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ASSESSMENT 1

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1. Eco-Tiles by EnGreen

EnGreen, a premier energy company aims to develop and seeks out novel and environmentally friendly solutions for energy generation and conservation. The company puts an emphasis on innovative technologies and business models, in strategic advice, organizing, carrying out, and managing energy projects (Engreen, 2023). The main product line for EnGreen has been shown in Fig 1. As per the rise in the demand of community based projects for energy generation, the company aims to launch a new product line for Eco-Tiles. The core technology backing the ‘Eco Tiles’ is based on harnessing energy generated by individuals walking, dancing, or leaping on the tile.

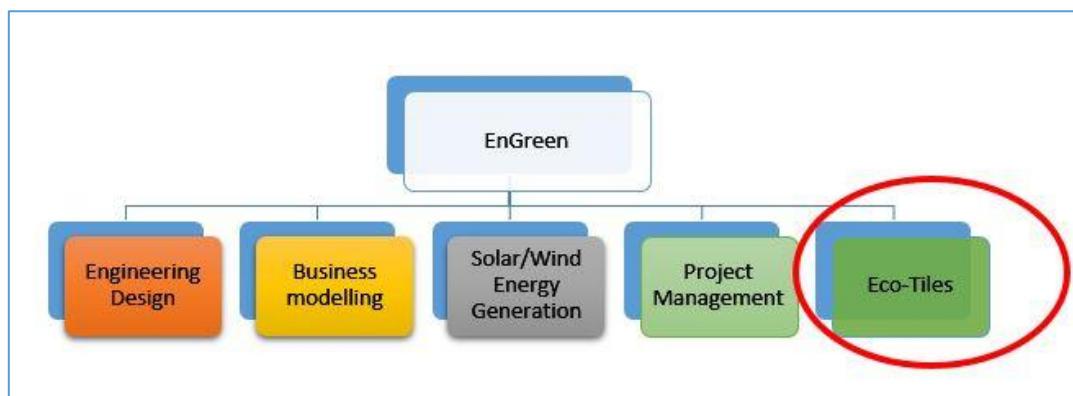


Figure 1: Product Line for EnGreen

1.1 Eco-tiles - The Concept

‘Eco-Tiles’ is a novel and sustainable approach aimed at converting urban landscapes into habitats that are both energy-efficient and environmentally friendly. During the day, these tiles function as pedestrian walkways and blend in perfectly with the current infrastructure. Their unique feature is their capacity to capture the kinetic energy that individuals create when they move throughout the day and transform it into a sustainable source of light at night (Seow *et al.*, 2011).



Pedestrians benefit from Eco Tiles' long-lasting and visually appealing surface during the day. Because they are made of eco-friendly materials, the tiles are safe and long-lasting for public

usage. The internal mechanisms of the tiles cleverly absorb and store the kinetic energy created by the pressure that people walk on them (Moussa et al., 2022).

1.2 Features

Key Features of Eco-tiles are mentioned below:

Sustainable Materials: By using sustainable materials in their construction, Eco Tiles encourage environmentally friendly production and use.

Durability: Made to endure the rigors of foot activity, this feature ensures a long lifespan and minimal upkeep.

Kinetic Energy Harvesting: Using embedded technology, kinetic energy from footsteps is captured and transformed into electrical energy (Moussa et al., 2022).

LED Illumination: The walkways become safe and well-lit at night when embedded LED lights are powered by the stored energy.

Adaptable Style: Comes in a range of patterns and designs that may be adjusted to fit different urban styles (Seow et al., 2011).

