ES.GENIUS

ESG Data Collection and Reporting Automation in the Software Entertainment Industry

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Pratt

Design Management

Capstone Project

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Abstract

The software entertainment industry, otherwise known as the video gaming or gaming industry, has seen unique and significant growth from 2019 to present day. The industry saw a massive uptick in users due to the effect of covid 19 quarantines and has not seen a slowdown since. A fast-growing, relatively new industry cemented its influence globally and has now begun to change the way that society socializes and has influenced the way that media is consumed and produced. Because of its relatively short history, many are unaware of the climate impact and sheer amount of energy it takes to produce, host, and play the games that are now a standard form of entertainment for over 3 billion users worldwide.

The difficulty or lack of tracking, reporting, and communicating of ESG data is not something unique to the software entertainment industry. However, the industry's position of influence between tech and manufacturing would make the gaming industry the perfect subject for developing and testing software that could streamline annual reporting and ESG communication using data that is more accessible than other industries with more complex pipelines.

This capstone looks into the relationship between stakeholders in the software entertainment industry and data processes supported by artificial intelligence. AI-assisted collection, generation, and comparison of ESG data across industry stakeholders goes further to ensure accurately reported progress toward a more sustainable, future-proof economy.

Background Information

Industry Background

The software entertainment industry is a fast-growing industry that increases in size and profits every year. It is a $188 billion industry and has grown 26% since 2019 (Browne, 2022). With 3 billion gamers worldwide in 2022 (Clement, 2022), The market has the opportunity for financial growth and social influence as the users are generally relatively young and dedicated to their platforms.

Conglomerates such as Sony, Microsoft, Tencent, and Zenimax have corporate sustainability goals and large incomes from sales. Still, annual reports lack carbon-neutral plans and often leave out the contributions of their acquisitions in appendixes. Companies with the infrastructure and resources of these conglomerates are positioned to set the tone for ESG reporting in an industry as influential as software entertainment. The collection demands in the software industry are less vast than their manufacturing counterparts and, therefore, can serve as a testing ground between manufacturing and distribution for data collection and report automation.

User Statistics and Interview Data

Our team looked into the software entertainment industry to study its impact, awareness, and opportunities for change. For this, we took two approaches. We interviewed game users personally through a survey and interviewed professionals that had worked in the field.

First Set of Survey Interviews

Our team found through interviews that most gamers either don't know or are apathetic toward the climate impact that the software entertainment industry has. Most said they would not give up playing a game simply because it's unsustainable. (see Appendix [p.51])

This lack of concern from users towards the sustainable activities of the game industry has created an industry with no real incentive to adopt sustainable practices due to the cost of setting up sustainable practices and no pressure to instill them in the first place. However, all interviewees were willing to pay roughly 10-15% more per game if it could be proven that the increased cost was due to adopting sustainable and eco-friendly actions.

Second Set of Survey Interviews

We interviewed gamers for our second round of interviews to find their play habits and opinions about the industry. We surveyed ten gamers who spend more than 15 hours a week gaming and five who spend more than 30 hours a week on video games. (see Appendix [p.51])

All ten players said that they do not care whether the game company is environmentally friendly; they are more concerned about the quality of the game and whether it can meet the needs of players. Three players said they had played mini-games related to environmental protection before, but because this game offered an attractive new mode, not because the game concept is environmentally friendly.

Among the respondents, only three players habitually turned off their computers, while the other players chose sleep mode when not using their computers.

Most of the respondents mentioned that most of the time, they only buy digital games and rarely buy CD ROMs. Sometimes CD ROMs are purchased for collection purposes. Finally, we found that most respondents only buy new products when their gaming equipment is damaged,

usually after one year of use. Only one interviewee said he habitually collects game equipment and will buy new products in about two or three months.

Industry Professor Interviews

We conducted interviews with professors from Pratt who either are currently working in the game industry or had previously worked in the game industry. Four interviews were conducted to ask three key questions: How many hours were worked on average? What were the conversations and culture around sustainability within the studios? [Moreover,] where do you [professor] see room for improvement in the industry that needs to be pursued?

Each professional stated that, on average, their work week stayed around 40 hours per week; however, they would shift during crunch time to 50 to 60 hours per week. Additionally, during crunch time, seven-day work weeks were regular occurrences.

Most professors reported that as a studio, there were no sustainability goals or conversations outside of the occasional recycling bin. However, many employees incorporated sustainable practices into their daily lives, such as compost bins, recycling programs, consumption conservation, and water conservation. These topics discussed the workplace but in an informal and social context.

Finally, each professor had a different idea of how the industry could mold into a more influential and/or impactful market. Some of the ideas mentioned were:

- Mid-budget funded games for better market targeting
- Server streaming Program reworks for at-home or hybrid employees.
- Restrictions on monopoly companies that drive AAA games

Research Question

In what ways can sustainability be integrated into the software entertainment industry?

Problem Map

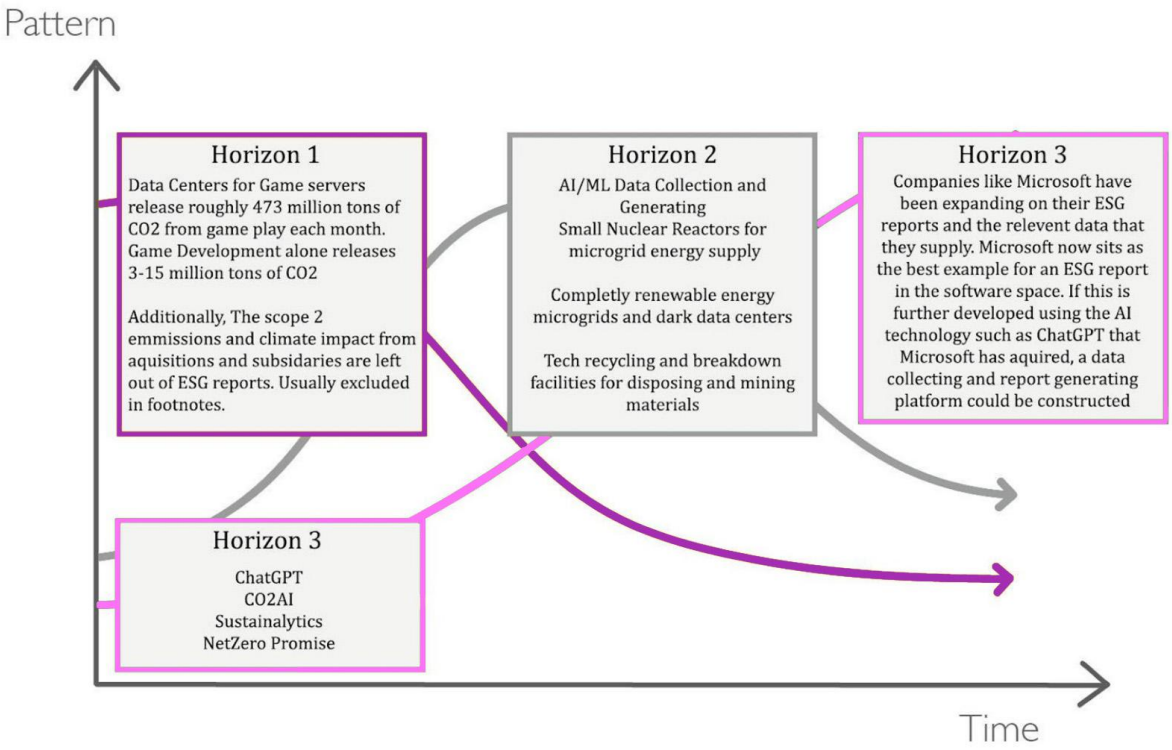
(Forstadt & Doore)

The above map details the ESG reporting issue within the software entertainment industry. The pivotal problem is being influenced both by producers and investors alike. The lack of regulation and communication has caused a gap, and relevant data is not reported due to the lack of pressure and insight from the other's process and expectations.

Problem Statement

In the software entertainment industry, consumers are unaware of the impact that video games can have on the environment and are hesitant to change their gaming habits despite climate change. In addition, producers have little incentive to form more sustainability practices and no forms of accountability for sustainable investment. However, with the influx of exposure and new advances within the software entertainment and tech industry, consumers are becoming more aware of the influence and impact that the gaming industry has. In a very competitive and growing market of gaming, sustainability can bring the competitive advantage that investors are increasingly interested in. Companies need to put much more emphasis on this if they want to grow and thrive.

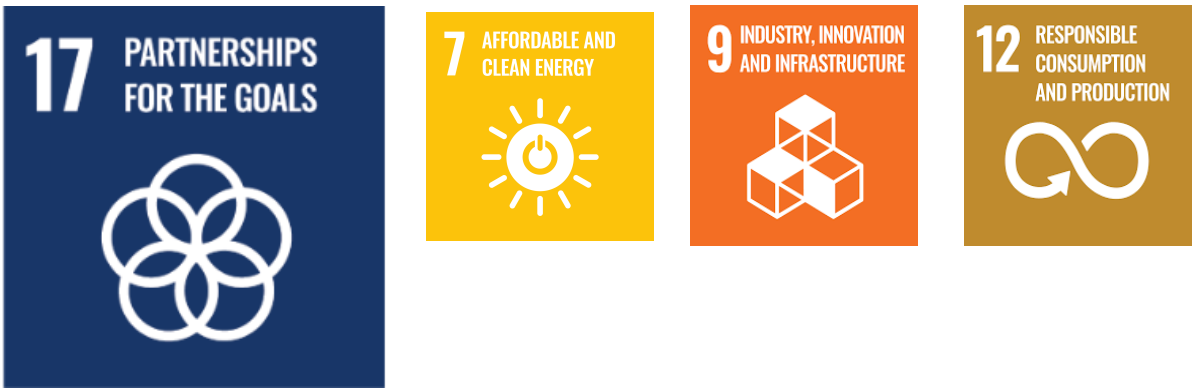
Opportunity Discovery - Three Horizons



(Sharpe, 2022)

The above maps detail the current trends of where the software industry is leading and are then compared to the developing issues and innovations. Data collection and language generation are getting faster and more easily automated with programs like ChatGPT. We looked at Sustainalytics and CO2 AI to see how data collection and prediction were being used with similar programs to see what needed to be done. We also noticed that the communication between the investor and the company was overlooked, creating a blind spot in the reporting structure.

UNSDG Goal and Keypoints



In future innovative designs, we will focus on SDG17, Partnerships for the goals. We will develop systems where goals, targets, and resources can be accounted for and easily shared. We will look from the company's point of view to help the software entertainment industry become more sustainable.

Our overall goal is to drive the sustainable transformation of the entire software entertainment industry, and ESGenius' important performance indicators will include the number of registered companies and investors, the number of sustainability projects posted on the platform, the average ESG rating of companies, and the proportion of high-quality ESG companies, and so on.

In addition, we will focus on UNSDG7 affordable and clean energy, UNSDG9 innovation and infrastructure, and UNSDG12 responsible consumption and production. ESGenius aims to create value for the sustainable development of the software entertainment industry through innovative business forms and services. In addition to enhancing information exchange among industry enterprises, investors, and users, we hope to drive the transformation of enterprises into

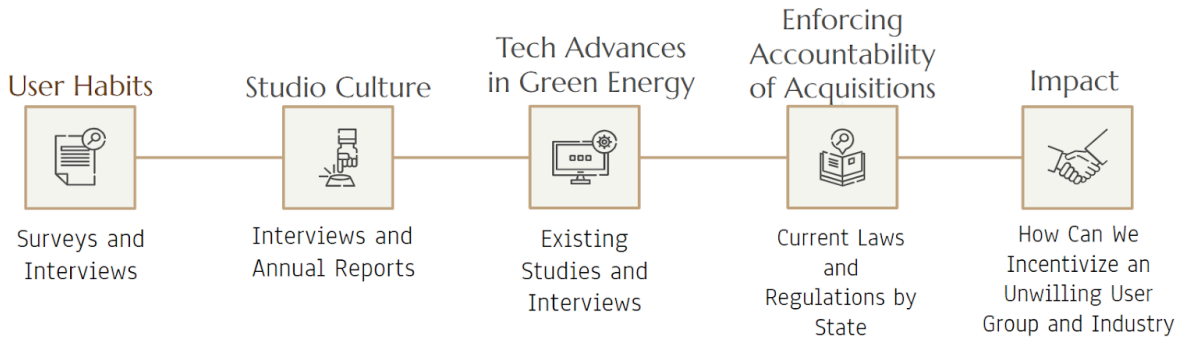
sustainable ones through investment, including the use of clean energy and environmentally sustainable materials for production.

