RenoBlue

MICROGRIDS

Independent Business Plan

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April 23, 2023

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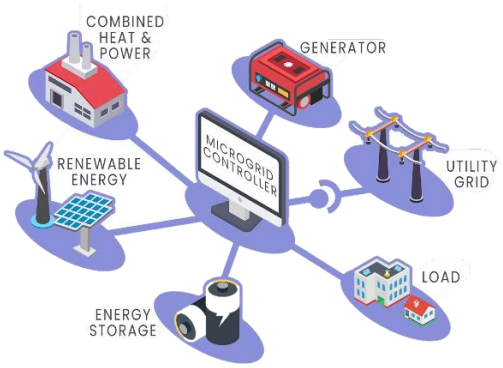
I. EXECUTIVE SUMMARY

DESCRIPTION OF SERVICE

RenoBlue is an engineering firm specializing in microgrid design, offering reliable, resilient, and renewable energy through advanced control technology. Founded in Philadelphia, RenoBlue is committed to providing reliable yet affordable solutions to energy management. RenoBlue aims to penetrate the microgrid market by utilizing a scalable and modular design platform: an innovative model that reduces implementation costs, offers localized solutions, and paves a greener future.

MICROGRID DEFINITION

A microgrid is a small-scale network of electricity with a local source of power supply. Microgrids are usually connected to the main grid, but they can also function independently. This network leverages power from a variety of distributed energy sources through a control center, allowing it to connect and disconnect from the main grid while still providing power.



RENOBLUE'S MODEL

Rather than one control center, RenoBlue's microgrids utilize multiple controllers that are programmed with software intelligence. These features allow scalability and modularity, meaning that control systems can be stacked upon each other. This model results in a more reliable microgrid, along with significant reductions in engineering activity and overall costs. RenoBlue's competitive advantage is that the modular design makes its microgrid services more affordable and accessible.

Problems		Solutions
The current power grid is outdated, which creates low power resilience, vulnerability to the increased number of severe weather events, and loss of productivity.		Microgrids increase the reliability and resilience of the power grid, which can lead to a reduction in power outages and energy-related disturbances.
The current centralized system for power distribution is not economical or efficient due to the severe energy loss from long-distance electrical transmission.		Microgrids produce energy that is bidirectionally profitable, cost-saving, and efficient because of their ability to reduce the strain on the main grid.
The power grid's infrastructure is too aged to integrate renewable energy, so it relies on non-renewables, which contribute heavily to climate change through carbon emissions.		Advanced microgrids use a combination of renewable energy sources that are more reliable than current methods and have a positive environmental impact.

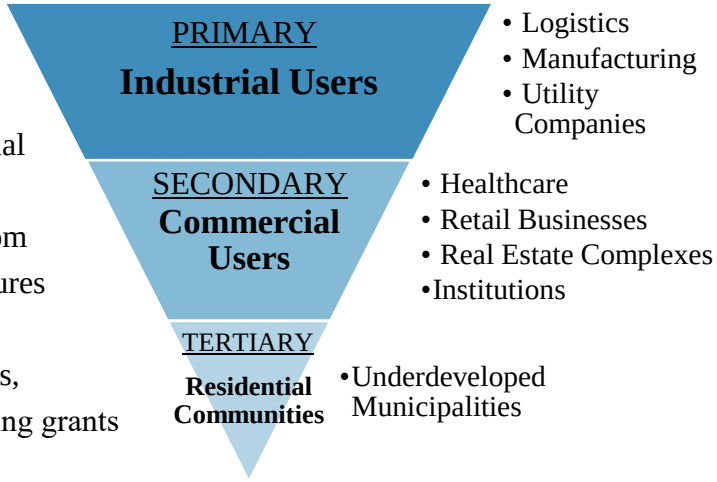
CUSTOMER SEGMENTS

RenoBlue will target industrial, commercial, and residential users. The segments are categorized by profitability and demand for microgrids.

Primary: The industrial segment uses the most power, necessitating a contingency during outages and independent systems. Their security and financial needs align with microgrids' features.

