INTERNATIONAL
ECONOMICS OLYMPIAD

Zero Waste Concert: Mutually Beneficial Solution for Plastic Pollution

For IEO-CN 2025
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Problem Statement

Real life situation:

Dao Lang concert

Impact:

1. Environmental pollution
2. Waste of resources

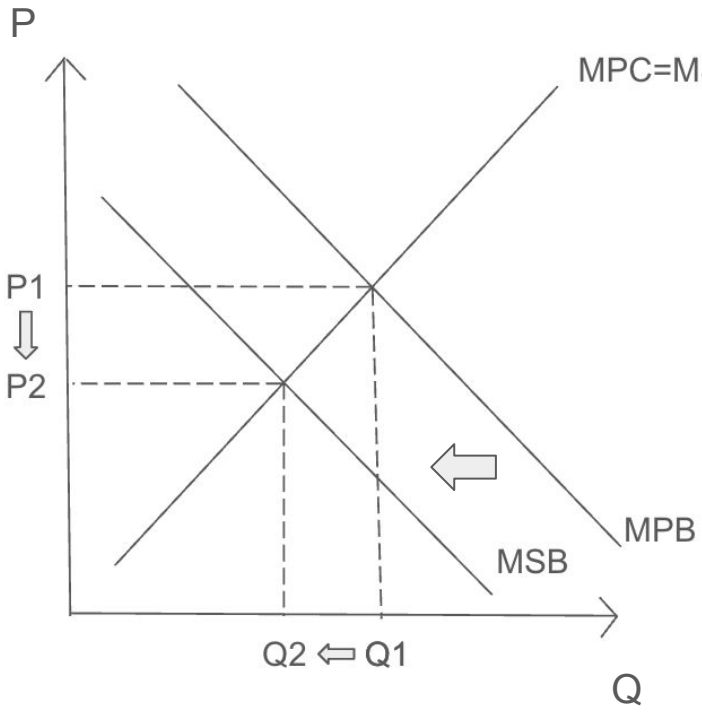
Externalities due to Environmental Pollution and Resource Waste

Concert Generates Plastic Waste

Low Recycling Rate

Waste Pollutes Soil and Water

Ecosystem Harmed



Recyclable Plastic Wasted

Inefficient Recycling System (Landfill or Incineration)

Land use
Air pollution, High costs

Resource waste

Theory: Coase Theory

Problems Need to Solve

Plastic Recovery Rate: **19%**

Plastic Pollution

Waste of Resources

Garbage Recycling Problem

Improve the Overall Efficiency of Society

Total Plastic Waste:

1.2 tons

Source: IPCC.(2023)

Current Problems

1. At concerts, attendees often discard waste improperly and fail to sort recyclables, making cleanup and waste management more challenging.

2. Most waste is then incinerated or sent to landfills, causing air pollution and long-term environmental damage.

Solution

1. Partnering with Contractors for Temporary Recycling Stations

2. AI-Powered Recycling Machines for Efficient Waste Processing

& Reward Mechanism for Recycling

Partnering with Contractors for Temporary Recycling Stations

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Win-Win Cooperation Model

Organizer:
Reduces costs with government subsidies and improves CSR image.

Contractor:
Gets stable projects and expands business coverage.

Society & Environment:
Reduces landfill pollution and promotes recycling.

Low-Cost, High-Efficiency Operation

Local Deployment:
Uses local contractors to cut transportation costs.

Modular Design:
Quick setup for flexible, scalable projects.

Government Support:
Eligible projects can apply for financial/tax incentives.

Environmental & Economic Win-Win

Recycling Material Value:
Sells recycled materials to offset costs.

Externality Benefits:
Lowers social costs from pollution and boosts community sustainability.

Reward Mechanism for Recycling

Smart bins that reward proper recycling with points—making eco-friendly choices

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Step 1: Deposit Recyclables

Users bring recyclables (plastic/**E-Waste**（**High-Risk Items:**）) to AI-powered smart bins

Smart Guidance: Clear on-screen instructions show acceptable materials and preparation tips

Quality Control: Non-recyclables are automatically rejected with helpful feedback

Step 2: AI Sorting & Processing

AI scans items in real-time (95% accuracy)

Instant Analysis: AI cross-checks material type, weight, and shape

Automated Optimization: Compacts high-volume items (like plastic bottles) to **cut transport costs by 30%**.

Benefit: **1.Cost-Efficient** 2.**Zero Errors 3. Instant Sorting 4. Space-Saving**

Step 3: Reward Distribution

Calculated by weight/type/market value

Recycling reward system: Users receive a biodegradable Dao Lang badge upon depositing bottles, combining eco-incentives with cultural appeal.

