



GEODYN
SOLUTIONS

PROPOSAL FOR A 100,000 MT/ DAY SEAWATER DESALINATION PLANT IN INDONESIA

© 2025 Geodyn Solutions. All rights reserved.

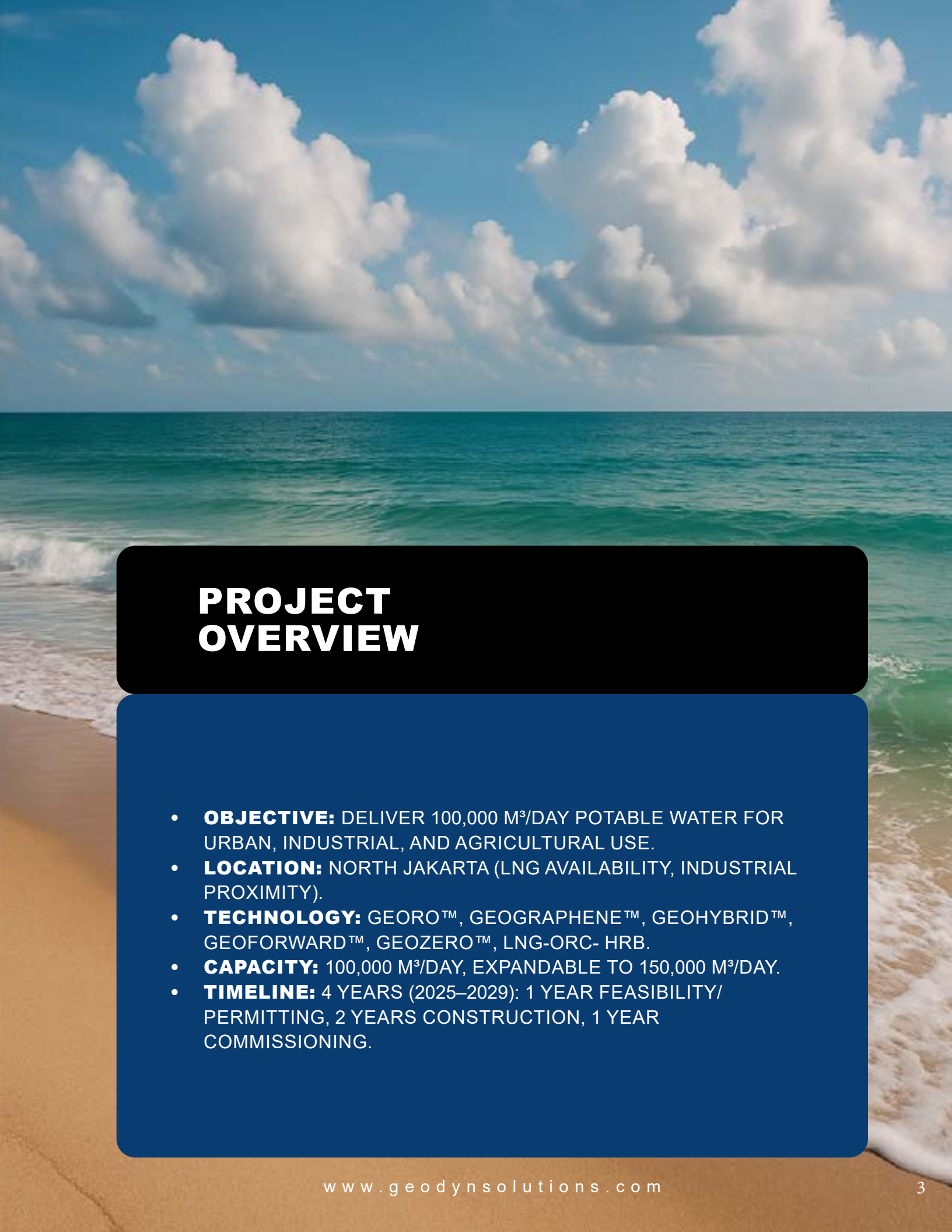
This document is confidential and proprietary. Unauthorized use, reproduction, or distribution is prohibited without written permission from Geodyn Solutions.