Secondary: Commercial businesses also benefit from RenoBlue's sustainable and energy-optimizing features that provide constant efficient power.

Tertiary: To support underdeveloped municipalities, RenoBlue's accommodating solutions involve seeking grants from the government to lessen the financial burden.



CHANNELS

RenoBlue will operate on a business-to-business (B2B) model via inbound and outbound platforms. Outbound channels reach specific clients while inbound channels promote personal connections.

Social Media: Creates a strong online presence and advocates RenoBlue's brand, specifically on YouTube, LinkedIn, Twitter, and TikTok.

Website & Content Marketing: Posts educational and engaging content that aligns with the B2B buyer journey. Examples include industry reports, webinars, and product demonstrations.

Attending Industrial Conferences: Network with potential clients and partners while increasing brand awareness, carving a position in the market.

Warm Email Prospecting: Send personalized emails to connections gained from marketing efforts. The goal is to initiate a meeting and create a personal relationship with the prospect.

Personal Selling: Immediately follows email prospecting, where a salesperson directly meets with the prospect to address questions and concerns to move them closer to purchase.

COST STRUCTURE

RenoBlue's cost structure is broken down by startup, human resource, and operating costs. The startup costs are separated by legal, research and development (R&D), and office assets. Regarding human resource costs, RenoBlue will hire 8 employees including project managers, engineers, sales and marketing personnel, and technicians. Finally, RenoBlue's operating expenses include utilities, salaries, insurance, etc. The following chart outlines our projected costs.

2023 Summarized Cost Structure			
Client Acquisition	**Human Resource**	**Start Up**	**Operating Costs**
$7,000	$549,992	$181,672	$738,766

REVENUE STREAMS

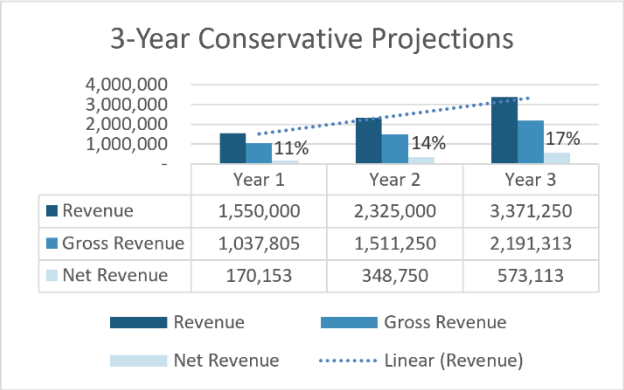
RenoBlue's revenue comes from three streams: cost-plus contracts, fixed-price contracts, and government grants. A summary of the three streams is given below.

	Cost-Plus Contracts	Fixed-Price Contracts	Government Grants
Definition	Client pays for all of a project's expenses + a profit percentage	Clients agree upon a predetermined price that will stay fixed	A form of funding for projects given by the government
Usage	Large-scale projects where costs are unpredictable	Standard projects with predictable outcomes	Underdeveloped municipalities who cannot afford costs
Payment Method	Monthly	50% deposit, 50% after microgrid is running	One-time payment

DETAILED FINANCIALS

Personal Investment	Loan Required
Sunny Chen and Krish Gupta will both invest $75,000 each, a total of $150,000	$550,000 paid over a 7-year term at an annual interest rate of 6%. Payments start year 1.

RenoBlue's financial projections are conservative, as we look to err on the side of caution. RenoBlue plans to invest the $550,000 loan into the opening launch and provide capital liquidity across the first year, where the projected net cash flow is $222,923. After the first year, 25% of gross revenue will be invested to R&D. Finally, RenoBlue will start reimbursing the loan in monthly payments.



KEY METRICS

RenoBlue will use the following key metrics to analyze how successful its performance is. Each will determine the effectiveness of RenoBlue's service, marketing, and future business. They will also evaluate RenoBlue's financial health and industry-specific development.