Benefit: 1. **Fun & fulfilling**. 2.**Time-saving**, 3. **Psychological incentives**, 4.**Eco-friendly appeal**

Theory: Nudge Theory

AI-Powered Recycling Machines for Efficient Waste Processing

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Quantity & Distribution

- **Total: 200-300 bins** recommended, adjusted dynamically based on crowd flow and event type.
- **Distribution**:

Main Stadium: **190-260 bins** (high-density placement at entrances, seating areas, and walkways)

Other Areas (shopping center, fitness areas, etc.): **10-40 bins**

Efficient Recycling: Integrated with Wuhan's waste management platform for better efficiency.

Timely Collection: Regular maintenance and overflow prevention for a better user experience.

Compliance & Sustainability: Meets local regulations, enhancing overall venue management.

Theory: Economic of Scale / Source : Zhang, L., et al. (2022). "AI-Based Waste Sorting: A Review." Journal of Cleaner Production

1. **Professional Collaboration**: Partnerships with industry leaders (e.g., GEM, Brump) ensure cutting-edge recycling technology and efficiency.
2. **Flexible Coverage**: Temporary sites and mobile models (e.g., festivals, community storage) enable agile, wide-reaching operations.
3. **Low-Carbon Solutions**: Solar-powered centers and advanced recovery tech drastically reduce carbon emissions.
4. **High Recovery Rates**: Achieves 85% overall efficiency, with 99.3% metal recovery and 95% plastic-to-fiber conversion.
5. **Cost Optimization**: Modular equipment and specialized teams cut labor/transport costs by 40-60%.

Comparison of New and Old Recycling Models

Comparison Dimension	Old Recycling Model	New Recycling Model (Contractor Cooperation with Temporary Stations)
Contractor	Non-professional teams or individual recyclers, e.g., Dongguan Xiaohuangou (withdrawn from some cities in 2023 due to technical failures).	Leading enterprises: GEM (98% cobalt-nickel recovery), Brunp Recycling (30% market share in power battery recycling), GRINM (98% recovery of platinum group metals).
Typical Location	Fixed recycling centers: Shanghai Yanlongji Waste Glass Recycling Center (50km transport radius). Community collection points: Traditional scrap stations in Beijing (daily recovery less than 1 ton).	Temporary sites: 2024 Aranya Shrimp Music Festival (8.5 tons of plastic bottles collected in 3 days). Community renovation areas: Lin'an "mobile storage instead of warehouses" model (136 towns, 75% recycling volume growth).
Carbon Emissions	High carbon emissions: Traditional incineration (1 ton of plastic incineration emits 3.2 tons of CO). Long-distance transport: Waste metal transport from Shanghai to Jiangsu (average 100 tons CO/month).	Low carbon emissions: GEM Wuhan sorting center (solar-powered, 60% emission reduction). Recycling utilization: GRINM's platinum recovery (1 ton reduces CO emissions by 12 tons).
Recycling Rate	Overall rate 50%: National average waste glass recycling rate only 26%. Low-value materials: Textile waste recovery rate ¡15%.	Overall rate 85%: Brunp's nickel-cobalt-manganese recovery rate 99.3%, lithium recovery rate 90%. High-value utilization: Shanghai Chengsheng's recycled plastic fiber conversion rate 95%.
Cost Structure	Labor cost: 45% (Beijing traditional recycling station training costs $70,000 annually). Transport cost: 40% (Guangzhou to Foshan textile waste transport: $120/ton).	Specialized teams: Lin'an's "mobile storage" model reduced labor costs by 40%. Modular equipment: Smart recycling bins in Hangzhou reduced transport costs by 60%, saving $280,000 annually.

Finance- Cost Breakdown

Fixed Costs 72.68%

AI Recycling Machines: ¥1,000,000
Software Development (AI & Blockchain) ¥100,000
Temporary Recycling Stations ¥600,000
Logistics Equipment (Transport & Storage) ¥400,000
Legal & Compliance ¥200,000