Research Design Method

We are continuing the Discover and Define process with a 4D and TBLD+C approach to give us a general idea of the problem on all sides. Knowing the influences created by the gaming industry will help us define the issue more clearly.

After looking at the problem through TBLD+C, we will begin using a Value Chain Analysis to see what part of the production pipeline can be most easily affected and how that will eventually change the process.

Lastly, we will use The Value Proposition Canvas to illustrate where the most influence lies in the market and what cannot be changed for a company to remain successful.



(Haag, 2022, creating by google slides)

The solution would be delivered through several phases based on the scale and estimated efforts. Through our first research and deep dive phase, we found that the acquired studios are not required to engage in sustainable activities and often do not. We will approach our subjects by showing the added value for the studios and producers. We aim to draw appropriate connections by distinguishing influences for successful studios and sustainability guidance.

Solution Journey

Solution Mapping

(Haag, 2022, created with photoshop)

Our team met to gather what we knew about our problem and list by scope how our solution could have the most influence and effect. We landed on a three-step process that would allow us to effect change at every scope within the production process using an AI Certification and Reporting program in addition to a free tool to aid us with awareness and data collection.

We then restructured our research plan to maximize our impact between the investor and producer. Our next steps were to evaluate what value we could bring to the stakeholders and what that could look like with an AI toolset.

Threat Assessment: Market Breakdown

Scope 1: ESG Reporting

The top three video game producers in the world all have ESG plans for their corporate offices and have stated that they are net zero for cloud servicing by offsetting emissions through carbon credits. This process for obtaining sustainability is not ultimately honest when we look at their subsidiaries and acquisitions, which have no ESG reporting or sustainability initiatives themselves.

Microsoft is one of the largest gaming parent companies in the West. They own Xbox hardware as well as a cluster of 23 studios. Microsoft has an ESG annual report as well as a pledge to reach net zero by 2050. Of their 23 subsidiaries, none have ESG reports or sustainability goals. Microsoft also hosts servers predominantly in Texas and California. Though they are transitioning to carbon zero data centers (Sharma, 2021), most of their data centers remain on traditional energy grids and are offset with carbon credits. (*Greener Datacenters for a Brighter Future: Microsoft's Commitment to Renewable Energy - Microsoft On the Issues*, 2016)

Since 2021, Microsoft's ESG scope 3 report includes subsidiaries except for Zenimax and GitHub, which were acquired last year and are promised to be included in next year's report. We can use Microsoft's ESG report as a ruler for our program in combination with investor measurements. (*2021 Sustainability Report*, 2022)

However, it is stated in their ESG 2021 report that: "For setting organizational boundaries and for corporate reporting of GHG emissions, energy, waste, and water metrics in Tables 1-9 above, Microsoft uses the operational control approach. This includes global wholly-owned and

partially-owned subsidiaries over which Microsoft has management and operational control, including Microsoft-owned and leased real estate facilities.“ (*2021 Sustainability Report*, 2022)

Sony Entertainment is the other large name in the Western video game market. They own PlayStation hardware as well as 21 studios. Sony also has an annual ESG report, but similarly to Microsoft, their subsidiaries and studios do not. The subsidiaries, instead, are listed as a consolidated group referred to in their report known as “the Sony Group.” This includes Sony Corporation and all subsidiaries that Sony Corporation has over 50% ownership of. “The Sony Group”’s scope 3 emissions are listed as an amalgamation and offer little insight into the myriad of industries included in the group. (*Sustainability Report 2022*, 2021) Sony has one location for their servers in San Diego, California. They have pledged to be net zero by 2050 and have detailed their plan with a roadmap since 2010. Although they do not have a renewable cloud service yet, they state that they have eliminated the use of virgin materials, curbing the mining of precious metals for computer systems. (*Sony Group*, n.d.)

Finally, Tencent in the East is the fastest-growing and largest software entertainment company as of this year. Tencent owns Epic Games and Riot Games, two of the most popular producers in the West. Between just the two producers, the company owns 32 studios and 41 servers around the globe. Epic Games has an ESG education program but no annual report. Similarly, Riot Games has no ESG reporting, but they do, however, have a social impact goal. This is most likely a result of their many lawsuits regarding the treatment of their female employees.

Tencent has a limited assurance report developed by PWC in 2021, which concluded that with the limited information at hand, and the site that PWC had visited, Tencent was within the criteria stated. However, the limitations of the report mean that only mainland China wholly

operated centers were included in this report, and a few international data centers that were supplied by Tencent. (*ENVIRONMENTAL, SOCIAL AND GOVERNANCE REPORT 2021*, 2022)

Scope 2: Reusable Energy

According to the research, there are significant energy concerns affecting the gaming industry. The creation, testing, maintenance, and design of video games all use a significant amount of electricity. Additionally, exceptional power must be consumed for the server to function normally. One of the most crucial methods to lessen the carbon footprint of the video game industry will be to encourage game studios to use renewable energy and change the way energy is used.

Energy Use in Gaming Industry

(based on average hours played, system users, and system kwh data)(see appendix pg 59)

Players Globally

- *3.24 billion gamers globally*
- *1.7 billion PC users*
- *254 million console users*

Per Week Energy Use from Play Time

- *PC* *4.3 Trillion kwh*
- *Console* *197.8 Billion kwh*

Emissions

- 1.9 billion metric tons of CO2 are released from PC players globally
- 85.6 million metric tons of CO2 are released from console players globally
- 32,445 Tons of COs were Released from Free Game Downloads.

Scope 2: Discrimination and Studio Culture

The gaming industry is developing rapidly, and game users are also growing. With the diversification of game types and channels, various regulations can no longer protect the rights and interests of players and businesses. Managers need to revise or add regulations through market supervision, user feedback, etc., to ensure the healthy and sustainable development of the game industry.

The software entertainment industry is a predominantly male-centered industry with very few developers of color, according to a recent study by Zippia. This has manifested in several key lawsuits, including one of the largest game developers, Riot Games.

In 2018 a class action lawsuit was filed by Melanie McCracken and Jess Negrón for alleged “gender discrimination as well as sexual harassment and misconduct at Riot Games”(Washington Post). Riot Games soon after agreed to a $10 million settlement but was then counter-sued by The California DFEH for insufficient compensation. The California DFEH sued on behalf of 2,300 women who had also experienced sexual harassment and discrimination during their time at Riot Games. Riot Games settled at $100 million compensation. $80 million would be dispersed to the members of the class-action lawsuit, and the remaining $20 million would go towards the plaintiff’s legal fees. (Liao, 2021)

Discrimination isn’t just seen in Riot Games. The theme of sexual harassment and discrimination is seen in Blizzard Activision three years after the Riot Games lawsuit. It details a similar culture of sexual harassment, promotion discrimination, and inappropriate behavior among management towards women within the company, specifically women of color. According to an NP report, “Some of the women who came forward with complaints of discrimination or harassment faced involuntary transfers, were selected for layoffs, or were denied certain opportunities.” (Hernandez, 2021)

Scope 3: Production and Distribution

When we think from a game studio's perspective, game developers always require the latest technology and upgrades to their IT equipment to make sure all of the software needed to create their games run effectively. Computer components such as CPUs, graphics cards, and memory units quickly become obsolete and must be updated regularly. While displays, keyboards, and mouses may also need to be changed, it is generally not as often.

A gaming computer needs between 300 and 500 kwh to run, which is about 10 times as much power as 10 game consoles or 6 computers. (Strydom, 2023)

Of all games, cloud games are particularly energy intensive, increasing the total power consumption of desktop computers by 60% and laptops by 300%. But one gaming researcher found through experiments that by simply changing the graphics card and power unit, his team could reduce energy consumption by 30 to 50 % without slowing down the game's performance (Peddie & Pollak, 2019). Because of the power needed for these computers to run, parts such as graphics cards, CPU boxes, and fans need to be replaced often. Their construction makes it difficult to recycle as these parts consist of plastic, metal, and rare minerals to function, making it difficult to properly recycle on a large scale.

In addition, Researchers analyzed the chemical composition of the PS4 processor unit and found that it includes toxic heavy metals, such as chromium and lead. However, these metals are difficult to extract and purify in the composite structure of the sealed unit, so the console is difficult to recycle. And, with a new generation of consoles released every 5 to 10 years, planned obsolescence has increased the global e-waste problem, generating 50 million metric tons per year (Asher et al., 2022). Currently, most of the e-waste ends up in landfills because many companies don’t know how to correctly recycle outdated hardware. If these toxic elements come

out of landfills, for example, by leaching into groundwater, they can pose a danger to humans and wildlife.

Opportunity Assessment: Market Breakdown

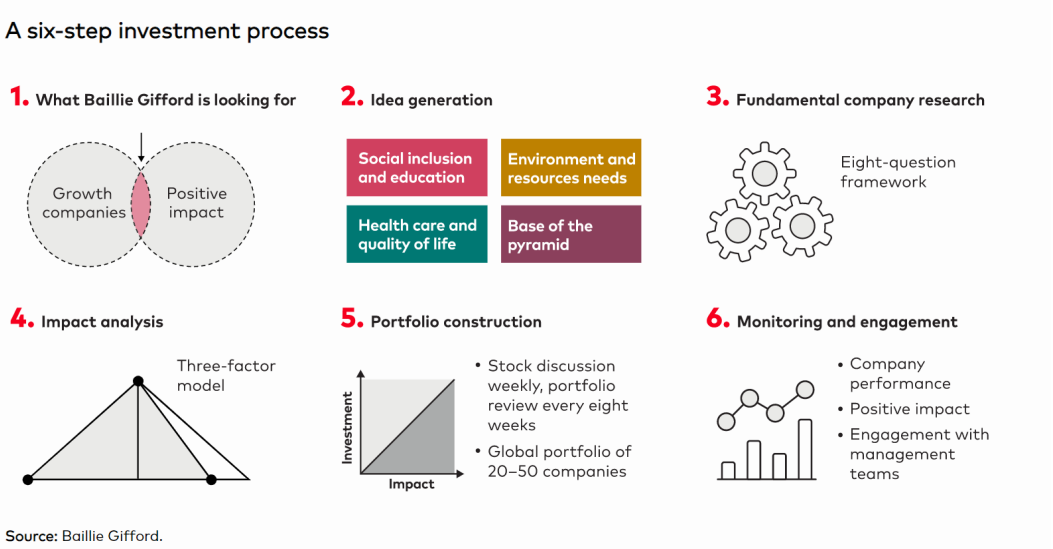
Scope 1: Investors

We looked into the top investors for three of the largest software entertainment producers in the world; the result was four prominent names: Vanguard, Blackrock, State Street Global Advisors, Primecap Management Co., and Prosus. The first four companies listed owned no more than 3% in each of the companies they invested in; (*Microsoft Corporation (MSFT) Stock Major Holders*, n.d.) (*Sony Group Corporation (SONY) Stock Major Holders*, n.d.) Prosus, an investment company listed by Naspers in the Netherlands, currently has a 28.9% share of China's largest Game and internet company, Tencent. (*Prosus Sells 2% of Tencent for $14.7 Billion in World's Largest Block Trade*, 2021)

