

ECONOMIC ANALYSIS OF THE INVESTMENT IN BIOWASTE MANAGEMENT SYSTEM IN MUNICIPALITY OF PROBISHTIP

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“Utilizing Pay As You Throw Systems and Autonomous
Composting Units for Biowastes Management in Touristic Areas”

Project co-funded by the European Union and National Funds of the participating countries



Introduction

The main aim of the financial analysis is to evaluate the economic benefits of the investment in new waste management system in the Municipality of Probishtip



Methodology

Cost-benefit analysis

- estimation of NPV (Net Present Value)
- estimation of internal rate of return of the investment

Data

- Capital cost – (CAPEX)
- Operating and maintaining cost (O&M cost – OPEX)
- Potential benefits in form of cost savings by implementation of the new waste management system for involved households and private entities, and benefits in form of the revenue from production of organic compost.

CAPITAL COST- CAPEX

| # | COST | No. | Price, EURO | Total cost, euro |
|-------|--|-----|-------------|------------------|
| 1. | Instillation of two Autonomous Composting Units for Biowastes Management | 2 | 92,620 | 185.240 |
| 2. | Civil construction work | 2 | 2.950 | 5.900 |
| TOTAL | | | | 191.140 |

| # | Additional equipment for biowaste management: | No. | Price, EUR | Total cost, euro |
|-------|--|-------|------------|------------------|
| 1. | GPRS system and system for measurement of the waste on truck | 1 | 943.275 | 15.340 |
| 2. | Plastic garbage cans 1000 liters | 2 | 270 | 540 |
| 3. | Plastic garbage cans 80-100 liters | 80 | 52 | 4.160 |
| 4. | Plastic garbage cans 10 liters | 100 | 12 | 1.200 |
| 5. | Biodegradable bags for 10 liters cans | 4.000 | 0,5 | 2.000 |
| TOTAL | | | | 23.240 |

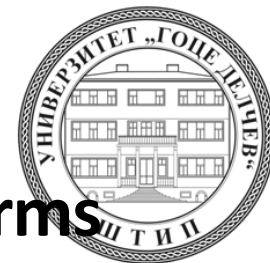
OPERATING AND MAINTAINING COST- OPEX

| COST | No. | Cost | Amount, euro /yearly |
|------------------------|-----|--------|----------------------|
| Energy cost | 2 | 540 KW | 960 euros |
| Cost for inputs | 2 | 4 tons | 1.200 euros |
| Administrating cost | 2 | / | / |
| Other maintaining cost | 2 | / | / |
| TOTAL | | / | 2.160 EUROS |

EVALUATION OF THE POTENTIAL BENEFITS

1) Evaluation of benefits in form of cost savings for households and firms

| User fees | | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
|--|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Tariff per person | EUR/t | 63.8 | 65.4 | 67.0 | 68.7 | 70.4 | 72.2 | 74.0 | 75.8 | 77.7 | 79.7 |
| Tariff per firm | EUR/t | 116.5 | 116.5 | 116.5 | 116.5 | 116.5 | 116.5 | 116.5 | 116.5 | 116.5 | 116.5 |
| | | | | | | | | | | | |
| Collection, transportation, treatment and disposal | | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 |
| Waste per person | tones, yearly | 0.296 | 0.296 | 0.296 | 0.296 | 0.296 | 0.296 | 0.296 | 0.296 | 0.296 | 0.296 |
| Waste per household | tones, yearly | 1.036 | 1.036 | 1.036 | 1.036 | 1.036 | 1.036 | 1.036 | 1.036 | 1.036 | 1.036 |
| Cost per person | EUR, yearly | 18,88 | 19,36 | 19,83 | 20,34 | 20,84 | 21,37 | 21,90 | 22,44 | 23,00 | 23,59 |
| Cost per HH | EUR, yearly | 66,10 | 67,75 | 69,41 | 71,17 | 72,93 | 74,80 | 76,66 | 78,53 | 80,50 | 82,57 |



Estimation of cost savings for households and firms

| Year | Cost savings of households, euros | Cost savings of firms, euros |
|--------------|-----------------------------------|------------------------------|
| 2024 | 2.998 | 3.985 |
| 2025 | 3.073 | 3.985 |
| 2026 | 3.149 | 3.985 |
| 2027 | 3.228 | 3.985 |
| 2028 | 3.308 | 3.985 |
| 2029 | 3.393 | 3.985 |
| 2030 | 3.477 | 3.985 |
| 2031 | 3.562 | 3.985 |
| 2032 | 3.651 | 3.985 |
| 2033 | 3.745 | 3.985 |
| 2034 | 3.839 | 3.985 |
| 2035 | 3.933 | 3.985 |
| 2036 | 4.032 | 3.985 |
| 2037 | 4.135 | 3.985 |
| 2038 | 4.239 | 3.985 |
| 2039 | 4.342 | 3.985 |
| 2040 | 4.450 | 3.985 |
| 2041 | 4.563 | 3.985 |
| 2042 | 5.475 | 3.985 |
| 2043 | 5.475 | 3.985 |
| TOTAL | 78.069 euros | 79.700 euros |

2) Benefits in form of revenue from production of organic compost

| Категорија | Output (organic compost) |
|------------|------------------------------------|
| Price | 0.96 denars / 1 kg |
| Quantitate | 55 tones yearly |
| Revenue | 52.800 denars / 860 euros per year |

Benefits in forms of revenue from production of organic compost in the whole period is estimated around **17.100 euros**

Rate of return of investment, 2024-2043

| Rate of return without EU support | Net-present value, with discounted interest rate 3% |
|--|---|
| Investment cost total | -214.262 euros |
| Operating and maintaining cost | -32.135 euros |
| Revenues from cost savings | $(56.440 + 59.287) = 115.727$ euros |
| Revenues of compost production | 17.170 euros |
| PROJECT CASH-FLOW | -113.438 euros |
| Financial rate of return of the investment | -1.35% |



Conclusion

- The project **has significant positive economic benefits** for the Municipality of Probishtip and the final beneficiaries (households and firms included in the project).
- The investments within this project is financed by the EU funds
- The utilization rate of the production capacity of the biowaste system will raise in the next period
- The positive effects in form of protection of the environment and decreasing the pollution



Thank you for your attention!