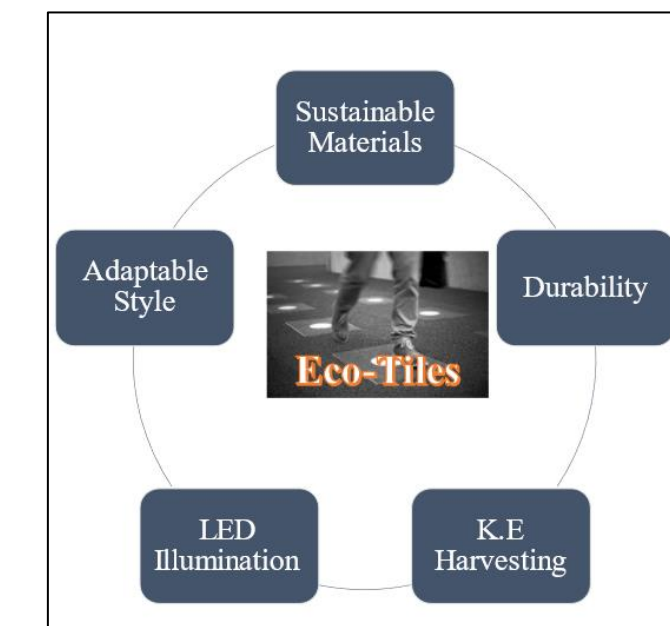


Figure 2 : Main Features of Eco tiles

1.3 Benefits

The key benefits of eco-tiles are discussed below:

Energy Efficiency: Eco Tiles help to reduce traditional energy usage by utilizing kinetic energy, which promotes energy efficiency in metropolitan areas.

Enhanced Safety: By increasing visibility at night, the embedded LED lights improve pedestrian safety and lessen the need for traditional street lighting.

Reduction of Carbon Footprint: In keeping with international efforts for environmental preservation, the sustainable design and energy-harvesting capabilities help to reduce carbon emissions (Seow et al., 2011).

Cost Savings: Because Eco Tiles use a self-sustaining energy source, companies and municipalities enjoy lower electricity expenses related to street lighting.

Community Involvement: Eco Tiles' interactive design encourages community involvement by highlighting the real-world advantages of sustainable technology (Begum et al., 2022).



Figure 3: Main Benefits of Eco Tiles

Eco Tiles are a progressive approach to the expanding demand for environmentally friendly urban infrastructure. Through their smooth integration into everyday life, these tiles not only provide useful routes but also help create a more environmentally friendly and energy-efficient future.

2. Identifying Market Gap

In recent years, the world has observed a concerning surge in the frequency and severity of natural disasters such as hurricanes, wildfires, floods, and droughts. Scientific consensus attributes a substantial portion of these events to global warming, resulting from the accumulation of greenhouse gases in the Earth's atmosphere (Begum et al., 2021). The ramifications extend beyond environmental harm, impacting global economies, communities, and overall human well-being.

To effectively address this crisis, there is a pressing need for scalable and sustainable solutions, such as provided by Eco Tiles that not only mitigate the consequences of global warming but actively contribute to reducing carbon footprints. Innovative solution—Eco Tiles aim to comprehensively tackle this challenge (Sweeney et al., 2020).

Below are the key features of Eco-tiles that would specifically fulfilling the current market demands:

- **Carbon Footprint Reduction:** The manufacturing process of Eco Tiles prioritizes sustainable materials, minimizing the carbon footprint associated with conventional construction materials. The kinetic energy harvested when pedestrians walk on the tiles during the day indirectly reduces energy demand from traditional sources, leading to a decrease in carbon emissions (Sweeney et al., 2020).
- **Renewable Lighting:** Eco Tiles utilize harvested kinetic energy to power LED lights at night, providing an alternative to traditional street lighting and further decreasing reliance on energy derived from fossil fuels (Shuai et al., 2022)

3. Proposed Location

3.1 Justification based on Environmental Conditions

When deciding where to put Eco Tiles sustainable energy option, it's important to take the environment and possible customer demand into account. In this situation, main urban centers in UK in such as London, Birmingham and Manchester with a high population density and a strong sustainability are focused (Ali et al., 2020).

3.2 Environmental Conditions:

Solar Potential: To optimize the performance of the solar-powered components and ensure maximum energy generation from the Eco Tiles, these places receive plenty of sunlight throughout the year.

Foot Traffic: To fully utilize the kinetic energy collecting feature of Eco Tiles and ensure steady energy generation all day, these urban areas with high foot traffic are ideal (Ramakrishna et al., 2014).

3.3 Consumer Demand:

Urban Centers: Because of their higher customer density and growing demand for sustainable solutions, the mentioned urban centers must be targeted. The population in these areas is frequently more ecologically aware and inclined to support and adopt eco-friendly projects (Shuai et al., 2022).

