



# TIDAL TURBINE PROJECT IN KENYA

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## EXECUTIVE SUMMARY

Geodyn Solutions proposes a \$1 billion investment in a 400 MW tidal turbine farm along Kenya's East African coast, delivering 1,401.6 GWh annually. With National Energy Policy incentives, it achieves 4-year payback, 25.5% IRR, and 640% ROI. A PPA with Kenya Power (KPLC) secures revenue, establishing Geodyn Solutions in Kenya's renewable sector.

# PROJECT OVERVIEW

The project focuses on Indian Ocean coastal channels like the Zanzibar Channel area, with currents around 2 m/s. The farm will comprise 200 turbines (2 MW each), operational by 2028. Total capacity: 400 MW, producing 1,401.6 GWh annually at 40% factor, powering over 4,672,000 households (based on average Kenyan household consumption of approximately 300 kWh/year), aligning with universal electricity access by 2030 under the Draft National Energy Policy 2025-2034.

# TECHNICAL FEASIBILITY



Tidal turbines harness ocean currents with durable blades and generators, providing predictable power superior to intermittent renewables. Maturity in design ensures resilience in marine environments. Enhanced AI will optimize turbine arrays, predictive maintenance, and yield, boosting efficiency by 25% and reducing downtime. Blockchain enables transparent energy tracking, facilitating tokenized investments for broader participation.

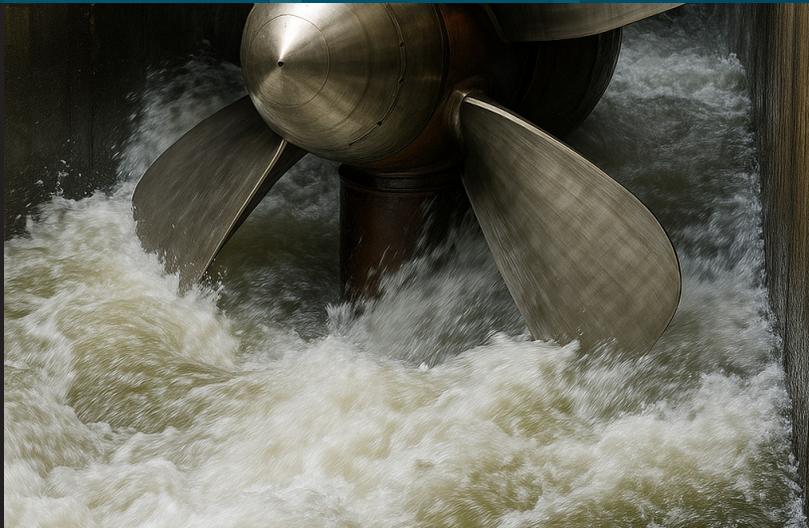


## CAPITAL EXPENDITURES (CAPEX)

**TOTAL CAPEX:** \$1 billion, allocated to turbine procurement (\$400 million), installation and infrastructure (\$350 million), site development and grid connection (\$200 million), and contingencies (\$50 million). Through economies of scale and 30% grants from government programs and World Bank funding, effective CAPEX reduces to \$700 million.

# REVENUE DETAILS

- **ELECTRICITY SALES:** SECURED VIA A 20-YEAR PPA AT \$160/MWH, YIELDING \$224.26 MILLION ANNUALLY FROM 1,401.6 GWH PRODUCTION.



- **CARBON CREDITS:** ANNUAL CO2 SAVINGS OF 981,120 TONS GENERATE \$14.72 MILLION AT \$15/ TON VIA KENYA'S DEVELOPING CARBON MARKET UNDER 2025 REGULATIONS.

- **TOTAL ANNUAL REVENUE:** \$238.98 MILLION, NET OF OPTIMIZED OPEX.



**OPERATIONAL  
EXPENDITURES (OPEX)**

ANNUAL OPEX: \$15 MILLION (1.5% OF CAPEX),  
LOWERED VIA AI EFFICIENCIES.

**NET ANNUAL CASH FLOW**

\$223.98 MILLION.





-981,120 tons  
CO<sub>2</sub>

## RETURN ON INVESTMENT

- **PAYBACK PERIOD:** 4 YEARS.
- **INTERNAL RATE OF RETURN (IRR):** 25.5%.
- **20-YEAR ROI CHART:** THE TABLE BELOW DETAILS ANNUAL AND CUMULATIVE CASH FLOWS, WITH CUMULATIVE ROI AS  $(\text{CUMULATIVE CASH FLOW} / \text{EFFECTIVE CAPEX}) \times 100$ .

