaching
  - Market Segmentation
  - Strategy and Business development
  - Financial Strategy & capital Raising
- Advisory Board being put together

Questions ?

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