Blackrock's sustainability investment process contains primarily qualitative qualities assessed through interviews and research on previous initiatives in their potential investments. Their three categories are investment process, material insights, and transparency. Each category includes its own processes for data collection and risk assessment. Blackrock also uses its project management program, Aladdin, to collect 3rd party data from companies they invest in who also use the Aladdin tool. (*BlackRock ESG Integration Statement*, 2018)

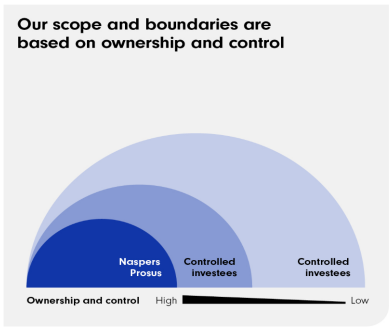
Vanguard’s Investment process is more quantitative than Blackrock’s and includes research from experts in the ESG field. This six-step process allows them to filter their

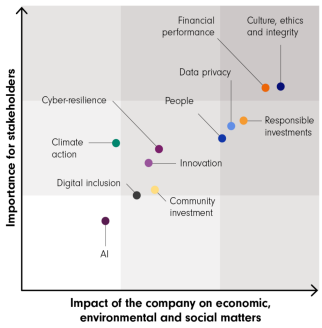
investments and assess how they hold up competitively amongst other companies within their area. (*Investing for Long-Term Growth and Positive Impact*, 2022)



(Vanguard,2022)

Finally, Prosus' process for ESG measuring is more fluid and does not have the structure that Blackrock's and Vanguard's have. Though this does not indicate that it is ineffective, it makes it difficult to communicate with their shareholders or potential companies interested in working with Prosus.





(Prosus,2022)

Scope 2: Reusable Energy

The United States is a resource-rich country with abundant renewable energy resources. The amount of electricity available is 100 times the national annual electricity demand (*What Are the Major Sources and Users of Energy in the United States?*, n.d.). By 2022, solar and wind are expected to add more than 60% of utility-scale power generation to the U.S. grid. The most troublesome environmental problem in the software entertainment industry is the consumption and waste of electricity. In 2020, gaming in the U.S. consumed 34 terawatt-hours of energy annually, the equivalent of 5 million cars (de Zwart, 2022). Data for game development was collected from Nintendo, Microsoft, and Ubisoft; each company produces 1 to 5 tons of carbon dioxide per employee per year. In addition, total emissions are increasing (de Zwart, 2022).

The game industry is also facing substantial energy challenges. Game design, development, testing, maintenance, etc., all require a significant amount of electricity. In addition, the game server's operation also consumes a considerable amount of power. If driving game studios could switch to using predominantly clean energy, it would transform how energy is utilized and would be one of the most important ways to reduce the carbon footprint of the software entertainment industry.

Microgrids are an excellent option for energy autonomy and sustainable practices. Localized grids called microgrids can operate independently by cutting their connections to the primary, city-owned grid. Microgrids can increase resilience, reduce disturbances, and serve as a resource for quicker system response and recovery. They can run even when the city-owned grid is down. Microgrids provide a flexible and effective electric grid by facilitating the integration of expanding installations of distributed energy resources, such as renewables like solar. Utilizing local energy resources to meet local demand also reduces energy losses during transmission and

distribution, further boosting the effectiveness of the electric delivery system (*The Role of Microgrids in Helping to Advance the Nation's Energy System*, n.d.).

According to the survey, there are significant differences in the penetration rate of microgrid power supply in different building types. Most microgrid-powered buildings are K-12 schools, wound facilities, and warehouses/storage (*Commercial Buildings and Onsite Renewable Energy | ENERGY STAR*, n.d.). We can find a way to drive more game studios to use microgrids for power and reduce carbon emissions.

Scope 3: Production and Distribution

Assisting game studios in properly recycling their old electronics and gaming systems to prevent the spread of dangerous compounds that pollute water and air is crucial in the sustainable development of the software entertainment industry. Certified e-waste firms, such as TechWaste Recycling, make it simple for businesses to discard obsolete devices and ensure that all e-waste is recycled responsibly. TechWaste Recycling directly serves all of Southern California and offers pickup services nationwide.

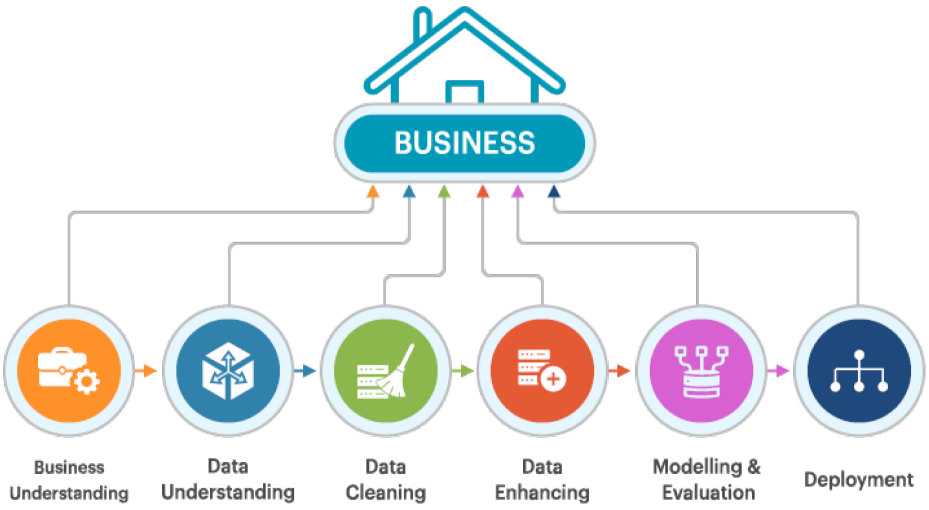
For example, the world's leading graphics card supplier Nvidia is committed to keeping technology products out of landfills. 100% of the technology acquired by NVIDIA employees is reused or recycled through certified e-waste suppliers. The metals, components, and plastics in this computer hardware can often be reused in future products (NVIDIA Corporation, 2022).

For companies to manage unwanted old electronics, there are now two accepted certification standards: R2 and e-Stewards® in the United States. Also, The ANSI-ASQ National Accreditation Board (ANAB), the United States accrediting agency for certifying organizations, keeps a current list of which accrediting bodies have been accredited to which standards.

AI/ML vs. Rule-Based

AI/ ML - Artificial Intelligence (AI) and Machine Learning (ML).

Artificial intelligence (AI) helps companies with repetitive and time-consuming tasks by building models. ML is an application of AI. Machine learning aims to discover patterns in a data set and then make predictions based on the findings to improve existing business services and help solve problems. There are five main tasks: Get Data, Clean/ Prepare Data, Train Model, Test Model, and Improve.



For game studios, AI/ML applications can measure ESG factors and evaluate a company's performance, such as how much energy is consumed in development and how much waste is produced by a company. It can then predict future water usage and create a plan to enhance system functionality and reduce costs.

Rule-Based System

Rule-based systems are easier to create, modify and maintain than machine learning systems. This system only requires a business analyst or IT professional to store the rules in a

database and be able to modify the rules at any time without any programming. Rule-based systems use an **if-this-then-that** structure to take information, process it, and develop a result by:

- Setting up data or new business requirements
- Analyzing data rules
- Following-up actions

In order to help game studios get ESG ratings and certifications, the studio can collect specific standards to measure the outcomes. For example, an "ideal" carbon footprint is anywhere from 6,000 to 22,000 pounds per year (JustGreen Lifestyle Blogs, 2013). When the system receives a report from a game studio, the system can use a simple rule like "If the carbon footprint is less than or equal to 22,000 and greater than or equal to 0 annually". After measuring all the factors, the studios will get a generated ESG rating. Based on the rating, investors can start to assess companies based on how they handle sustainability issues.

Positive AI Emission Software and Solution Examples

We found some companies providing AI solutions that measure carbon emissions and suggest recommendations to other companies willing to substitute current actions for sustainable expectations from investors, employees, and customers.

Of course, major companies such as AWS from Amazon, Google Cloud, and Azure from Microsoft have been offering carbon-emissions-tracking tools for free for their customer companies to track and forecast carbon emissions from their cloud system. Amazon announced that the tools are following Greenhouse Gas (GHG) Protocol standards and helping customers to estimate emissions based on where they are and the share of green electricity powering the data centers they are using. (Amazon, n.d.) Among the companies providing their AI solutions for measuring carbon emissions are

Case 1. Gravity

Gravity Climate aims to help customers set carbon management goals and identify emission reduction opportunities while maximizing ROI and operational efficiency.

Case 2. Cirrus Nexus

TrueCarbon helps customers gauge their carbon emissions and meet targets around emissions reduction based on the AI technology which comes from client-use patterns and the energy-consumption trends of data centers. (Bhattacharyya, 2022)

Case 3. BCG CO2 AI

An AI-powered solution to help corporations measure accurately, simulate, track, and optimize their emissions. Their solution leverages deep learning and graph theory to increase accuracy and support decision-making. (Minevich, 2021)

Case 4. Watershed

Watershed aims to accelerate the adoption of large-scale, clean, renewable energy and power desalination. The company uses AI to analyze emissions with granular data on specific suppliers. (Minevich, 2021)

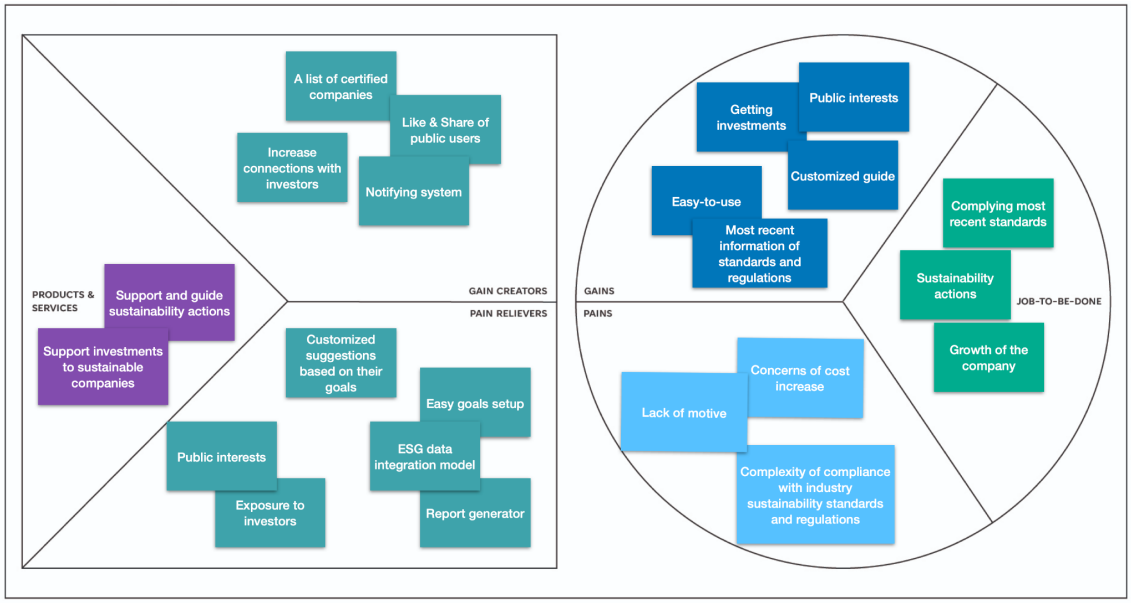
Case 5. Tomorrow

Danish-based Tomorrow is a technology startup that uses data and machine learning to automatically quantify the climate impact of our daily actions. Tomorrow was founded in 2016 by data scientists, machine learning engineers, and climate change experts to automate carbon accounting and enable large-scale environmental activism. (Minevich, 2021)

Case 6. CodeCarbon

CodeCarbon is a software package that seamlessly integrates into the Python codebase. It estimates carbon emissions produced by resources used to execute the code and shows how to lessen emissions by optimizing their code or by hosting their cloud infrastructure in geographical regions that use renewable energy sources.