# 20-YEAR ROI CHART

YEAR	ANNUAL CASH FLOW (USD MILLIONS)	CUMULATIVE CASH FLOW (USD MIL- LIONS)	CUMULATIVE ROI (%)
1	223.98	223.98	32.0
2	223.98	447.96	64.0
3	223.98	671.94	96.0
4	223.98	895.92	128.0
5	223.98	1,119.90	160.0
6	223.98	1,343.88	192.0
7	223.98	1,567.86	224.0
8	223.98	1,791.84	256.0
9	223.98	2,015.82	288.0
10	223.98	2,239.80	320.0
11	223.98	2,463.78	352.0
12	223.98	2,687.76	384.0
13	223.98	2,911.74	416.0
14	223.98	3,135.72	448.0
15	223.98	3,359.70	480.0
16	223.98	3,583.68	512.0
17	223.98	3,807.66	544.0
18	223.98	4,031.64	576.0
19	223.98	4,255.62	608.0
20	223.98	4,479.60	640.0

Over 20 years, the project yields \$4.48 billion in cumulative cash flow.



## ENVIRONMENTAL BENEFITS

- THE PROJECT OFFSETS FOSSIL FUEL USE, CUTTING CO2 EMISSIONS BY 981,120 TONS ANNUALLY—EQUIVALENT TO REMOVING 200,000 CARS FROM ROADS. AI-OPTIMIZED DESIGNS MINIMIZE MARINE IMPACTS, SUPPORTING BIODIVERSITY AND LOW-CARBON TECHNOLOGY DEVELOPMENT IN KENYA.





## **GOVERNMENT GRANTS, INCENTIVES, AND WORLD BANK SUPPORT**

- KENYA'S DRAFT NATIONAL ENERGY POLICY 2025-2034 OFFERS TAX EXEMPTIONS, IMPORT DUTY REMOVALS ON RE EQUIPMENT, AND SUBSIDIES FOR RENEWABLES. THE WORLD BANK PROVIDES UP TO 30% CAPEX FUNDING FOR SUSTAINABLE ENERGY PROJECTS.



# INNOVATIVE FINANCING FOR OPTIMAL ROI

**CO2 BONDS:** ISSUE BONDS LINKED TO EMISSION REDUCTIONS, ATTRACTING GREEN INVESTORS AND PROVIDING UPFRONT CAPITAL BASED ON VERIFIED SAVINGS.



## PREDICTIVE MAINTENANCE 25% YIELD BOOST



**AI OPTIMIZATION:** IMPLEMENT AI FOR DYNAMIC CONTROL, INCREASING YIELD BY 15-25% AND SLASHING OPEX, AMPLIFYING CASH FLOWS.

**BLOCKCHAIN AND TOKENIZATION:** TOKENIZE ASSETS ON BLOCKCHAIN FOR FRACTIONAL OWNERSHIP, DRAWING GLOBAL INVESTORS AND REDUCING EQUITY NEEDS BY 25%. PROJECT TOKENS DISTRIBUTE DIVIDENDS FROM REVENUE, ENHANCING LIQUIDITY AND ROI THROUGH TRADABLE GREEN ASSETS.





## **POWER PURCHASE AGREEMENT (PPA)**

- A 20-year PPA with KPLC guarantees all output purchase at \$160/MWh, inflation-indexed. This provides revenue certainty, with performance clauses ensuring stable cash flows while advancing Kenya's renewable targets.

# 20 Year IFA \$160/MWh



THIS OPTIMIZED \$1 BILLION INVESTMENT ELEVATES GEODYN SOLUTIONS' ROLE IN KENYA'S TIDAL ENERGY SECTOR, YIELDING SUPERIOR FINANCIAL RETURNS, ENVIRONMENTAL IMPACT, AND INNOVATION. WITH A 4-YEAR PAYBACK, 25.5% IRR, AND ELEMENTS LIKE AI, BLOCKCHAIN, AND CO2 BONDS, THE PROJECT MAXIMIZES ROI AND SUPPORTS GLOBAL SUSTAINABILITY. PROCEED WITH DETAILED FEASIBILITY AND PARTNERSHIPS.



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