Metrics	Purpose	Calculation	Benchmark	Improvement Strategy
Proposal Win Rate	Measures the total project proposals accepted	# of accepted proposals / # of total proposals	15%	Tailor proposals to higher chance prospects
Profitability Ratios	Quantifies financial performance	Net: net income / sales Gross: revenue - cost of goods sold	Net: 10-15% Gross: 65%	Strategically cut parts from operating expenses
CSAT	Measures customer satisfaction with product and service	Satisfied clients / total # of clients	95%	Analyze feedback and identify pain points around processes to change
Sales Backlog	Determines amount of future business in pipeline	# of future scheduled projects	2-4 projects	Focus on outbound channels to secure more prospects

II. PROBLEM

Problem 1: The current power grid is outdated, which creates low power resilience, vulnerability to the increased number of severe weather events, and loss of productivity.

The American Society of Civil Engineers gives a D+ grade to the maintenance of our electricity system. They state "without greater attention to aging equipment, increased demand, and increasing climate impacts, Americans will likely experience longer and more frequent power interruptions." As shown in the graphic, the number of power outages over the last six years has more than doubled (North American Electric Reliability Corporation). Additionally, Climate Central found extreme weather to be the cause of 83% of major power outages between 2000 and 2021. As much of the grid infrastructure was built before the 1980s, the outdated power grid is unable to provide energy security amidst the increasing number of severe weather events.

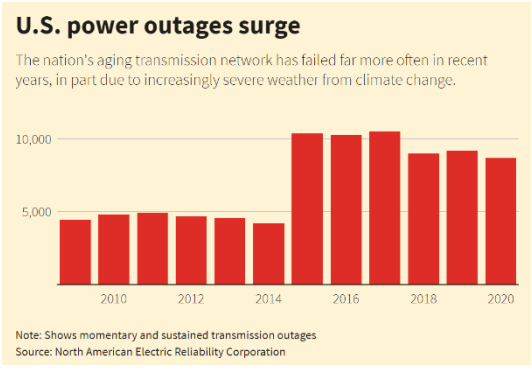


Figure 1: US's increase in outages from severe weather

One example is the infamous 2021 Texas Power Crisis, where a freezing winter storm battered Texas and left about 10 million people without power for two weeks. The storms caused the worst energy infrastructure failure in the state's history and 246 people died as a result. Other examples of power crises include raging wildfires in California or frequent hurricanes in the Mid-Atlantic region.

> **"We shouldn't have to worry about people dying because someone flips off the electric switch."**
> Jana Langley, whose father had several strokes during the 2021 Texas Crisis.

Problem 2: The current centralized system for power distribution is not economical or efficient due to the severe energy loss from long-distance electrical transmission.

A centralized system for power distribution means a large amount of electricity is generated at a single site, such as a power plant, and then distributed to customers through a long network of transmission lines. Due to the resistance in the electrical wires, the energy transmission is inefficient. In other words, the longer the travel distance, the more energy is lost.

> **"We can send a rover to Mars, but we can't send an electron to California from New York."**
> U.S. special climate envoy John Kerry

When long-distance transmission is combined with the aging infrastructure discussed in **Problem 1**, the country's power delivery efficiency falls below 50% (Electric Energy Magazine). This cumulative loss is especially problematic during times of peak demand when the grid is already strained.

Moreover, this decreased efficiency leads to higher energy bills and costs for consumers, as utility companies must ensure that far-away demand can be replaced with additional generation from other sources. In August 2022 alone, the electricity price spiked by 15.8%, which was double the annual inflation, and the highest since 1981 (Bureau of Labor Statistics).

Problem 3: The power grid's infrastructure is too aged to integrate renewable energy, so it relies on non-renewables, which contribute heavily to climate change through carbon emissions.

In the U.S., energy-related emissions are the largest contributor to climate change at 73%, and the power grid contributes 32% of those emissions (Energy Information Administration, EIA). Because climate change is a major cause of the severe weather events explained in **Problem 1,** this trend creates a vicious cycle of electricity disruptions.

Additionally, the grid is not able to facilitate the transmission of electricity from many small, distributed sources that only produce intermittent energy, such as solar, because of the antiquated design. Therefore, redesigning the grid would be monumentally expensive and challenging. A group of scholars at the University of Austin Texas said that replacing the grid nationwide would cost about $5 trillion and take over 10 years to construct new transmission lines.