Value Proposition



(Thomson, 2019)

We aim to encourage companies to implement sustainability actions by connecting them with investors and supplying a platform to the public users interested in investing in sustainable gaming companies. To support both company interest in sustainability as well as company sales, we will encourage public engagement by updating our platform with relevant news, company reports, and special partnership releases that incentivize users and producers alike to interact in a sustainability-centered digital space. Companies will also be able to connect with investors that are looking to strengthen their portfolio with sustainable organizations. Through our platform, companies will be able to generate and send annual and quarterly ESG reports through our blockchain-encrypted program. We will assist companies and investors with our customized notification system that also suggests proper activities based on their initial set-up goals. Companies will build their own sustainability goals with our setup process, generate their report according to the most recent standards and regulations with the ESG data integration model, and publish their progress for investors and users alike.

Prototype

The Design

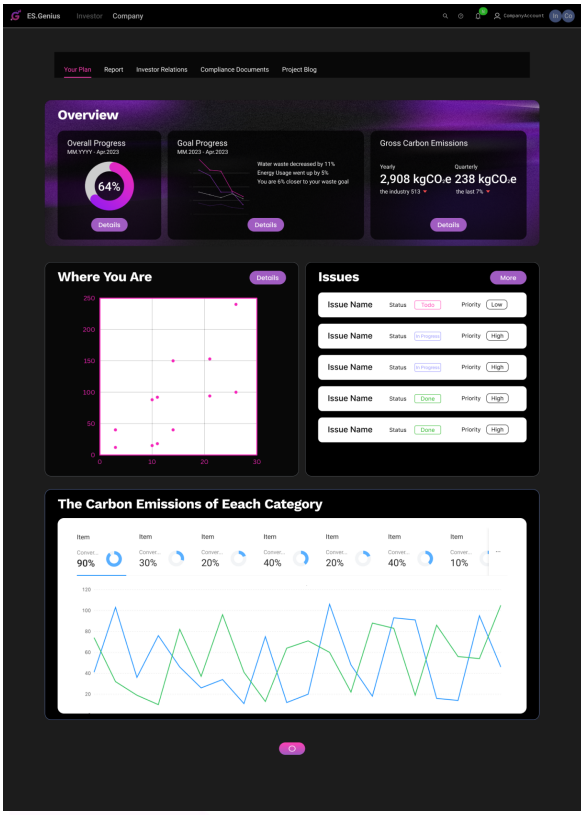
(Haag, 2023, creating by photoshop)

ES.Genius is an AI-driven ESG tracking and report-generating program concept with online published results and communication. ES.Genius would make it easier for a company to track, plan, and publish ESG reports for investors and consumers alike. with ES.Genius, a company would be able to connect information about subsidiaries, network with sustainable investors, and update consumers on NetZero plans and projects.

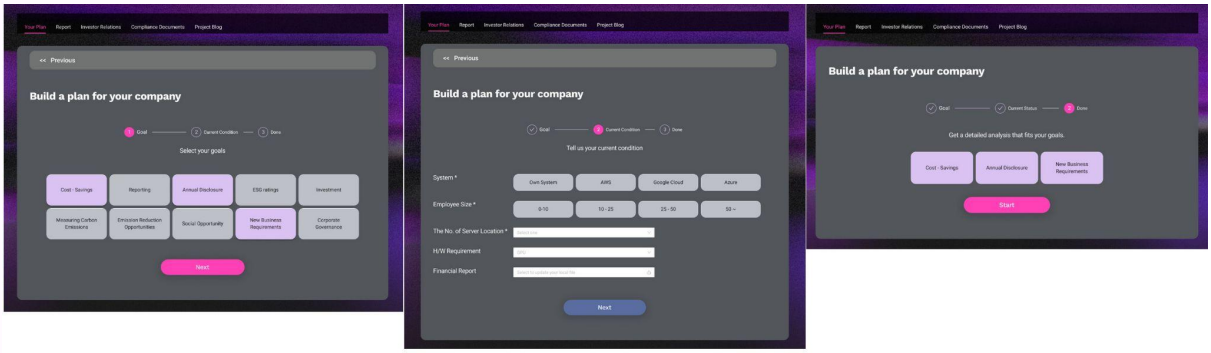
Program Design

Companies

Beyond a seal or attestation certificate, sustainable company certification offers other advantages. The procedure turns into a tool intended to build a more resilient organization. A company's sustainability accreditation is more than just a seal of approval. A commitment to organizational change is what counts. These ESG activities go beyond one-off tactics to cover social and environmental initiatives. Sustainability can help businesses cut costs, increase sales, and give them a fresh edge over rivals. We will support our customers to get certified around ESG by partnering with several institutions, such as B Lab, LEED, and others. Companies will manage their sustainability activities through our platform and get recommendations enhancing ESG efforts based on our AI technology which measures accurately, simulates, tracks, and optimizes their emissions.



(Jeon & Zhao, 2023, creating by Figma)



Company Page Features

- Sustainability Goals Setup : We designed an easy setup process which not only helps companies set up their sustainability goals step by step but also leads companies through sustainability action plans. After the initial registration and sustainability goal setting, companies will have opportunities to connect with investors and get further suggestions on how to achieve green efficiency.
- Reports : Our customer companies are able to generate sustainability reports in an easy way through our system on their private page. This will be informed by our various tracking tools that will collect data from connected program accounts such as Oracle, Intuit, and ADP
- Investor Relations : Companies can communicate with investors and manage reports through our program.
- Notifying System : Companies can generate reports and manage compliance documents as soon as they become our customers. Our tracking tool will also notify our clients any updates that require direct attention or any updates that can be publish to their company page.

Investors

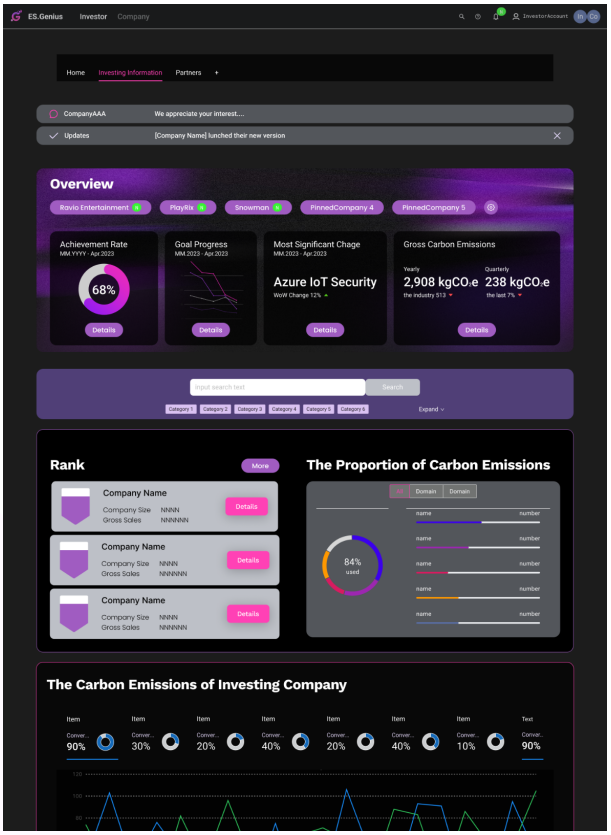
We aim to help investors connect with appropriate companies with long-term sustainability approaches. Throughout our platform, investors are able to follow companies that they are interested in and get updated information promptly in an intuitive way. The investor page would be how companies and financial stakeholders could request information from companies, track project progress from key accounts, and have risk assessments automated based on the data from the companies within the portfolio.

Investor Page Features

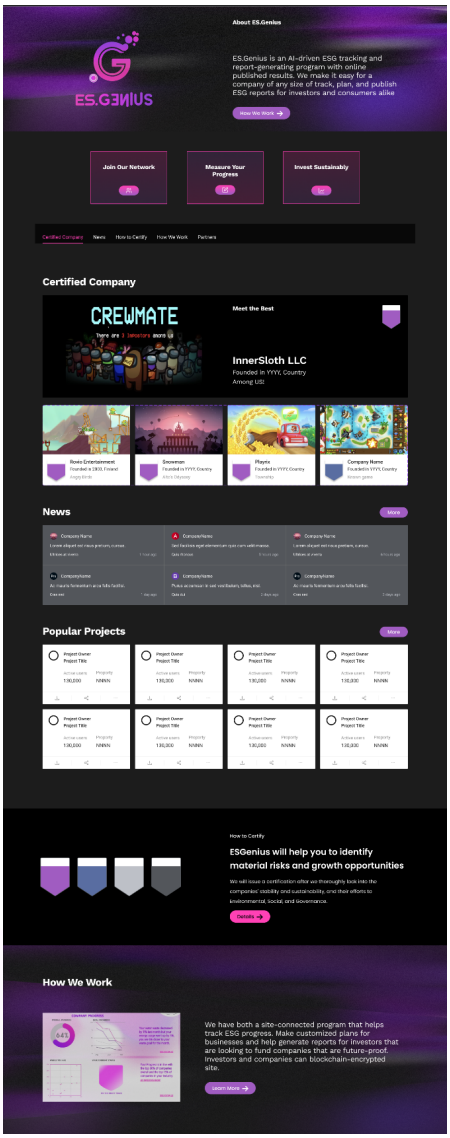
- Pin companies : Investors can follow all recent information of interested companies on their private page just by pinning companies.
- Search : We will support users to find interesting companies and news in the gaming industry
- Messages : We aim to motivate companies by connecting with investors so we will support their direct communications to share specific information.

Understandable Information to public

Our public site will serve as a news and tool library to translate certification standards and progress into simple terms to help inform consumers within the industry. Our site will host project updates, free-to-use tools, and a library of studios and companies that have been certified through our platform.



(Jeon & Zhao, 2023, creating by Figma)



Free User Tools

In addition to corporate sustainability assessments, some websites, such as NetZero, can use formulas to calculate personal carbon emissions. In subsequent research and innovation, we will devote ourselves to strengthening the connection between technology and target users, enhancing user education and participation, and raising sustainability awareness.

Sustainability Goals Setup

We aim to help customers set their sustainability goals to not only identify opportunities around sustainability goals but also connect with investors looking for appropriate companies while maximizing operational efficiency. We will provide our own setup process for our customers to find their goals in an easy way and help them approach their goals based on our analysis with AI technology.

Public Page Features

- Sustainability goals setup : We designed an easy setup process which not only helps companies set up their sustainability goals step by step but also lead companies to sustainability actions. After setting goals and being our customer, companies will have opportunities to connect with investors and get further suggestions in sustainable aspects around the gaming industry.

- Reports : Our customer companies are able to generate sustainability reports in an easy way through our system on their private page.
- Investor relations : Companies can communicate with investors and manage through our program.
- Notifying system : Companies can generate reports and manage compliance documents as soon as they become our customers. To lead our customers feeling comfortable with sustainable actions that we support, we will notify them as a to-do list.