www.geodynsolutions.com

EXECUTIVE SUMMARY

Geodyn Solutions proposes a 100,000 Mt/day (100,000 m³/day) seawater desalination plant in North Jakarta, Indonesia, powered by a self-reliant 40 MW LNG plant with Organic Rankine Cycle (ORC) and Heat Recovery Boiler (HRB). Using enhanced GeoRO™, GeoGraphene™, GeoHybrid™, GeoForward™, and GeoZero™ technologies, the plant maximizes efficiency and sustainability. GeoZero™ recovers 1,500 tons/day of salts for fertilizers and commodities, generating \$64.20M/year net profit. With a 30% contingency, 0% Bappenas loans, World Bank grants, and BKPM tax incentives, it achieves a 10-year ROI of 141.40 %, creates 880–1,180 jobs, and aligns with Indonesia's water security goals.





PROJECT OVERVIEW

- **OBJECTIVE:** DELIVER 100,000 M³/DAY POTABLE WATER FOR URBAN, INDUSTRIAL, AND AGRICULTURAL USE.
- **LOCATION:** NORTH JAKARTA (LNG AVAILABILITY, INDUSTRIAL PROXIMITY).
- **TECHNOLOGY:** GEORO™, GEOGRAPHENE™, GEOHYBRID™, GEOFORWARD™, GEOZERO™, LNG-ORC- HRB.
- **CAPACITY:** 100,000 M³/DAY, EXPANDABLE TO 150,000 M³/DAY.
- **TIMELINE:** 4 YEARS (2025–2029): 1 YEAR FEASIBILITY/ PERMITTING, 2 YEARS CONSTRUCTION, 1 YEAR COMMISSIONING.

TECHNICAL DESIGN



The plant uses optimized Geodyn technologies and a 40 MW LNG power plant:

- **Pre-treatment:** GeoClean™ Ultrafiltration and Dissolved Air Flotation for GeoGraphene™ membranes.
- **Core Desalination:** GeoRO™ with enhanced ERDs (1.8 kW h m⁻³ to 2.3 kW h m⁻³) and GeoGraphene™ with graphene oxide coatings (99.8 % salt rejection, 25 % less energy).
- **Energy:** 40 MW LNG plant with ORC and HRB (\$0.05 kW⁻¹ h, 10 MWth steam), cutting costs by 58 % vs. grid (\$0.12 kW⁻¹ h).
- **Post-treatment:** GeoPure™ for WHO-compliant water (<500 mg/L TDS).
- **Brine Management:** GeoZero™ recovers 1,500 tons/day salts (NaCl, KCl, MgCl₂/MgSO₄, CaCO₃).
- **Automation:** GeoSmart™ AI reduces OPEX by 15 %.

TECHNOLOGIES FOR PROFITABILITY

OPTIMIZED TECHNOLOGIES ENHANCE ROI:

1. GEOGRAPHENE™: CUTS ENERGY USE BY 25 % (~1.8 KW H M-3), EXTENDS MEMBRANE LIFE TO 12 YEARS.

2. LNG-ORC-HRB: REDUCES ENERGY COSTS TO \$0.05 KW-1 H.



3. GEOFORWARD™: LOWERS GEOZERO™ ENERGY COSTS BY 20 %.

4. GEOSMART™: CUTS MAINTENANCE COSTS BY 15 %.



5. GEOZERO™: GENERATES \$64.20 NET PROFIT, OFFSETTING OPEX BY 35 %.



MOST EFFICIENT TECHNOLOGIES FOR ROI

1. GEORO™ WITH ERDS:
1.8 KW H M⁻³ TO 2.3 KW H M⁻³,
\$0.24 M⁻³ TO 0.75 M⁻³, SCALABLE.



2. GEOHYBRID™ RO-MED:
USES WASTE HEAT, CUTTING
ENERGY COSTS BY 25 %.

3. LNG-ORC-HRB: REDUCES
ENERGY COSTS BY 58 %.

4. GEOZERO™:
ADDS BRINE BYPRODUCT
REVENUE.

BRINE VALORIZATION: FERTILIZER AND COMMODITY PRODUCTION



GeoZero™ recovers 1,500 tons/day (547,500 tons/year) from 15,400 m³/day brine (100–120 g/L TDS):

FERTILIZERS:

- KCl (82,125 tons, \$300 to 400): \$24.64 to 32.85 .
- MgSO₄ (54,750 tons, \$200 to 300): \$10.95 to 16.43 .
- CaCO₃ (27,375 tons, \$100 to 150): \$2.74 to 4.11

COMMODITIES:

- NaCl (383,250 tons, \$50 to 100): \$19.16 to 38.33 .
- MgCl₂ (54,750 tons, \$200 to 300): \$10.95 to 16.43 .