Initiative for Smart Cities: Pay particular attention to above mentioned cities that are actively funding these projects, since these are the ones that are most likely to give sustainable infrastructure top priority and funding (Shuai et al., 2022)

3.4 Global Applicability:

Climate Diversity: Both product design and functionality should be able to adapt to different climates, even when the products were first intended to be used in the selected cities with ideal environmental circumstances. This guarantees worldwide application and permits growth into areas with diverse environmental features (Solaun and Cerdá, 2019)

Cross-Cultural Considerations: Taking into account the local culture's acceptance of sustainable practices. These places offer higher environmental sustainability is highly valued culturally can be an inspiration for international expansion.

4. Legal Entity

Selecting the appropriate legal entity for a business engaged in the production and implementation of innovative sustainable energy solutions is crucial for aligning with global scalability and technological advancement. Opting for a Limited Liability Company (LLC) proves to be a fitting decision for several compelling reasons, which are discussed below

- **Global Operations:** An LLC's flexibility facilitates global operations, enabling seamless adaptation to diverse regulatory environments—a critical aspect for a business aspiring to implement sustainable energy solutions worldwide.
- **Risk Mitigation:** The limited liability structure shields the personal assets of business owners, a particularly significant feature when dealing with pioneering technologies that may pose unforeseen challenges.
- **Management Structure:** The management structure of an LLC offers greater flexibility compared to other business entities, accommodating a decentralized decision-making process suitable for a globally operating business.
- **Investor Appeal:** The flexible structure and limited liability of LLCs make them attractive to investors, easing the process of securing funding for research, development, and expansion into new markets.

5. SWOT Analysis

5.1 Strengths:

Innovative Technology: Eco Tiles inventiveness establishes the company as a leader in sustainable energy solutions, drawing in environmentally conscientious customers and local governments (Solaun and Cerdá,, 2019).

Scalability: The Company can grow internationally thanks to the scalability of both products. The market reach and possible profitability are improved by this scalability (Ali et al., 2020).

Environmental Impact: By providing practical ways to lower carbon footprints, the company directly solves environmental issues. This fits well with the widespread tendency towards sustainable practices.

Adaptability: Eco Tiles capacity to adapt to various climates increases its potential for worldwide applicability, meeting a range of market demands.

5.2 Weakness

Initial Capital Investment: To lessen the financial strain brought on by the first capital investment, look for venture money, government grants, and strategic alliances (Ali et al., 2020).

Dependencies on Technology: Make continuous research and development investments to keep up with technology developments and make sure your products are competitive and relevant in the market.

Public Awareness: Launch aggressive marketing and instructional initiatives to increase public knowledge of the advantages of sustainable energy options, encouraging demand and acceptance.

5.3 Opportunities

Governmental incentives: Take advantage of government grants and incentives for environmentally friendly projects, using clever alliances to get money and support.

Collaborations and Partnerships: Take advantage of the increasing demand for sustainable technologies around the world by carefully entering markets where environmental consciousness is high (Solaun and Cerdá, 2019).

Partnerships & Cooperation: To increase the impact of sustainable energy solutions and expand market access, establish partnerships with technological partners, environmental organizations, and municipalities.

5.4 Threats

Competitive Landscape: Continue to spend in R&D and get patents as necessary to stay ahead of the curve in innovation and preserve a competitive edge (Mohanapriya, 2021).

Economic Downturn: To lessen the effects of economic downturns on the company, diversify your sources of income and create long-term contracts.

Obsolescence of Technology: To maintain products technologically current and prevent them from becoming outdated in the quickly developing sustainable energy market, implement a continuous improvement strategy (Begum et al., 2022).

Global Political Chaos: To provide flexibility in response to shifting geopolitical conditions, diversify operations across politically stable regions and carry out in-depth risk assessments prior to entering new markets (Solaun and Cerdá, 2019).

6. Segmentation and Target Market

6.1 Segmentation:

6.1.1 Segment A: Urban Planners and Municipalities:

Table 1: Segmentation for Urban Planners and Municipalities

<u>Demographic:</u> • Age: 30-60 years of age. • Occupation: Urban planners, city authorities, and civil specialists with something like 5 years of involvement. • Education: Four-year certification or higher in urban preparation, ecological science, or related fields.	<u>Geographic:</u> • Targeting urban regions in created locales focused on maintainable turn of events. Primary focus is on cities in UK such as London, Birmingham and Manchester. • Center around urban communities with a populace of north of 100,000 individuals.
<u>Psychographic:</u> • Values earth cognizant practices and advancement in urban plan. • Effectively associated with nearby local area drives and green tasks. • Looks for arrangements that line up with a drawn-out vision of reasonable urban turn of events.	<u>Behavioral:</u> • Routinely goes to industry meetings and studios on urban preparation and supportability. • Effectively takes part in proficient organizations and affiliations connected with urban turn of events. • Leaders who have the position to impact public ventures and designate spending plans.