The Structure

Data Model

This is the visual representation of our data model, a list of programs and input options that will provide the data points we will use to inform our AI engine. We are using PWC's ESG auditing structure; Blackrock, Vanguard, and Prosus Sustainability investment requirements; and Sustainalytics data point statistics to inform our model and program base. Each dot represents a category for the sustainability certification. Each square represents internal and external sources that will be used to inform the category. (See Appendix pg 56-58)

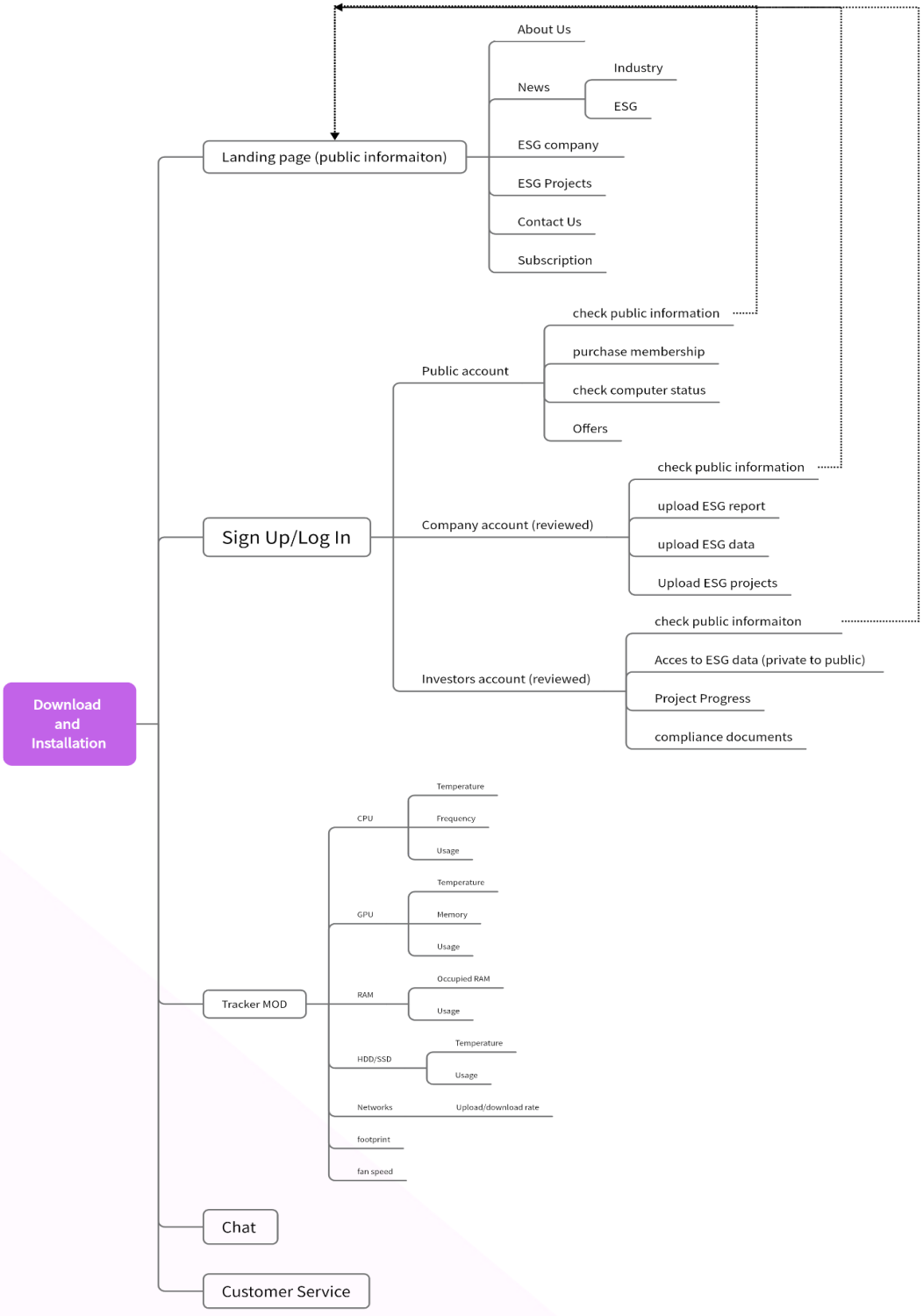
(Haag,2023, created in photoshop)

Our model would pull data from connected human capital, accounting, and project management Saas programs in order to inform our ESG Audit Report Generation and tracking tools. Most competitive ESG tracking and rating tools on the market either use only external data to inform their ratings or they use limited internal dat to inform energy use and emissions only. Our program would use a combination of internal and external data in order to get a full view of a company's ESG progress and standing.

For example, one of the 39 categories that we analyze in our AI assisted audit is workplace diversity. Our internal data collection for this would be ADP. using ADP, we can pull information of each employee's demographic. In addition to the internal data, the code would collect external data through LinkedIn. By using more than one data point for each category, both internally and externally, we get a better picture of how a company operates.

The program would be written with a combination of both AI SQL language and Rule-Based Python language. Rule-based coding would be ideal for the quantitative data that we would need to collect such as energy used, water used, demographic populations and competitive salaries. Alternatively, AI is best suited for collecting and comparing qualitative data and would therefore be used for the more difficult to define measurements such as Health and Safety and

Functional Structure Diagram



(Zhao, 2023, created in BoardMix)

As shown in the diagram, when users open the ESGenius software, they will enter our landing page, where they can view some basic information on the platform, such as relevant news, ESG company introductions, and ESG projects. To use our features, users need to register. Public users, corporate users, and investor users will register separately and use different categories of services after registration.

The Strategy

Business Model

Our main profit methods are mainly user membership. The membership is scaled by company and investor size. For companies and investors with over 1,000 employees or portfolios of over 200 invested companies, an advisor would be assigned to help manage subsidiary data and portfolio tracking.

Stakeholder Analysis and Identified Partners

Our primary stakeholders are individual users, gaming industry companies, and investors within the gaming industry, as well as investors in ESGenius. Our platform not only serves as an information bridge for the public, gaming companies, and investors in the gaming industry but also contributes to the sustainable development of the gaming industry. In addition, our robust business model will generate profits for ESGenius' investors.

Public Users：

Our platform warmly welcomes all members of the public who are interested in the gaming industry. With a simple and easy-to-use interface, public users can access our extensive

library and free toolkit without the need for an account. Stay up to date with the latest industry news, dive into ESG reports, and check out ratings of game companies all in one convenient location.

Our first tool is designed to provide computer data tracking services, which will be an invaluable resource for those concerned about their environmental impact. Users can monitor their computer's temperature, fan speed, RAM status, and estimated carbon emissions through our user-friendly software. This will allow users to make informed decisions about their energy consumption and take steps towards a more sustainable computing lifestyle. Join us on our mission to promote environmentally responsible gaming practices and help build a better world for all. We aim to provide users with an easy-to-use tool through our platform while also increasing their awareness of the sustainability of the gaming industry.

Company:

Our platform offers the option for companies and studios to register as enterprise accounts, requiring submission of certain verification materials. Once verified, these enterprises can independently upload their ESG reports and data, which will be evaluated and rated by our system. Companies with higher ESG ratings will receive greater exposure, including more contacts with individual users and promotion on the investor interface.

Through our platform, companies and studios can better showcase their sustainable development projects, increase transparency, and attract more investments and users. We believe this will help drive the sustainable development of the gaming industry, while also meeting the demand of investors for ESG factors.

Investors registering on ESGenius:

Investors, whether investing in companies or as individuals, have the option to register their account as an investor on our platform. Similar to enterprise accounts, investors are required to submit verification materials for identity authentication. Once approved, investor accounts will have the ability to request and view ESG projects and data from game companies.

Through ESGenius, investors can learn about high-quality sustainable development projects and make environmentally conscious investments. Our platform offers a bridge for investors to gain

access to valuable ESG information and resources, promoting greater awareness and investment in sustainable gaming practices.

Investors of ESGenius:

As investors in the platform, they will receive reasonable returns through investing in ESGenius. According to industry research, the software entertainment industry is booming and profits are increasing year by year. At the same time, the trend towards sustainable development is becoming increasingly apparent. In the context of industry development, we believe that ESGenius has reliable revenue prospects, and investors can profit from our platform's long-term and sustainable business model.

Gaming Industry:

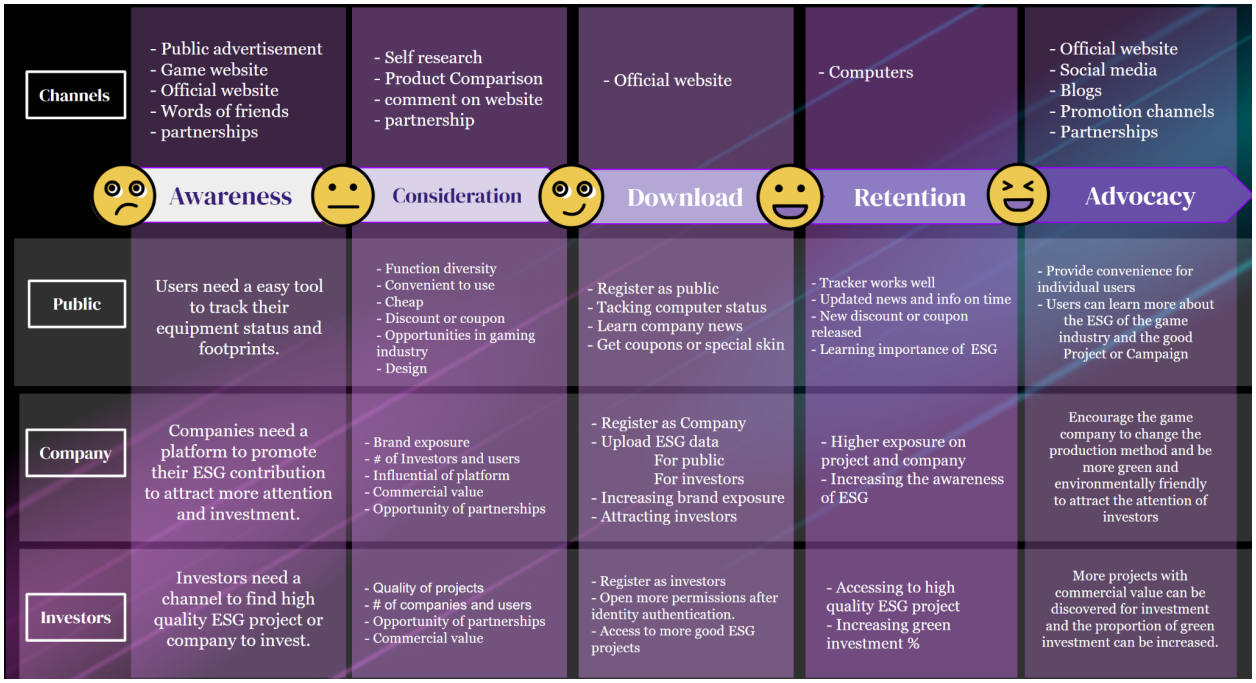
Our platform will provide opportunities for three-party users in the game industry to communicate and link. Individual users can understand the importance of sustainable development in the game industry and, at the same time, monitor their carbon footprint. Investors can discover more sustainable companies and projects to invest in, which also provides an impetus for companies to improve their sustainability data to promote the sustainable development of the entire game industry.

Identified Partners:

In the early stage of the project, we will be committed to finding reliable investor partners to encourage companies in the industry to register and promote on the platform. We will give priority to investors who are interested in investing in sustainable development and ESG projects. Possible partners are as follows:

- Vanguard
- EY
- Capital Group
- Blackrock
- Oracle
- Intuit
- ADP
- Netsuite
- Salesforce
- Microsoft Teams
- Google suite

User Journey



(Zhao, 2023, creating by google slides)

TBLD+C Analysis

Environment:

- Encouraging businesses to use clean energy to become more sustainable
- Provide more exposure for projects related to environmental protection
- Improve sustainability awareness by tracking users' carbon footprints

Social:

- Provide a platform for information exchange among game industry stakeholders.
- Build a unique community in the games industry to spread the word about the importance of sustainability.