The White House has set a 100% clean energy goal by 2035, as they see it as a crucial foundation for net-zero emissions by 2050. Without modernizing infrastructure using microgrids' small-scale nature, non-renewables will continue to exacerbate both the climate and energy crises.

III. CUSTOMER SEGMENTS

RenoBlue's customer segments are separated into three levels based on industrial users, commercial users, and residential communities, particularly underdeveloped municipalities. Geographically, RenoBlue will start in Philadelphia because of its ample amount of business opportunities. As a center of economic activity, this region contains over 5,600 industrial corporations, 23,000 commercial establishments, and 350 municipalities.

Primary: Industrial Users

Logistic Facilities, Manufacturing Buildings, Utility Companies

According to the 2020 EIA Annual Energy Outlook, the primary energy consumer is the industrial sector, which includes businesses that manufacture and distribute goods. Power interruptions can cause severe consequences, such as revenue losses, production stoppages, and disruptions in the supply chain. Thus, from a financial and security standpoint, industrial businesses will seek RenoBlue's reliable-energy services. Furthermore, because these businesses typically

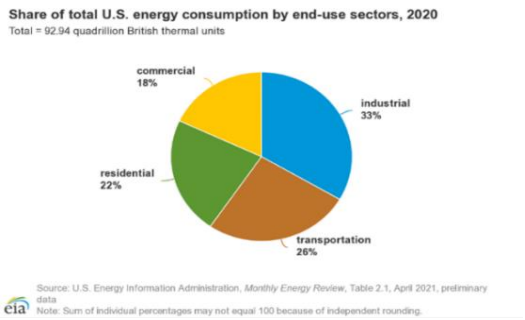


Figure 2: U. S's 2018 energy consumption by end-use sectors

consume more energy, the projects are large-scaled and more profitable, making industrial users a primary market.

Secondary: Commercial Users

Healthcare Facilities, Retail Businesses, Institutions, Real Estate Complexes

The commercial sector accounted for 18% of the energy consumption in 2020 (EIA). This sector generally includes service-providing establishments such as healthcare facilities, retail businesses, etc. These customers are interested in meeting three goals: (1) finding a reliable and efficient power source, either to supplement or to replace their existing power supply, (2) optimizing their energy usage to reduce overall cost, and (3) becoming more sustainable.

These businesses often rely on some form of backup power, such as diesel generators. However, these alternatives have several weaknesses including limits on fuel storage and unreliable delivery. Conversely, microgrids continuously operate, do not need constant maintenance, and can help facilities achieve their cost and sustainability goals. Projects with commercial users are expected to be smaller-scaled, but this feature allows RenoBlue to install more microgrids in less time. In the short term, RenoBlue anticipates more business from this segment because clients are committing to a smaller investment. As RenoBlue's brand grows, however, it predicts more profits from industrial users.

Tertiary: Residential Communities

Underdeveloped Municipalities

A 2022 study on the impacts of recent weather events, such as the 2021 Texas Power Crisis, found that power outages disproportionately affected underdeveloped and low-income communities. In the Philadelphia area, 23.3% of the population lives in poverty (U.S. Census Bureau) across 350 municipalities. While microgrids are typically too expensive for individual households, a $1.2 trillion Bipartisan Infrastructure Bill was passed in November 2021, projecting $73 billion specifically for electric grid developments (New York Times). RenoBlue will apply for grants under this bill to work with municipal councils and local governments.

Previously, microgrids were viewed as too expensive for residential communities. However, with RenoBlue's technological innovations that decrease prices, along with government grants, this market can now benefit from RenoBlue's services.