Source: Self-created

6.1.2 Commercial Developers:

Table 2: Segmentation for Commercial Developers

<u>Demographic:</u> • Age: 25-55 years of age. • Occupation: Commercial land developers, modelers, and task managers. • Education: Four-year certification or higher in design, structural designing, or a connected field.	<u>Geographic:</u> • Targeting regions with a high grouping of commercial land improvement, including urban and suburban districts. • Zeroing in on locales with a solid accentuation on feasible structure rehearses.
<u>Psychographic:</u> • Values imaginative and tastefully satisfying answers for commercial tasks. • Exhibits a promise to integrating reasonable components into improvements. • Looks for items that improve the general allure and attractiveness of their tasks	<u>Behavioral:</u> • Consistently goes to commercial land exhibitions, career expos, and systems administration occasions. • Effectively follows industry distributions and online discussions connected with maintainable turn of events (Ali et al., 2020). • Chiefs who have the position to choose materials for commercial tasks.

Source: Self-created

6.2 Targeting:

6.2.1 Urban Planners and Municipalities:

- Foster custom fitted showcasing materials featuring the natural advantages of Eco Tiles, accentuating diminished carbon impression and further developed energy efficiency.
- Engage in industry gatherings, courses, and studios went to by urban planners and civil authorities to exhibit Eco Tiles as a state-of-the-art answer for supportable urban plan.

- Use online stages and distributions that take care of urban preparation and metropolitan advancement experts for targeted publicizing and content dissemination (Shuai et al., 2022).

6.2.2 Commercial Developers:

- Accentuate the unmistakable and outwardly lovely parts of Eco Tiles to draw in the consideration of commercial developers.
- Offer contextual analyses and examples of overcoming adversity exhibiting the reconciliation of Eco Tiles in retail shopping centers, parks, and corporate grounds to show down to earth applications (Mohanapriya, 2021).
- Go to commercial land exhibitions and career expos to coordinate with developers, modelers, and task managers, introducing Eco Tiles as an extraordinary and reasonable decision.

6.3 Positioning:

Table 3: Positioning Strategy

Urban Planners and Municipalities:	• Position Eco Tiles as a progressive answer for reasonable urban plan, adding to green drives and lining up with natural objectives. • Feature the cost-efficiency and long-haul advantages of Eco Tiles in making eco-accommodating public spaces that improve the city's image
Commercial Developers:	• Position Eco Tiles as a premium and outwardly staggering course answer for commercial land projects. • Stress the positive effect on corporate branding, client experience, and generally project manageability.

7. Market Entry Strategies

ANSOFF matrix provides various business growth strategies that can be followed based on company's current and forecasted business scenario (Zugay and Zakaria, 2023). There are four growth strategies available to EnGreen for Eco-Tile as detailed in Table 4.

Table 4 : Market Entry Strategies as per ANSOFF

<u><i>Market Penetration:</i></u> • Involves selling more of the existing products to existing customers or finding new customers in the existing market. • Increase sales of existing Eco Tiles by targeting current customers and promoting repeat purchases. • Develop loyalty programs or incentives to encourage existing customers to buy more (Hussain et al., 2013).	<u><i>Market Development:</i></u> • Involves finding and entering new markets with existing products. • Move out into the selected areas where there is a demand for sustainable urban design. • Tailor marketing strategies to introduce Eco Tiles to urban planners and developers in new regions (Zugay and Zakarias, 2023).
<u><i>Product Development:</i></u> • Involves creating and selling new products to existing customers. • Develop new variations or enhancements of Eco Tiles with improved features, durability, or design options. • Introduce these new products to existing customers, emphasizing the added value and innovation.	<u><i>Diversification:</i></u> • Involves entering new markets with new products that may be unrelated to the company's current offerings. • Explore diversification carefully, perhaps by introducing complementary sustainable products. • For example, consider expanding into sustainable outdoor furniture or landscaping solutions (Zugay and Zakaria, 2023).