Economy:

- Encourage investors to find more companies with ESG certification for investment.
- Encourage investors to participate in sustainable development-related projects to improve the sustainability of the game industry.

Culture:

Users can understand the importance of sustainable development by viewing corporate ESG ratings, ESG-related project promotions, and browsing game industry news. Through the influence of the platform and the participation of more investors, more companies will devote themselves to improving ESG data and transforming into sustainable companies.

SWOT Analysis

Strength

- The uniqueness and connectivity of the software can provide users with a platform for information exchange.
- Complete functions: ESGenius can provide users with various services according to their identity.
- Easy to use: just download from the official website, install, and use without taking up too much memory and CPU
- Safe and stable: We have a complete privacy policy. Whether it is an individual user, a company user or an investor, the information will be properly protected.

Weakness

- Requires a large amount of investment to ensure stable operation and management
- Need to go through multiple layers of testing to ensure the operation of the function.
- Need publicity to increase the number of users

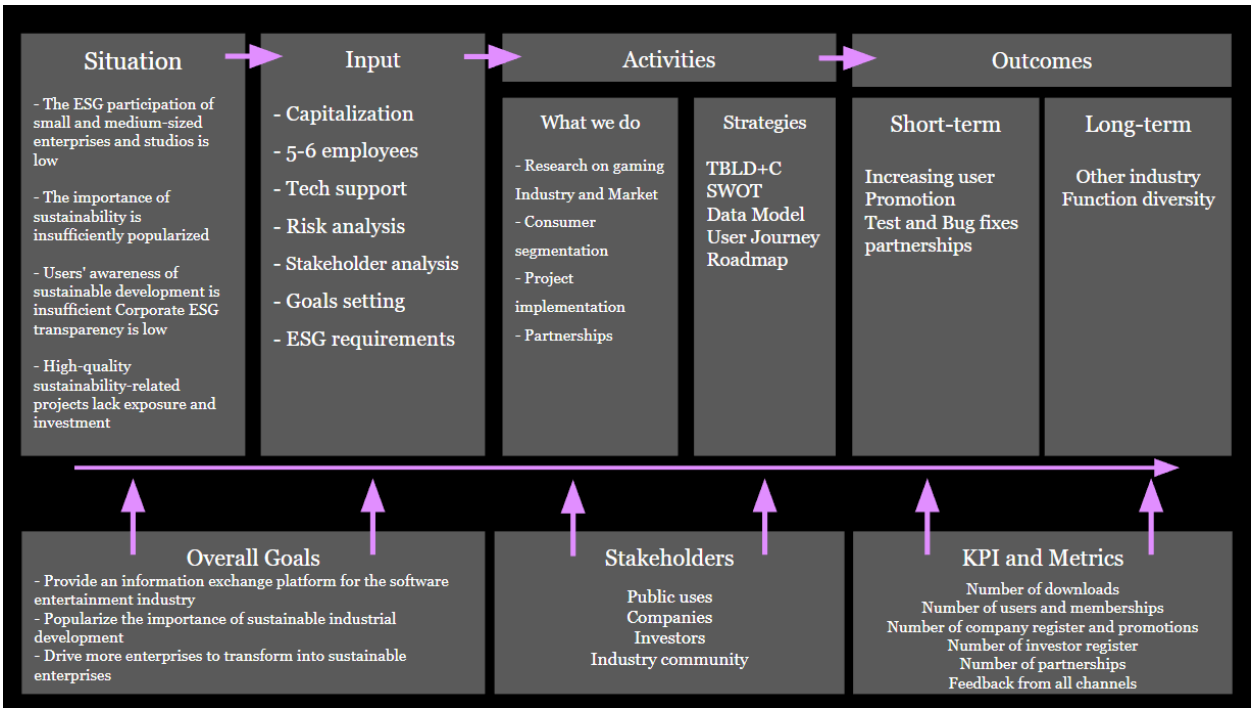
Opportunities

- Sustainability will be the future development trend of various industries, whether investment-driven or policy-driven.
- In the future design, the platform can touch more industries besides the game industry, such as the software and entertainment industries.
- Establish a sustainable development discussion community, and summarize multi-resource sustainable development suggestions to improve the sustainability of the game industry.

Threats

- The software development process also consumes energy and increases carbon emissions.
- Businesses may falsify data, information, and reviews for promotional purposes.
- A professional legal team must follow up on policy changes while protecting the rights and interests of users.
- It is necessary to understand the relevant laws to protect the rights and interests of users, such as privacy policies, trade secrets, etc.
- Need to continuously improve technical support

Development Logic Model



(Zhao, 2023, creating by google slides)

The participation in ESG planning and reporting amongst gaming companies is low, The awareness of the environmental impact that the gaming industry has is overlooked, and Corporate transparency is low.

We would input: a small team of software engineers, UI designers, and partner relations specialists; a risk and stakeholder analysis; as well as a roadmap informed by KPIs and our ESG requirement list. The small team would mobilize after investment to deploy our key strategies and activities: collecting more information on our market, customer base, implementation plan, and partners in order to build buzz, make connections, and refine our program. Long term, the program would be used in more diverse industries and be outfitted for more complex supply chains.

Implementation Plan

We will establish partnerships with Oracle, ADP, and Intuit to promote our products through industry-standard accounting and project management programs, as well as through exhibitions. We also plan to participate in major game industry exhibitions such as Electronic Entertainment Expo, Game Developers Conference, PAX East, Consumer Electronics Show, etc., to give presentations and promote our products to game companies and investors interested in the game industry. Our goal is to showcase our products to companies at the exhibitions and establish partnerships with portfolio risk assessment analysts to showcase to investors.

We plan to expand our network of strategic partnerships by collaborating with industry giants such as Netsuite, Salesforce, and Microsoft Teams. Our association with Microsoft Teams will enable us to broaden our testing landscape, access crucial information, and gain financial support to troubleshoot and optimize our program. This, coupled with additional funding, will allow us to venture into new industries and reach unprecedented heights.

Netsuite offers financial management solutions that can help track expenses, manage budgets, and provide real-time financial data. This can be useful for a game studio that wants to invest in sustainable practices and measure the impact of those investments.

Salesforce provides customer relationship management solutions that can help manage relationships with suppliers, customers, and stakeholders. This can be useful for a game studio that wants to build relationships with sustainable suppliers and communicate its sustainability initiatives to customers and stakeholders.

User base and engagement: One important indicator of software success is the user base and engagement. By collecting and analyzing user data, we can understand the size of the user base and their behavior, such as download, registration, and usage frequency, page dwell time, feature usage, registered company numbers, registered investor numbers, partner numbers, etc.

1. User satisfaction and feedback: Understanding user satisfaction and feedback is crucial for measuring the success of ESGenius. We can collect user feedback through surveys, reviews, and social media to understand their opinions and make adjustments and improvements accordingly.
2. Revenue and profitability: Another indicator of software success is revenue and profitability. By analyzing the revenue and profitability of ESGenius, we can understand its business value and profit potential.
3. Competitiveness and market share: Competitiveness and market share are important indicators of ESGenius's success. By understanding competitors and market trends, we can assess its competitiveness and position in the market.
4. Technical stability and security: Finally, technical stability and security are also important indicators of software success. ESGenius needs to ensure stable operation and safe use to avoid serious technical issues and security vulnerabilities.

Marketing Plan

Our Marketing strategy will be broken down to address each of our stakeholder categories: Companies, Investors, and Public users. Our first-phase plan is to focus on small to mid-sized companies that are seeking funding and interested in gaining a competitive edge against AAA studios. We will offer them a certification audit at a competitive price, with the added benefit of connecting them to investors.

Companies

1. We focused on designing a user-friendly site that appeals to game studios, showcasing the benefits of our certification audit, investor connections and progress tracking tools.

2. Use social media platforms such as Twitter, LinkedIn, and Reddit to promote our services and engage with potential clients. We will create a content calendar with posts about industry trends, case studies, and educational content about the certification process. Paid social media advertising will target game studios matching our target audience criteria.
3. Attend gaming industry conferences and events to network with potential clients and showcase our services. We will provide informational brochures and host workshops about the certification process to educate attendees about our services. We will also consider sponsoring industry events to increase our visibility and credibility within the gaming industry.
4. Implement a referral program to leverage our existing client networks and increase our client base. We will reward existing clients for referring new clients to our services.

KPIs

We will measure the success of the project through key performance indicators (KPIs) such as

1. Accounts Created: Measure the number of accounts created on the game studio sustainability investing system platform.
2. Data Shared: Measure the amount of data shared by clients on the platform to determine engagement and interest.
3. Projects Added: Track the number of sustainability projects added to the platform by clients.
4. Communication Sent/Received: Measure the amount of communication sent and received on the platform to track engagement.
5. Reports Generated: Track the number of sustainability reports generated by clients using the platform.

6. Site Visits: Monitor website traffic to determine the effectiveness of marketing campaigns and adjust strategies accordingly.

Investors

1. Develop a beta platform that offers investors and VC firms a quantitative and competitive ESG risk tracking tool for portfolios. The platform will use data from small to midsize game studios to generate insights on their ESG performance and potential risks.
2. We focus on creating a user-friendly website that highlights the benefits of our ESG risk tracking tool for investors and VC firms. The website displays portfolio management and includes information about the data points used to generate insights.
3. Utilize targeted advertising on social media platforms such as LinkedIn and Twitter to reach potential investors and VC firms. We will use targeted keywords and demographics to ensure that our ads reach our target audience.
4. Attend industry conferences and events to network with potential investors and VC firms. We will provide informational brochures and host workshops about the ESG risk tracking tool to educate attendees about our services. We will also consider sponsoring industry events to increase our visibility and credibility within the gaming industry.
5. Develop partnerships with industry influencers and thought leaders to promote our ESG risk tracking tool. We will work with prominent investors and VC firms to create content and case studies that highlight the benefits of our platform.
6. Implement a referral program that rewards existing investors and VC firms for referring new clients to our platform. This will help us leverage the networks of our existing clients and increase our client base.

KPIs

We will measure the success of the project through key performance indicators (KPIs) such as

1. Key performance indicators (KPIs)

2. Number of portfolios uploaded to the platform
3. Number of accounts created by investors and VC firms
4. Number of communication sent/received through the platform
5. Number of site visits to the website
6. Number of successful case studies and testimonials from clients

Public

We will leverage Github, Reddit, and Youtube to market our free tools and provide walkthroughs, to educate users on how to use them effectively. This will help us attract more users and increase engagement.

1. Twitch Influencer Partnerships: We will partner with game influencers on Twitch, such as Hasan and Markiplier, to showcase our sustainability investing system during their live streams. This will give us access to a large audience of gamers and help us to reach our target audience more effectively. We will provide influencers with early access to our tools and features so they can promote them to their followers.
2. Social Media Promotion: We will use social media platforms such as Twitter, Facebook, and Instagram to promote our sustainability investing system and engage with our target audience. We will create engaging content such as infographics, videos, and blog posts to educate users about the benefits of sustainability investing and how our system works. We will also use social media to encourage user-generated content, such as user reviews and testimonials, to build trust and credibility.

KPIs

Our KPIs will include site visits, tool downloads, and influencer views. We will track

1. The number of users who visit our website and download our free tools,
2. The number of views our influencers generate on Twitch.
3. Measure engagement on our social media platforms, such as likes, comments, and shares, to track user interest and satisfaction.