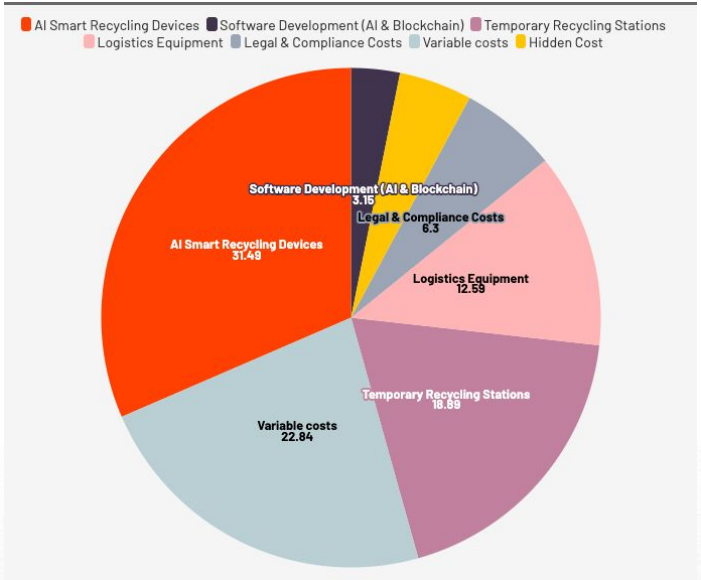
Variable Costs 18.08%

Operation Staff Salaries ¥50,000
Equipment Maintenance ¥500,000
Logistics Transportation ¥75,000
Waste Processing: ¥ 100,000

Hidden Costs 9.35%

Regulationary Risk: ¥ 50,000

User Education & Promotion ¥100,000



3,175,000 RMB
Estimated Total Cost in the first show

Finance- Revenue Stream

Revenue per show

Fundings

Government Subsidy:
￥**50,000**
(Wuhan "Waste-Free City" single-session subsidy)

Sponsorship and advertising:
Companies and brands pay to have their logos and advertisements displayed .

Sponsorship deals contribute **¥500,000** per concert.

Resales

Recycled Material Sales:

The project collects approximately **500** tons of recyclable waste per event. The average selling price for these materials is **¥200** per ton, leading to a total revenue of **¥100,000** (500 tons × ¥200/ton).

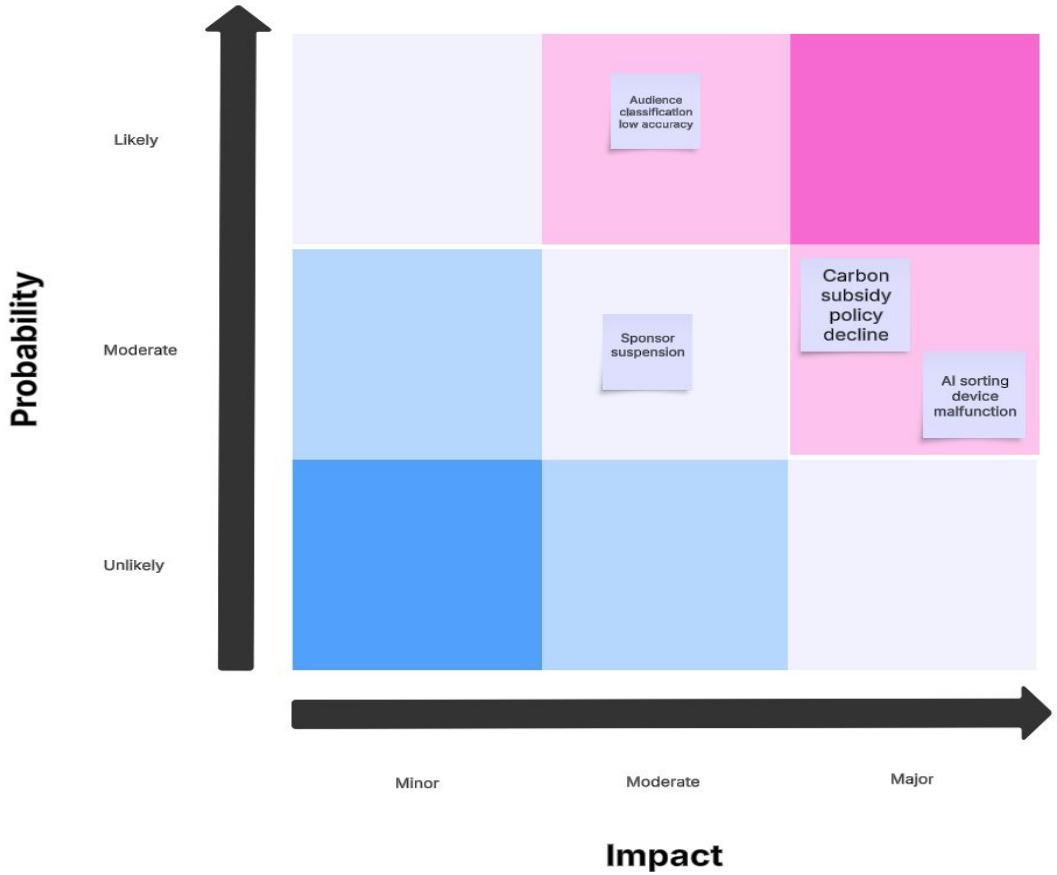
Ticket Share

Ticket Revenue Share
The total ticket sales for each concert are estimated at **¥51,000,000**. The project has negotiated a **5% revenue share** with the event organizers, generating **¥2,550,000** (5% × ¥51,000,000).