PROCESS: 15 nanofiltration trains, high-efficiency electrochemical cells, multi-effect evaporators using GeoHybrid™/GeoSolar™ waste heat yield 70 % NaCl, 15 % KCl, 10 % MgCl₂/MgSO₄, 5 % CaCO₃.

OUTPUT: Revenue \$57.51 to 91.71 (midpoint \$74.61), net profit \$64.20 after \$10.41 costs (\$0.30 m⁻³).

FEASIBILITY: Indonesia's agriculture (13 % GDP, 7.5 %) and industry (4 %) ensure demand, with ASEAN exports.

ENVIRONMENTAL BENEFITS: Maintains near-zero discharge, supports sustainable agriculture.



FEASIBILITY STUDIES

WATER DEMAND

20 % SHORTFALL BY 2035, JAKARTA SUBSIDENCE (10 CM/YEAR).

SITE SELECTION

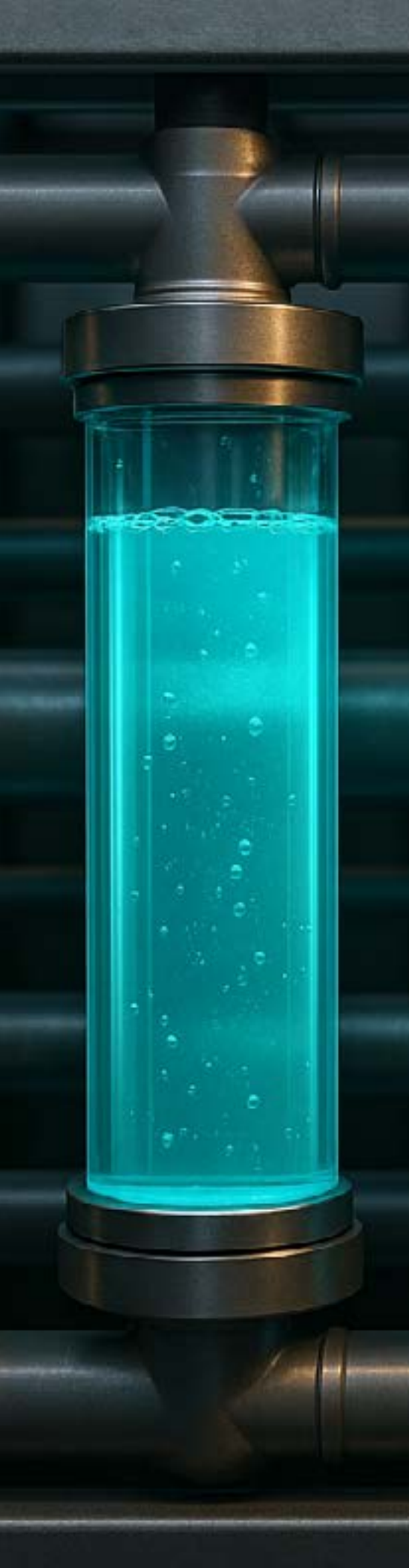
NORTH JAKARTA MINIMIZES DISTRIBUTION COSTS, EIAS
ASSESS MARINE IMPACTS.

TECHNICAL FEASIBILITY

GEORO™/GEOGRAPHENE™ MATCH SINGAPORE'S JURONG
ISLAND (3.5 KW H M⁻³, TARGETING 1.3 KW H M⁻³).

REGULATORY FRAMEWORK

REQUIRES EIAS, BRINE MONITORING, COMMUNITY ENGAGEMENT.