Source: Self-created

The most suitable strategy is Product Development. Market Penetration is another objective that shall be achieved by EnGreen via launching eco-tile.

7.1 Product Development:

- Venture with the mega urban centers (Parks, Shopping Plazas etc.) in select cities and develop Eco Tiles as a replacement for conventional tiles.
- Develop Eco Tiles for residential buildings.

7.2 Market Penetration

- Offer Eco Tiles at discounted price to penetrate in the market.
- Provide Eco Tiles samples for solar and wind installations carried out by the EnGreen.

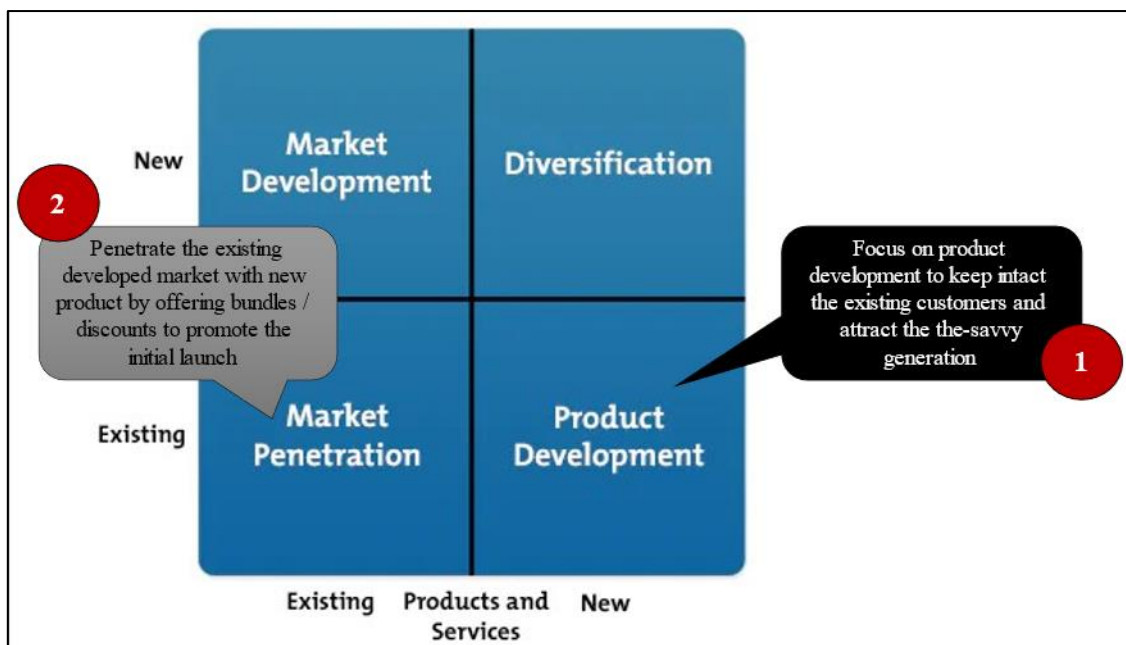


Figure 4 : Selected Marketing Entry Strategy for EnGreen

8. Marketing Strategies (4Ps)

When marketing a good or service, the four Ps—product, pricing, place, and promotion—are the essential components of a "marketing mix." In order to communicate effectively to their target demographic, EnGreen must take into account when developing advertising strategy and plans (Xia, 2023).

8.1 Product Strategy:

Product width is the concept where the company adds a new product line in the existing product range (Staniewski *et al.* 2016). EnGreen is using the product width strategy by adding a new product line with the first product i.e., Eco-Tiles. It is important to focus on the product depth in the later stage as soon as the launch becomes successful. Adding feature changes in the Eco-Tiles such as designs, colors and material upgrade would help the company to expand its product depth.

8.2 Price Strategy

For Eco-tiles, the first mover advantage can be taken and Price Skimming can be adapted where the initial prices are set high and then slowly reduce it, by integrating Peneengreentration Pricing to add more customer base (Hussain *et al.* 2013). Eco-tiles is a high-tech product and a new concept being launched commercially therefore, it is important not to use low pricing strategies to avoid brand dilution.