Budget

First Year Budget

We project a total budget of $859,900 for the first year, as detailed in the diagram below

Capitalization request of ESGenius			
Factors	Capitalization request ($)	First year total	Remarks
Start-up Costs			
Business registration and legal fees	$1,000	$1,000	
Office furniture and equipment	$5,000	$5,000	
Computer hardware and software	$10,000	$10,000	
Employee recruitment and training	$5,000	$5,000	
Marketing and advertising	$150,000	$150,000	
Renting and utilities for 6 month	$30,000	$60,000	
Subtotal		$231,000	
Ongoing Monthly Expenses			
Salaries and payroll taxes	$45,000	$540,000	for 5-6 employees
Software development tools and licenses	$1,000	$12,000	
Marketing and advertising	$1,000	$12,000	
Miscellaneous expenses	$2,000	$24,000	
Subtotal		$588,000	
First Year Expenses			
First year subtotal		$819,000	
5% Contingency		$40,950	
First Year Total Cost		$859,950	

(Zhao, 2023, creating by google excel)

Revenue Forecast

First Year Revenue Forecast of ESGenius			
User Segmentations			
User types	Numers	Percentage	Remarks
Public User	18400	92%	
Company User	1000	5%	
Investors	600	3%	
Total user number	20000		
Mumbership			
Premium Plan	Numer of purchase	Unit price	Total
$9/month	800	$9	$7,200
$5.99/month	18000	$5.99	$107,820.00
$15.99/3 months	700	$5.33	$3,731.00
$28.99/6 months	600	$4.82	$2,892.00
$46.99/year	200	$3.90	$780.00
Total membership revenue			$122,423
Merchant registration fee			
New registration #	Company size	Unit Price	total revenue
200	1-10	$20.00	$4,000.00
320	10-50	$50.00	$16,000.00
200	50-200	$80.00	$16,000.00
100	20-500	$100.00	$10,000.00
100	500-1,000	$200.00	$20,000.00
50	1,000-5,000	$300.00	$15,000.00
20	5,000-10,000	$500.00	$10,000.00
10	10,000+	$1,000.00	$10,000.00
Total Registration Fee			$101,000.00
Total Revenue for first year			
		20000 users	$223,443

Operation Cost Structure						
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Initial Investment	$171,000					
Fixed Costs	$84,000	$80,000	$75,000	$80,000	$60,000	$68,000
Variable Costs	$564,000	$520,000	$540,000	$536,000	$346,000	$324,000
5% contingency	$40,950	$30,000	$30,750	$30,800	$20,300	$19,600
Total	**$859,950.00**	**$630,000.00**	**$645,750.00**	**$646,800.00**	**$426,300.00**	**$411,600.00**

Revenue Stream						
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
# of users	20000	50000	150000	270000	351000	421200
User growth rate		150%	200%	80%	30%	20%
Sales	$223,443	$335,165	$670,329	$692,158	$802,205	$531,583
op.Profit	-$636,507	-$294,836	$24,579	$45,358	$375,905	$119,983
Ratio			3.67%	6.55%	46.86%	22.57%

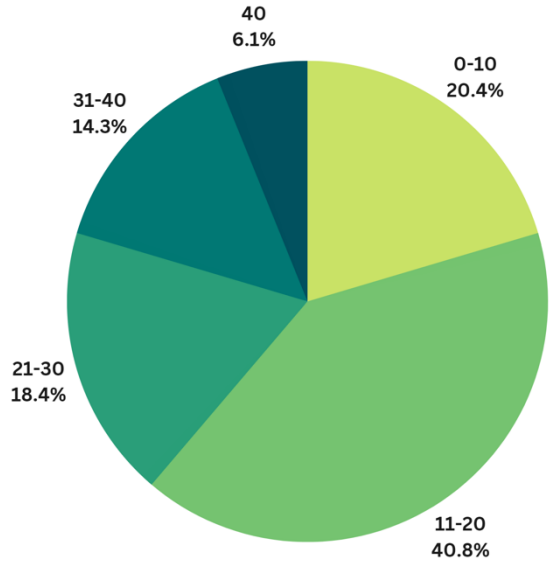
Conclusion

Through the investigation and research on the sustainability of the game industry, it is not difficult to see that although many large enterprises have mature ESG systems and are committed to improving their sustainability, there are still many problems. The participation of small and medium-sized enterprises in sustainable practices is low, the importance of sustainability is insufficiently popularized, corporate ESG transparency is low, and high-quality sustainability-related projects lack exposure and investment. Our platform can build a bridge for companies, investors, and gamers alike.We can assist companies with excellent ESG data get better exposure and provide investors with more sustainable investment options all while raising awareness among game consumers. During the construction and development of the platform, our team will also prioritize clean energy and environmentally friendly innovation to ensure that our products can uphold our sustainable philosophy.

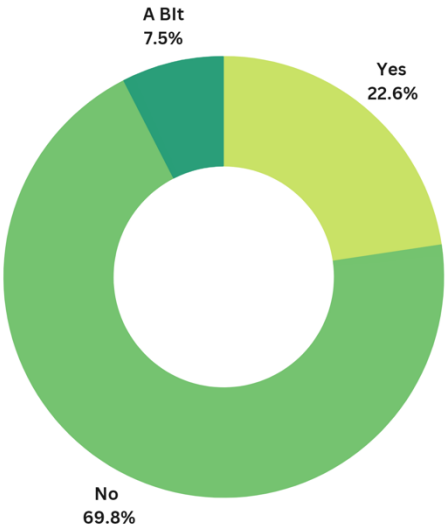
Appendix

Player Survey

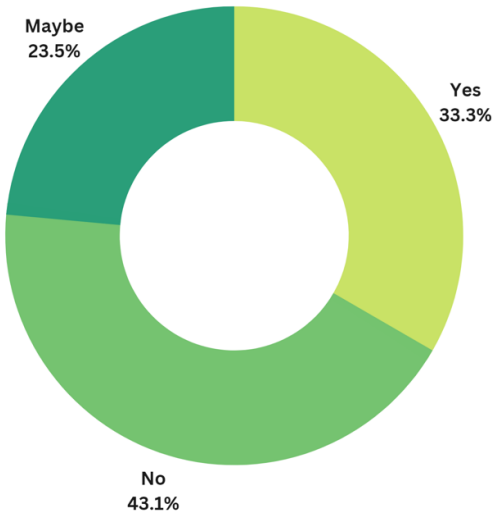
How Many Hours Do You Play a Week?



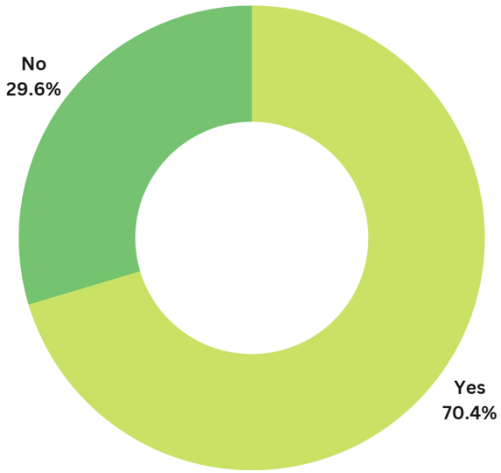
Have You Considered Any Possible Environmental Impacts That the Gaming Industry Produces?



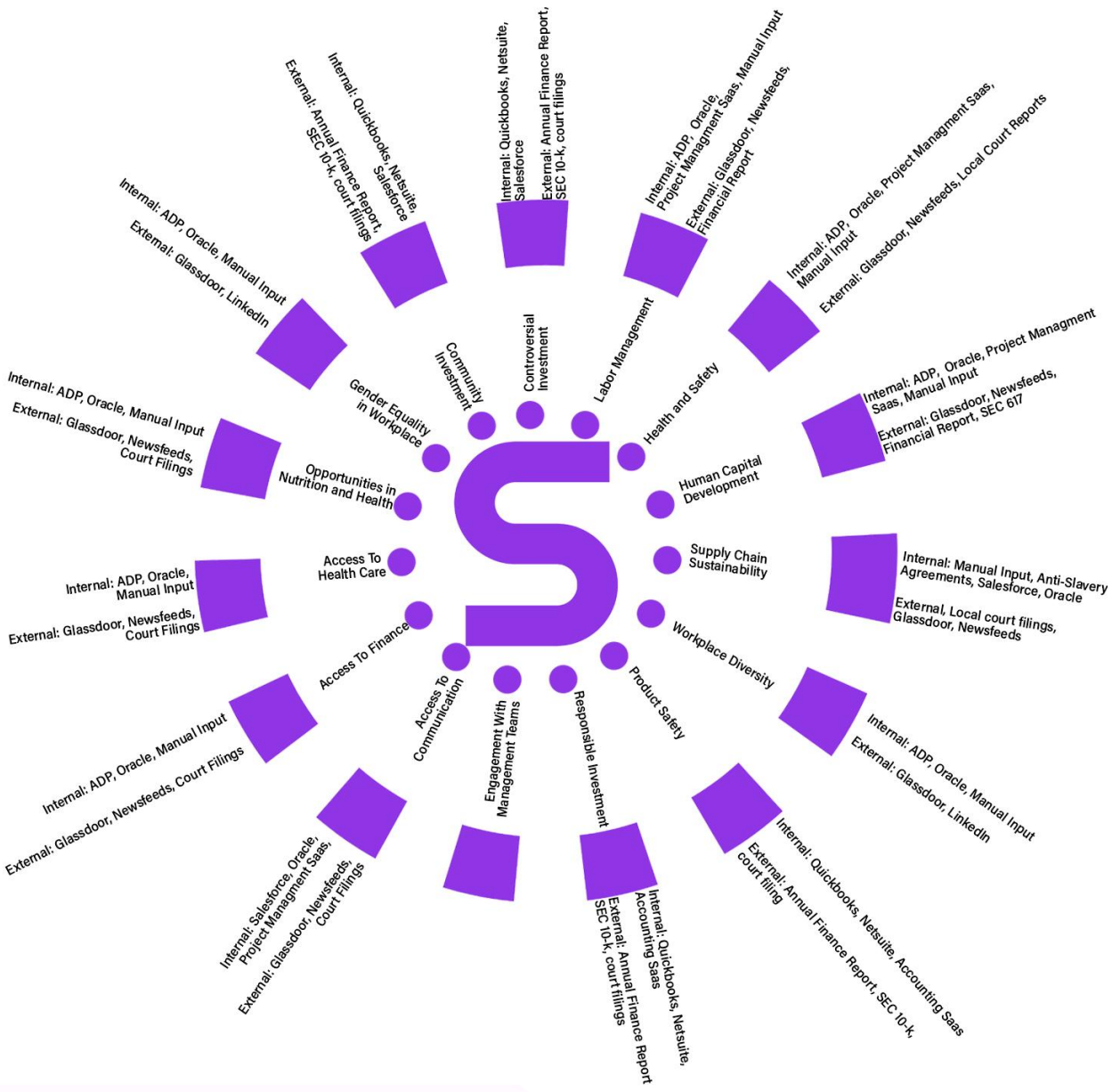
Would You Stop Playing Your Favorite Game If the Developer Contributed to Climate Change?



Would You Pay 10-15% More Per Game For Sustainably Made Games?



