GPSD Water Recovery – Pumping Cost Integration (3-Year Projection)

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⚙ Pumping Integration for GPSD Systems

While GPSD is designed to function passively via gravity, **minimal pumping is required** for: - Drawing filtered water from the base reservoir - Optionally distributing water to holding tanks or irrigation lines

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Pumping Requirements Overview

| Task | Requirement | Notes | |---|---|---| | Water extraction (10m lift) | Small submersible or surface pump (250–400W) | Intermittent use only
| Daily usage duration | ~30–60 minutes | Based on 2,000L/day
| Energy source | Solar, grid, or generator | Solar highly recommended

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Energy Consumption Estimate

| Parameter | Value | |---|---| | Avg pump power | 300W | | Avg runtime/day | 1 hour | | Daily consumption | 300 Wh (0.3 kWh) | | Annual consumption | ~110 kWh | | 3-Year consumption | ~330 kWh |

Pumping Cost (3-Year)

| Region Type | Energy Cost/kWh | 3-Year Pump Cost | |---|---|---| | Solar (standalone) | €0 after install | ~€150–€300 (hardware only)
| Grid – Europe avg | €0.25 | ~€82.50
| Diesel gen (1 kWh = 0.4L diesel) | ~€0.60+ | ~€198

Notes

- Small solar water pumps (12V–24V) are highly efficient and well-suited to GPSD deployment
- Manual pumping is possible if electric is unavailable, but limits throughput
- Automated float activation is ideal for drawing only clean, settled water

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Adjusted 3-Year Total (Including Pumping)

| Total System Element | Cost (Range €) | |----------|----------| | GPSD + Stage 2 Build | €1,800–€2,500 | | Maintenance (3 years) | €450–€800 | | Pump + energy (solar/grid)| €80–€300 | | **Total** | **€2,330–€3,600** |

Water output remains: **1.6M–2.7M liters**

Conclusion

Factoring pump energy and cost into GPSD deployment increases the total budget by ~€80–€300 over 3 years — a marginal increase for maintaining consistent daily access. Solar-driven pumps ensure autonomy, while grid use remains low-cost for intermittent operation.