8.3 Place (Distribution)

EnGreen will focus on using existing distribution channel for Eco-tiles however, for Segment A (Urban Planners and Municipalities), a direct sales forces having expertise in business-to-business and government sales. Direct sales force would focus on providing solutions to the government and business customers.

8.4 Promotion Strategy

Push Strategy shall be focused for Eco-Tiles where the distribution channel and the direct sales teams will be incentivized for selling the product. The product is relatively new in the market and therefore, generating awareness via 360-degree advertising campaigns (Xia, 2023) would enhance the marketing budgets and would add pressure to the profitability of the company.

9. Financial Plan and Funding Requirements

9.1 Capital Requirements and Income Projections

The financial plan basically includes the budget required before the product launch (*Table 5*) and the income forecast for the first three years (*Table 6*).

Table 5 Pre-launch Cost (self-created)

Description of Expenses / Cost	Amount
Product Development Cost	£500,000
Research & Development Cost	£150,000
Pre-Launch Advertising	£50,000
Launch Event	£20,000
Recruitment & Selection Cost	£5,000
Travel and Allowances	£10,000
Launch Project Team Expenditure	£8,000
Misc.	£5,000
Total Pre-launch Cost	£748,000

The above cost mentioned in Table 5 includes the additional cost that is needed by EnGreen to launch the product. The product development cost does not include the product manufacturing cost as the company is focused on outsourcing the manufacturing process to a Chinese company and therefore, this cost includes the stock arrival and maintenance costs. The company (EnGreen) is committed to provide exclusive manufacturing rights to a Chinese company and launch the product in their home country with value added features and brand name. Various resources shall be shared by EnGreen from their existing business operations

however, the table 5 above exclusively shows the costs which are additional to business operations.

Table 6: Forecast Income Statement (Year 1 to 3)

	Year 1	Year 2	Year 3
Revenue			
<i>Segment A</i>	<i>£750,000</i>	<i>£937,500</i>	<i>£1,171,875</i>
<i>Segment B</i>	<i>£487,500</i>	<i>£609,375</i>	<i>£761,719</i>
Total Revenue	£1,237,500	£1,546,875	£1,933,594
Less: Cost of Sales	-£581,625	-£727,031	-£908,789
Gross Profit	£655,875	£819,844	£1,024,805
Expenses			
Sales & Advertising	-£123,750	-£154,688	-£193,359
Administration Expenses	-£24,750	-£30,938	-£38,672
Commission / Payouts	-£160,875	-£201,094	-£251,367
Import / Transportation	-£18,563	-£23,203	-£29,004
Others	-£12,375	-£15,469	-£19,336
Total Expenses	-£340,313	-£425,391	-£531,738
Operating Profit	£315,563	£394,453	£493,066
Less: Taxes	-£63,113	-£78,891	-£98,613
Net Profit	£252,450	£315,563	£394,453

Source: Self-created

9.2 External Funding Sources

Various funding sources are available to meet the required initial capital of £748,000. However, the most suitable for the EnGreen is discussed below:

Debt Financing: The Company can go for the bank loan as it would allow them to pay a pre-decided fixed interest amount and it would be less costly than other source of financing such as Equity financing (Staniewski et al. 2016).

Government Grants and Programs: Department of Energy (DOE) offers a variety of funding programs for sustainable building technologies, including grants for the development and commercialization of innovative paving materials like Eco Tiles.

National Institute of Standards and Technology (NIST) supports research and development in sustainable construction materials, and Eco Tiles could align with their efforts to advance environmentally friendly building practices (Taghizadeh-Hesary and Yoshino, 2020).

10. Conclusion

In conclusion, the cutting-edge sustainable energy solutions—Eco Tiles that have been put out represent revolutionary steps in the fight against environmental problems around the world. Through the use of pedestrian movement energy and the integration of solar panels into urban infrastructure, these solutions provide a concrete route towards decreased carbon emissions and more environmentally friendly energy usage. With an eye on municipalities, eco-aware customers, and urban planners, the company wants to take the lead in the quickly expanding sustainable technology sector. Widespread adoption has a great deal of potential effects, from encouraging smart and sustainable urban development to significantly reducing carbon emissions.

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