CAPITAL EXPENDITURE (CAPEX)

TOTAL CAPEX: \$385.50, REDUCED TO \$376.50 WITH TAX INCENTIVES, VALIDATED AGAINST CARLSBAD (\$250 FOR 35 MGD):

DIRECT COSTS (56.0 %, \$216):

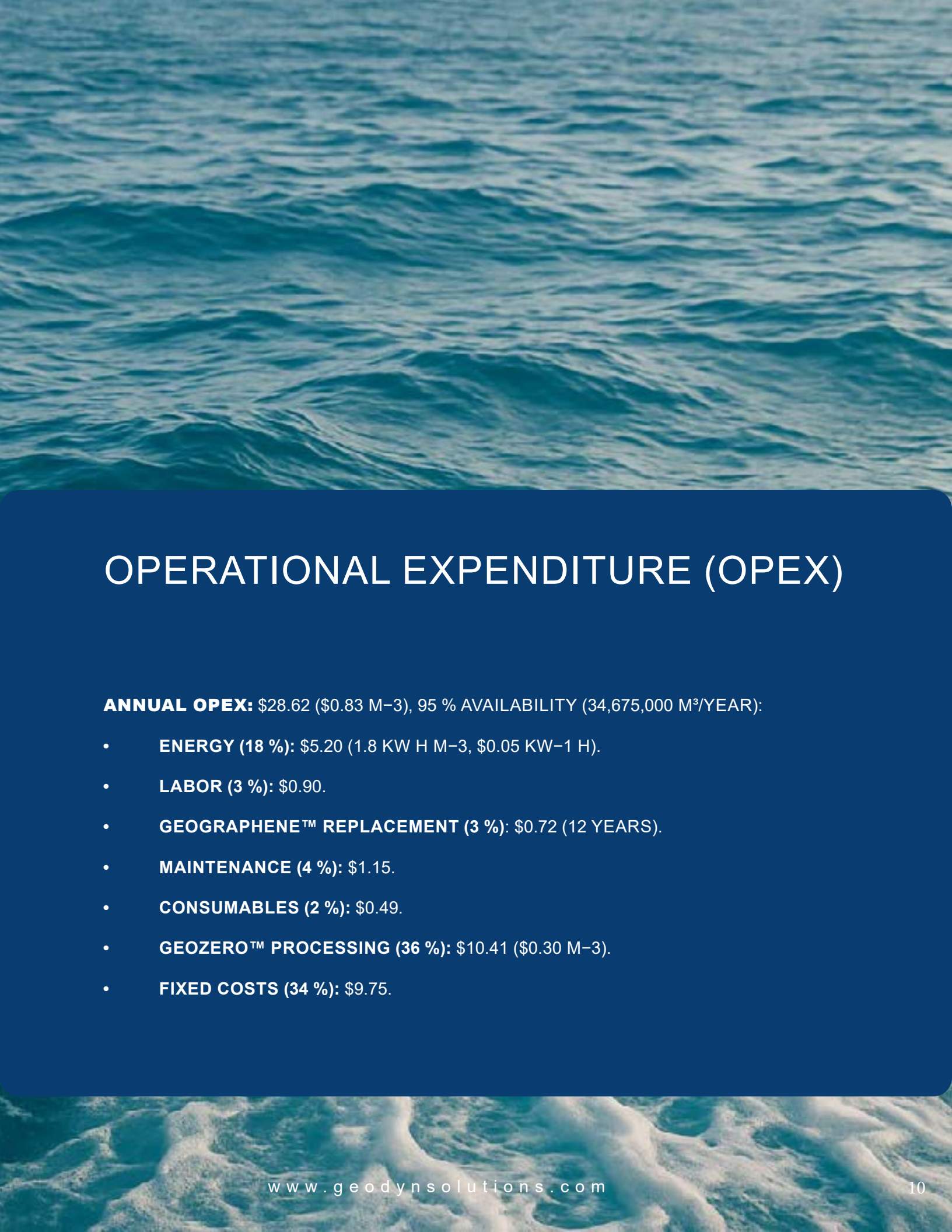
- GEORO™/GEOGRAPHENE™ (ENHANCED): \$68
- LNG-ORC-HRB 40 MW: \$80
- PIPING/INFRASTRUCTURE: \$20
- SITE DEVELOPMENT: \$11
- GEOZERO™ EXPANSION: \$35
- GEOFORWARD™/GEOHYBRID™ UPGRADES: \$11

INDIRECT COSTS (5.2 %, \$20):

- ENGINEERING/DESIGN: \$9
- PERMITTING/EIAS: \$8
- FINANCING/LEGAL: \$3

CONTINGENCY (30 %): \$82.50

TAX INCENTIVES: \$9 VIA BKPM EXEMPTIONS.