E
Carbon Emissions
Internal: Quickbooks, Manual Input
External: City Energy Estimates, Hours of operation
Carbon Footprint
Internal: Salesforce, Oracle, Netsuite
External: Annual Report, SEC 10-k
Enviromental Impact Financing
Internal: Salesforce, Oracle, Netsuite
External: Annual Report, SEC 10-k
Server Operations
Internal: Manual Input
External: City Property Records, Annual reports,
Water Waste
Internal: Quickbooks, Manual Input
External: City Water Estimates, Hours of Operation
Biodiversity and Land Responsibility
Internal: Quickbooks, Manual Input
External: City Property Records, City Construction Filings Hours of Operation
Equipment and Material Sourcing
Internal: Salesforce, Oracle, Netsuite
External: Local Waste Management, Government Sourcing Documentation
Crunch Time Carbon Offsets
Internal: Manual Input, Microsoft suite
External: Newsfeeds
Toxic Waste
Internal: Manual Input
External: City Waste Management Records
Materiel Waste
Internal: Manual Input
External: City Waste Management Records
Electronic Waste
Internal: Manual Input
External: City Waste Management Records
Clean Tech Investment
Internal: Manual Input
External: Newsfeeds
Infrastructure Investment
Internal: Manual Input, Quickbooks
External: Newsfeeds
Clean Energy Investment
Internal: Manual Input , Quickbooks
External: Newsfeeds


Internal: Quickbooks, Netsuite, Salesforce
External: Annual Finance Report, SEC 10-k, court filings
Controversial Investment
Internal: ADP, Oracle, Project Managment Saas, Manual Input
External: Glassdoor, Newsfeeds, Financial Report
Labor Management
Internal: ADP, Oracle, Project Managment Saas, Manual Input
External: Glassdoor, Newsfeeds, Local Court Reports
Health and Safety
Internal: ADP, Oracle, Project Managment Saas, Manual Input
External: Glassdoor, Newsfeeds, Financial Report, SEC 617
Human Capital Development
Internal: Manual Input, Anti-Slavery Agreements, Salesforce, Oracle
External, Local court filings, Glassdoor, Newsfeeds
Supply Chain Sustainability
Internal: ADP, Oracle, Manual Input
External: Glassdoor, LinkedIn
Workplace Diversity
Internal: Quickbooks, Netsuite, Accounting Saas
External: Annual Finance Report, SEC 10-k, court filing
Product Safety
Internal: Quickbooks, Netsuite, Accounting Saas
External: Annual Finance Report SEC 10-k, court filings
Responsible Investment
Internal: Salesforce, Oracle, Project Managment Saas,
External: Glassdoor, Newsfeeds, Court Filings
Engagement With Management Teams
Internal: ADP, Oracle, Manual Input
External: Glassdoor, Newsfeeds, Court Filings
Access To Communication
Internal: ADP, Oracle, Manual Input
External: Glassdoor, Newsfeeds, Court Filings
Access To Finance
Internal: ADP, Oracle, Manual Input
External: Glassdoor, Newsfeeds, Court Filings
Access To Health Care
Internal: ADP, Oracle, Manual Input
External: Glassdoor, Newsfeeds, Court Filings
Opportunities in Nutrition and Health
Internal: ADP, Oracle, Manual Input
External: Glassdoor, LinkedIn
Gender Equality in Workplace
Internal: Quickbooks, Netsuite, Salesforce
External: Annual Finance Report, SEC 10-k, court filings
Community Investment

Internal: Quickbooks, Netsuite, Oracle ESB, Manual Input
External: SEC Filing 10-K, Annual Report
Tax Transparency
Internal: Compay Input
External: SEC Filing 10-K
Board Diversity
Internal: Quickbooks, Netsuite, Oracle ESB, Manual Input
External: SEC Filing 10-K, Annual Report
Financial System Instability
Internal: Oracle and ADP
External: SEC Filing 10-K
Executive Pay
Internal: Google and Microsoft Suite
External: Glassdoor, Corporate Location Court Filings
Corporate Instability
Ownership
Internal: Oracle, ADP, Manual Input
External: SEC Filing 10-K
Anti-Competitive Practices
Accounting
Internal: Company Ethics Page
External: Glassdoor, Local Newsfeeds, Corporate Location Court Filings
Business Ethics
Cyber-Security Safety
Internal: Oracle ESB, Quickbooks, Netsuite, Manual Input
External: Annual Financial Report SEC 10-K
Internal: Manual Input, Oracle, Project Management Saas,
External: FTC Filing
Internal: Manual Input

3.24 Billion Gamers Globally (*Gamer Demographics: Facts About the Most Popular Hobby*, 2023)

1.7 Billion PC Gamers (*Gamer Demographics: Facts About the Most Popular Hobby*, 2023)

254 Million Console Gamers (Cresswell, 2023)

6.33 average hours of video games played by users per week (Gilbert, 2023)

Average kwh of PC 400 kwh (Strydom, 2023)

Average kwh of console 123 kwh (*Electricity Usage of a Game Console*, n.d.)

PC Gamers x average hours played x average kwh of gaming PC
=
4.3 trillion kwh or 1.9 billion metric tons of CO2

Console Gamers x average hours played x average kwh of console
=
197 billion kwh or 85.6 million metric tons of CO2

Median size of studios: 500 people (*Video Game Developer Demographics and Statistics [2023]: Number Of Video Game Developers In The US*, 2022)

Average studio size x avg. kwh of gaming computer x 15 hour days x 7 day work weeks x 12 weeks
=
252 billion kwh or 109 million metric tons of CO2

Average studio size x average kwh of gaming PC x 8 hours x 5 days x 50 weeks
=
400 billion kwh or 173 million metric tons of CO2

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Appendix

Interview notes

Original discussion guide:

1. Name of interviewee
2. Age of interviewee
3. The three industries you think are the least sustainable：
4. Do you play games?
5. Do you know any sustainable practices in the gaming industry? (Why)
6. Do you think it's a problem in the gaming industry? (Why)
7. Do you care about the emission from the gaming industry (why)
8. Would you change your gaming habits if you knew the game was unsustainable?（Why）
9. Will you stop playing your favorite game if they have a terrible influence on the environment? (Why)
10. Will you keep purchasing the game if they raise the price because of sustainability? (Why)

Interview notes

Ruth：

1. Name of interviewee:
    a. Serena
2. Age of interviewee:
    a. 24
3. The three industries you think are the least sustainable：
    a. Fashion, furniture, transport
4. Do you play games?
    a. yes
5. Do you know any sustainable practices in the gaming industry? (Why)
    a. No, because I'm not interested in knowing this.
6. Do you think it's a problem in the gaming industry? (Why)
    a. I think yes, in game design, production, testing, running, maintenance, etc., it takes electricity, a lot of electricity. Not very environmentally friendly.
7. Do you care about the emission from the gaming industry (why)
    a. I don't really care, I play games for fun not to be sustainable.
8. Would you change your gaming habits if you knew the game was unsustainable?（Why）
    a. Probably, if there's a report that the company's game production is causing serious environmental problems, I'll try to minimize or not play the game. It depends on how much I like the game.
9. Will you stop playing your favorite game if they have a terrible influence on the environment? (Why)
    a. Probably not, and I don't care that much about it.
10. Will you keep purchasing the game if they raise the price because of sustainability? (Why)
    a. Yes, if the price is reasonable.

1. Name of interviewee
    a. Sally
2. Age of interviewee
    a. 26
3. The three industries you think are the least sustainable：
    a. Chemical industry, Pharmaceutical industry, food industry
4. Do you play games?
    a. yes
5. Do you know any sustainable practices in the gaming industry? (Why)
    a. I don't know, sometimes there is a news interface in the game, I might see it. But no impression.
6. Do you think it's a problem in the gaming industry? (Why)
    a. I think yes because they will need electricity so much.
7. Do you care about the emission from gaming industry (why)
    a. I don't really care because this sounds so far from my life.
8. Would you change your gaming habits if you knew the game was unsustainable?（Why）
    a. Probably not, the game is for fun so if I want to play the game, I don't care if it's sustainable.
9. Will you stop playing your favorite game if they have a terrible influence on the environment? (Why)
    a. No, No, but probably less time on this game.
10. Will you keep purchasing the game if they raise the price because of sustainability? (Why)
    a. Yes, if the price is reasonable and there is good communication with the players.

Zoey:

1. Name of interviewee:
    a. J: Johnny
    b. E: Elijah Nadler
2. Age of interviewee:
    a. -23
    b. -24
3. The three industries you think are the least sustainable：
    a. -Fashion, car, fuel
    b. -fashion, error space, Transportation
4. Do you play games?
    a. -Yes. League of Legend, CSGO
    b. -yes, sometimes, I play games with my brother
5. Do you know any sustainable practices in the gaming industry? (Why)
    a.
    b. -No, I wasn't aware of it.
    c. -Yes,I heard about a few places recycling hardware. Also, second hand, sell your game
6. Do you think it's a problem in the gaming industry? (Why)
    a. -Yes. There may be a lot of energy and electric product wastes.
    b. -maybe. I never thought about it until now. I only play it because its interesting.
7. Do you care about the emission from gaming industry (why)
    a. -be aware of it, but care less about it.
    b. -yes. If people tell me there are emissions from the gaming industry, I would like to know more.
8. Would you change your gaming habits if you knew the game was unsustainable?（Why）
    a. -maybe paying less.
    b. -maybe not. I just play the game for interest sometimes when I have nothing to do.
9. Will you stop playing your favorite game if they have a terrible influence on the environment? (Why)
    a. -maybe not.
    b. -it depends on how the game communicates to users and how they show the outcome that there is a big influence on the environment.
10. Will you keep purchasing the game if they raise the price because of sustainability? (Why)
    a. -Yes. If the game is interesting enough, the design is good, I want to play it.
    b. -Yes, I will buy it if I like it. " sustainability is one of the factors for me to buy it, but not the only factor. I will not decide to buy it just because the game has sustainability practices.

Lauren：

1. Age: 23（Kyle）
2. Industry higher emissions? Top 3
    a. Fashion
    b. Auto Industry
    c. Tech Industry
3. Do you play games?
    a. Yes
4. Any sustainable practices in the gaming industry?
    a. No
5. Do you think it's a problem in the gaming industry?
    a. Could definitely be. No recycling or reuse

6. Do you care about the emission from gaming industry
    a. Yeah
7. Change your gaming habits after knowing the facts?
    a. Yeah
8. Will you stop playing your favorite game if they have a terrible influence on the environment?
    a. No
9. Will you keep purchasing the game if they raise the price because of sustainability?
    a. Yeah

1. Age: 25（Leo）
2. Industry higher emissions? Top 3
    a. Auto Industry
    b. Manufacturing
    c. Trash Collection
3. Do you play games?
    a. Yes. Starcraft, FIFA, PUBG
    b. Twice a week to once a week. Sometimes every day
4. Any sustainable practices in the gaming industry?
    a. Not one.
5. Do you think it's a problem in the gaming industry?
    a. Now yes, but not while we are playing. We are not focused on climate change while playing.
6. Do you care about the emission from gaming industry
    a. No not really but that should be the responsibility of the studio/manufacturer
7. Change your gaming habits after knowing the facts?
    a. I would need the details communicated to me so that I could avoid exacerbating the problem
8. Will you stop playing your favorite game if they have a terrible influence on the environment?
    a. Reduce but not stop
9. Will you keep purchasing the game if they raise the price because of sustainability?
    a. Yeah I wouldn't mind

Jen:

1. Age
   a. late 20s
   b. 26
2. The First 3 industries have high emissions. Do you know the gaming industry consumes a lot of energy?
   a. No
   b. Yes, Because I know they have huge computer system
3. Play any games?
   a. xbox console
   b. PC game
4. Do you know any sustainability practices within the gaming industry??
   a. No
   b. no
5. Would you stop playing your games after you know there is a big impact on the environment? Do you care about the emission? How much do you know? have you ever thought about it?
   a. Maybe not. but will care about it
   b. Yes, because I know sustainability issue
6. Would you be willing to make any changes to your gaming habit?
   a. No, I think habits not gonna changes but feeling bad
   b. Yes, limit the hours
7. Would you purchase the game if the industry raises the price by doing sustainability practices?
   a. Maybe yes as long as the company explains the reason. I can afford upto 8% increase
   b. up to 25%