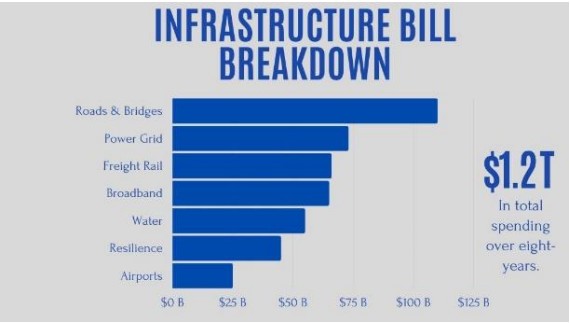


Figure 3: Bipartisan Infrastructure Bill Breakdown

IV. UNIQUE VALUE PROPOSITION

Reliable. Resilient. Renewable.

RenoBlue is an engineering firm that delivers clean, reliable, and affordable energy through innovative microgrid design. Through scalable and modular solutions, our microgrids generate renewable energy, strengthen grid resilience, and lower energy costs. In addition, our clients are able to generate revenue through microgrid installation by selling excess energy to the main grid. With our advantageous technology, bidirectional profitability, and environmental benefits, our microgrids empower consumers to reduce their carbon footprint with a guarantee of access to uninterrupted efficient power.

What are Microgrids?

Microgrids are independent small-scale power networks that can operate both connected or disconnected from the main grid. They can generate power from various sources, such as solar panels and generators, that is then used locally rather than across long distances.

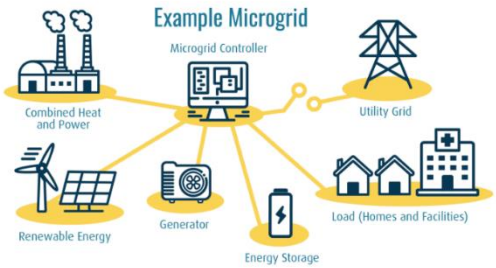


Figure 4: Microgrid example model

Advanced microgrids use a sophisticated management system through multiple distributed energy resources, combining traditional methods and new renewables. This mix of energy sources makes operating megawatt-scale systems more resilient and diversified during power outages. Another ability of microgrids is islanding, where they isolate themselves from the utility grid and use their own energy assets to provide power. Therefore, microgrids are valued for their independence, sustainability, and variety of energy sources.

The greatest drawback to traditional microgrids is their costs. For context, one megawatt (MW) power plants can power over 500-750 homes, meaning it overshoots the needs of most clients. Currently, microgrids cost around $2-3 million/MW and have a life expectancy of around 10-20 years. If we divide a $2 million/MW microgrid by a 15-year-lifespan, microgrid consumers would be paying over $11,000 monthly for power. Another disadvantage to older iterations of microgrids is that they have just one control center, resulting in the whole system shutting down if this control is disturbed. RenoBlue has identified technological innovations that address these major issues, which will be discussed in Section XI: Competitive Advantage.

V. SOLUTION

Even though microgrids are relatively new, being first developed in the 1990s, their industry is growing rapidly. According to research from MarketsandMarkets, the global microgrid market is expected to grow from $26.9 billion in 2021 to $63.2 billion by 2027, at a compound annual growth rate (CAGR) of 18.6%.

Solution 1: Microgrids increase the reliability and resilience of the power grid, which can lead to a reduction in power outages and energy-related disturbances.

The reliability issues that the centralized power grid causes, as stated in **Problem 1**, can be combated with the localized and independent power systems of microgrids. According to the U.S. DOE, microgrids can increase the resilience of the grid by up to 40%, particularly through their islanding features. When the main grid is down or is experiencing an outage, microgrids mitigate systemic disturbances by continuing to operate for their local communities. From essential services like medical care to activities such as transportation, microgrids act as a fail-safe for unpredictable situations.

Furthermore, microgrids re-energize the main grid directly through their bidirectional distribution flow. Not only can microgrids act as a backup power source, but they can also decrease the frequency and duration of downtime for when the main grid is unavailable. Overall, the increased energy security allows microgrids to prevent major disruptions for customers.

Solution 2: Microgrids produce energy that is bidirectionally profitable, cost-saving, and efficient because of their ability to reduce the strain on the main grid.