OPERATIONAL EXPENDITURE (OPEX)

ANNUAL OPEX: \$28.62 (\$0.83 M-3), 95 % AVAILABILITY (34,675,000 M³/YEAR):

- **ENERGY (18 %):** \$5.20 (1.8 KW H M-3, \$0.05 KW-1 H).
- **LABOR (3 %):** \$0.90.
- **GEOGRAPHENE™ REPLACEMENT (3 %):** \$0.72 (12 YEARS).
- **MAINTENANCE (4 %):** \$1.15.
- **CONSUMABLES (2 %):** \$0.49.
- **GEOZERO™ PROCESSING (36 %):** \$10.41 (\$0.30 M-3).
- **FIXED COSTS (34 %):** \$9.75.

EMPLOYMENT COSTS

- **Construction (2 years):** 630–830 jobs, \$8.2 : 200 engineers (\$25.000, \$5), 400 workers (\$7.000 , \$2.8), 80 managers (\$25.000 , \$0.4).
- **Operational:** 60 jobs, \$0.90 (3 % escalation): 20 technicians (\$18.000 , \$0.36), 10 engineers (\$25.000 , \$0.25), 30 support (\$6.300 , \$0.29).
- **Indirect Jobs:** 200–300 in supply chains/services.
- **Training:** \$0.1 with universities.



WATER PRICING

PRICE:

\$0.80 M⁻³, COMPETITIVE
(\$0.60 M⁻³ TO 1.20 M⁻³), 4 %
MARGIN OVER OPEX (\$0.83
M⁻³). SUB- SIDIES MAY
LOWER TO \$0.55 M⁻³.



REVENUE:

34,675,000 M³/YEAR × \$0.80
M⁻³ = \$27.74 , PLUS \$64.20
GEOZERO™, TOTALING \$91.94 .



GOVERNMENT SUPPORT AND INCENTIVES

- **0% Loan:** Bappenas 0% interest loan for 50 % CAPEX (\$184.375, 30 years).
- **World Bank:** Grants of \$10 to 30 for sustainable water projects.
- **Tax Incentives:** BKPM tax holidays/import duty exemptions, \$9 CAPEX reduction.
- **Impact:** Reduces CAPEX to \$376.50, boosts ROI.



RETURN ON INVESTMENT (ROI)

ASSUMPTIONS:

- REVENUE: \$91.94
- OPEX: \$28.62
- CAPEX REPAYMENT: \$12.55 (30-YEAR, 0% FOR \$184.375, 5 % FOR \$192.125, 5-YEAR INTEREST-ONLY)
- NET CASH FLOW: $\$91.94 - \$28.62 - \$9.61$ (YEARS 1–5) = \$53.71; $\$91.94 - \$28.62 - \$12.55$ (YEARS 6–10) = \$50.77
- TOTAL 10-YEAR CASH FLOW: $(\$53.71 \times 5) + (\$50.77 \times 5) = \$522.10$
- ROI: $(\$522.10 / \$376.50) \times 100 \% = 141.40 \%$
- BREAK-EVEN: ~3

10-YEAR RETURN TABLE

10-YEAR ROI GRAPH

ENVIRONMENTAL IMPACT

- **GeoZero™:** Recovers 1,500 tons/day salts, maintaining near-zero discharge.
- **Marine Ecosystem:** GeoIntake™ low-velocity systems, EIAs ensure compliance.
- **Carbon Footprint:** LNG-ORC-HRB cuts emissions by ~30,000 vs. grid (0.4 kg2/kWh).
- **Community:** Consultations address concerns; fertilizers aid agriculture.