3,200,000 RMB
Estimated Revenue RMB in First Show.

ROI in First Show **0.79%**

Risk Analysis



Risk Analysis

Risks	Mitigation
Carbon subsidy policy decline	Signing long-term carbon quota agreements in advance
	Expand other subsidy channels
AI sorting device malfunction	Standby mobile sorting vehicles are deployed on site
	Sign a "4-hour response" maintenance agreement with the equipment manufacturer
Audience classification low accuracy	AI recycling bin real-time error correction
	Increase volunteer guidance
Sponsor suspension	Establish an alternative library of sponsors
	Design a standardized sponsorship package to lower the threshold of cooperation

Key Metrics

Environmental Impact

1. Plastic Reduction Eliminated (kg/event)
2. Carbon Footprint Plastic pollution Emissions Reduction (tons/event)

Economic & Financial

1. Cost Efficiency Waste Management Cost Savings ($/event)
2. Revenue Streams Eco-Sponsorship Revenue ($)

Social & Engagement

1. Audience Participation Awareness Improvement (%)
2. Brand Impact Social Media Mentions (#)

Operational Efficiency

1. Logistics Performance Waste Sorting
2. Accuracy (%) Response & Adaptability
3. Reusable Item Lifespan (uses/item)

Event Contractor

Project stability and business expansion
Revenue from material sales
Advertising revenue from trash bins

Public

Reduce environmental pollution and improve quality of life
Economic incentives and enhanced sense of participation
Promote sustainable lifestyles

Event Organizer

Government subsidies
Ticket revenue sharing
Cost reduction & brand enhancement

Government

Reducing environmental governance costs and alleviating fiscal pressure
Creating green jobs and driving industrial upgrading
Enhancing international image and political capital

Source: China Ministry of Ecology

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Thanks For Your Attention

We Greatly Look Forward to Your Valuable Suggestions!!!

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Business for Good

Appendix 1

Cost Item	Amount (¥)	Calculation Method
Fixed Costs		
AI Recycling Machines (500 units @ ¥2,000/unit)	1,000,000	$500 \times 2,000 = 1,000,000$
Software Development (AI & Blockchain)	100,000	Fixed cost assigned for software development.
Temporary Recycling Stations	600,000	Estimated as 3 stations at ¥200,000 each: $3 \times 200,000 = 600,000$.
Logistics Equipment (Transport & Storage)	400,000	Estimated as 4 units at ¥100,000 each: $4 \times 100,000 = 400,000$.
Legal & Compliance	200,000	Flat fee for legal services and certifications.
Fixed Costs Subtotal	2,300,000	Sum of fixed costs.
Variable Costs		
Staff Salaries (Total for event)	50,000	Total wages for all staff during the event.
Equipment Maintenance (500 units @ ¥1,000/unit)	500,000	$500 \times 1,000 = 500,000$.
Logistics & Transportation (500 tons)	75,000	Estimated based on handling 500 tons of materials.
Waste Processing (500 tons)	100,000	Estimated based on processing 500 tons of waste.
Variable Costs Subtotal	725,000	Sum of variable costs.
Hidden Costs		
Regulatory Risks	50,000	Budget set aside for potential regulatory expenses.
User Education & Marketing	100,000	Budget allocated for promotional activities and user outreach.
Hidden Costs Subtotal	150,000	Sum of hidden costs.
Total Costs	3,175,000	$2,300,000 + 725,000 + 150,000 = 3,175,000$.

Table 1: Cost Breakdown and Calculation Methods

Revenue Source	Amount (¥)	Calculation Method
Government Subsidies	50,000	Fixed subsidy provided by the government for environmental support.
Recycled Material Sales	100,000	Selling 500 tons of recycled material at ¥200 per ton: $500 \times 200 = 100,000$.
Ticket Revenue Share (5% of ¥51,000,000)	2,550,000	Calculated as 5% of total ticket sales: $51,000,000 \times 0.05 = 2,550,000$.
Sponsorship & Advertising	500,000	Revenue from secured sponsorship and advertising deals during the event.
Total Revenue	3,200,000	$50,000+100,000+2,550,000+500,000 = 3,200,000$.

Table 2: Revenue Breakdown and Calculation Methods

The Return on Investment (ROI) is calculated using the following formula:

$$ROI = \frac{\text{Total Revenue} - \text{Total Costs}}{\text{Total Costs}} \times 100\%$$

Substituting the values:

$$ROI = \frac{3,200,000 - 3,175,000}{3,175,000} \times 100\%$$

$$ROI = \frac{25,000}{3,175,000} \times 100\% \approx 0.79\%$$

Thus, the estimated ROI for this project is 0.79%.

Appendix 2

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