Year	Revenue (\$M)	OPEX (\$M)	CAPEX Repayment (\$M)	Net Cash Flow (\$M)	Cum. Cash Flow (\$M)
1	91.94	29.77	8.14 (interest)	54.03	54.03
2	91.94	29.77	8.14	54.03	108.06
3	91.94	29.77	8.14	54.03	162.09
4	91.94	29.77	8.14	54.03	216.12
5	91.94	29.77	8.14	54.03	270.15
6	91.94	29.77	11.16	51.01	321.16
7	91.94	29.77	11.16	51.01	372.17
8	91.94	29.77	11.16	51.01	423.18
9	91.94	29.77	11.16	51.01	474.19
10	91.94	29.77	11.16	51.01	525.20

TABLE 1: 10-YEAR FINANCIAL PROJECTIONS WITH BRINE VALORIZATION

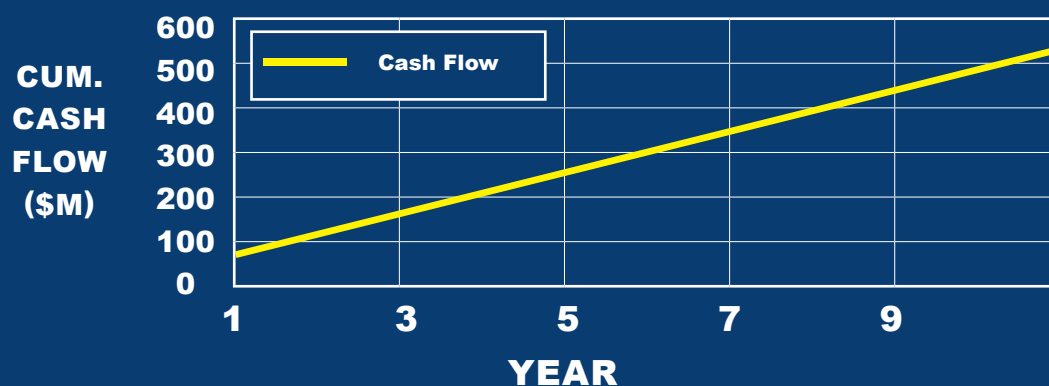


Figure 1: Cumulative cash flow rises from \$53.71M to \$522.10M, break-even ~3.5.

ECONOMIC AND SOCIAL BENEFITS



WATER SECURITY:

SERVES 500,000–1,000,000 RESIDENTS/
INDUSTRIES.

JOB CREATION:

630–830 CONSTRUCTION, 60 PERMANENT,
200–300 INDIRECT JOBS.

ECONOMIC IMPACT:

BOOSTS GDP BY 0.5 % TO 1 %.

RISKS AND MITIGATION

COST OVERRUNS:

30 % CONTINGENCY (\$82.50).

ENVIRONMENTAL:

EIAS, GEOZERO™ ENSURE COMPLIANCE.

ENERGY COSTS:

LNG-ORC-HRB LOCKS IN \$0.05 KW-1 H.

MARKET SATURATION:

DIVERSIFIED PRODUCTS, ASEAN EXPORTS.

SOCIAL RESISTANCE:

COMMUNITY BENEFITS (TRAINING, INFRASTRUCTURE).



FINANCING STRATEGY

PPP MODEL:

PARTNERS WITH BAPPENAS, WORLD BANK, ASIAN
DEVELOPMENT BANK.

LOAN:

50 % (\$184.375) 0% VIA BAPPENAS, 50 % (\$192.125) 5 %,
30-YEAR, 5-YEAR INTEREST-ONLY.

GRANTS/INCENTIVES:

WORLD BANK GRANTS (\$10 TO 30), BKPM TAX
EXEMPTIONS (\$9).

REVENUE:

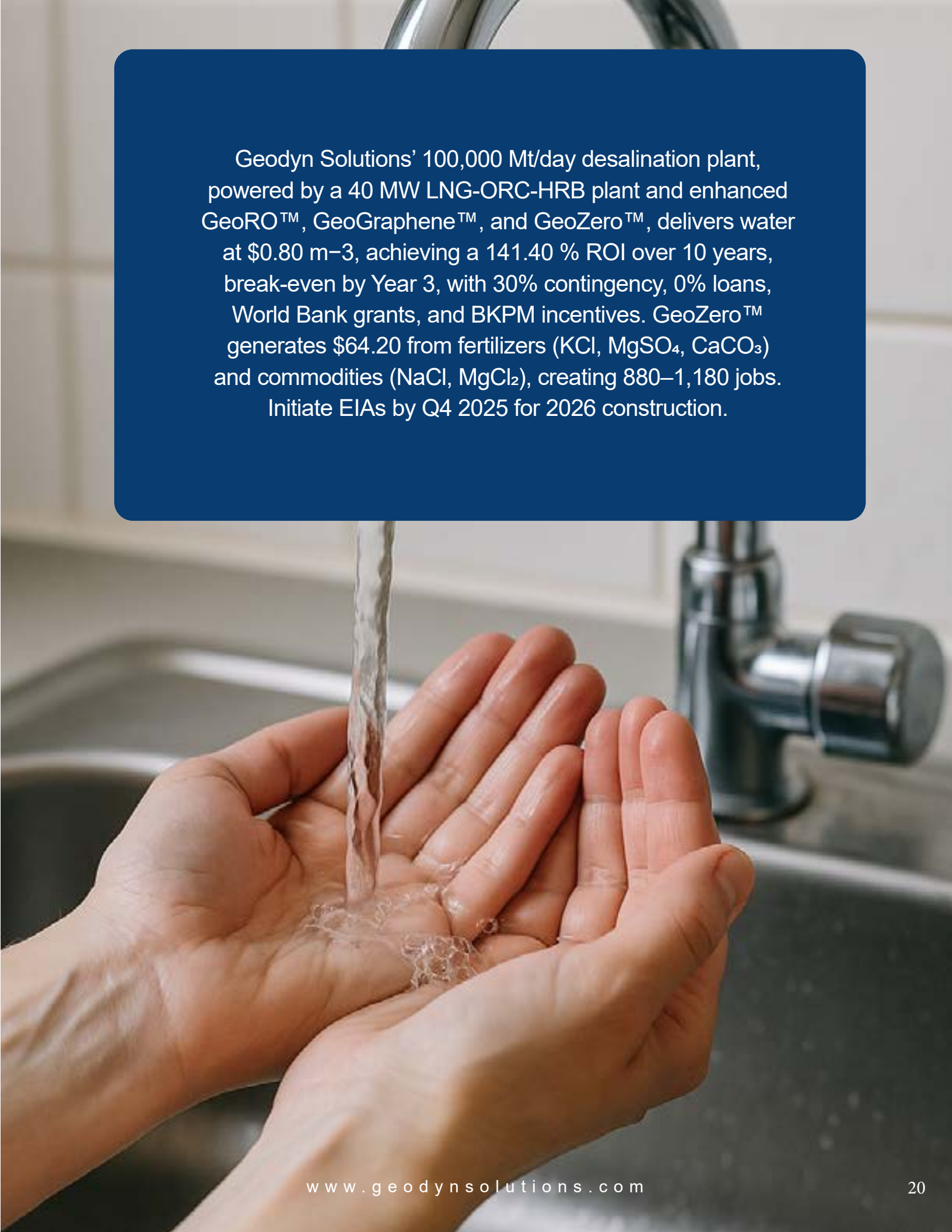
$\$0.80 \text{ M}^{-3} + \$64.20 \text{ GEOZERO}^{\text{TM}}$.



SUMMARY OF TECHNOLOGIES AND ROI IMPACT

Technology	Efficiency (kWh/m ³)	Cost (\$/m ³)	ROI Impact
GeoRO™	1.8–2.3	0.24–0.75	High: Scalable
GeoGraphene™	1.8	0.24–0.65	High: 25 % energy savings
LNG-ORC-HRB	1.8–2.3	0.24–0.55	High: 58 % cost cut
GeoHybrid™	2.8–4.5	0.45–0.75	Moderate: Waste heat
GeoForward™	1.6–2.0	0.35–0.75	Moderate: Brine recovery
GeoZero™	N/A	0.30	High: \$64.20

Table 2: Summary of Proprietary Technologies



Geodyn Solutions' 100,000 Mt/day desalination plant, powered by a 40 MW LNG-ORC-HRB plant and enhanced GeoRO™, GeoGraphene™, and GeoZero™, delivers water at \$0.80 m⁻³, achieving a 141.40 % ROI over 10 years, break-even by Year 3, with 30% contingency, 0% loans, World Bank grants, and BKPM incentives. GeoZero™ generates \$64.20 from fertilizers (KCl, MgSO₄, CaCO₃) and commodities (NaCl, MgCl₂), creating 880–1,180 jobs. Initiate EIAs by Q4 2025 for 2026 construction.



www.geodynsolutions.com

©Geodynsolutions 2025 - All Rights Reserved