As discussed in **Problem 2**, the cost of energy in the US has been rising in recent years, particularly spiking in August 2022. Microgrids lower these costs in multiple ways. First, their systems are located significantly closer to the load compared to the conventional grid. This short travel distance and higher efficiency minimize the cost of energy losses, thereby boosting profitability and requiring less power to meet the same level of demand. With optimal control system algorithms, consumers can get up to a 20-40% reduction in power costs (Forbes).

Adding on, microgrids grant their owner a great deal of flexibility in optimizing their energy costs. For example, they can store excess energy during off-peak times when it is cheaper, which can then be either used or sold to the main grid when demand is higher, resulting in additional revenue for the owner. To conclude, microgrids can serve as a mutually beneficial resource to both the grid and its users by reducing costs during peak demand and allowing microgrid owners to profit.

Solution 3: Advanced microgrids use a combination of renewable energy sources that are more reliable than current methods and have a positive environmental impact.

Problem 3 discussed how the burning of fossil fuels for energy is a major contributor to air pollution in the US. Microgrids reduce these emissions by enabling the use of renewables, which cannot be integrated into the current grid's outdated infrastructure. One problem with renewables like solar, wind, and hydro, is their irregular nature, but microgrids overcome this challenge by using storage systems such as batteries or through other technologies like demand response systems.

Additionally, microgrids offer the opportunity to deploy more zero-emission electricity sources, which reduces the reliance on fossil fuels and the overall emissions from the energy sector. These advantages align with the White House's goal stated in **Problem 3**. With RenoBlue's robust energy storage systems and control centers, it makes it possible to create anywhere from 25% to 100% renewable energy microgrids. When used in conjunction with natural gas or nuclear power, microgrids provide a much steadier supply of electricity while still being more sustainable than the main grid.

VI. CHANNELS

RenoBlue will operate on a B2B model to reach its customers. The goal of RenoBlue's channels is to build a client base through inbound and outbound marketing. Inbound marketing involves creating content that allows customers to discover the company themselves, while outbound marketing involves proactively reaching out to relevant clients. Outbound marketing can target specific markets and gain prospects quickly, but this strategy lacks personalization. To minimize rejection if the advertising is viewed as intrusive, RenoBlue will also use inbound marketing to add personality to the company image, build a loyal audience, and increase trust.

The graphic on the right shows the B2B buyer's journey and the three stages of RenoBlue's marketing channels. These steps create a partnership with customers that foster better dialog and sales results.

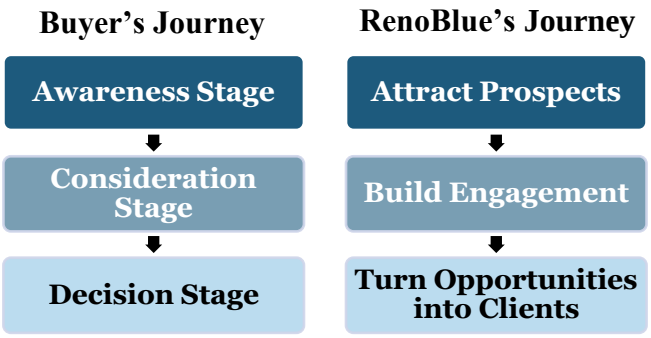


Figure 5: RenoBlue's marketing journey aligned with the buyer's journey

Inbound Channels

Social Media

Through a social media presence, RenoBlue creates an audience persona and advocates our brand. An International Data Corporation study found that 75% of B2B buyers and 84% of chief-level executives use social media to make purchasing decisions. This means that social media targets all three stages: 1) extending outreach, 2) building customer engagement, and 3) highlighting competitive advantages. RenoBlue will focus on building a platform primarily on YouTube, LinkedIn, Twitter, and TikTok, as they are seen to be the most popular social media channels for B2B marketers (HubSpot).

Website & Content Marketing

Because microgrids are a new concept, customer education is crucial. Initially, RenoBlue will build a website to present its product and promote its innovation. Meanwhile, RenoBlue's staff will create educational content like videos and case studies, which will be posted on YouTube, TikTok, and the website. 77% of B2B buyers find their purchases complex and difficult (Gartner), and an effective tactic is sharing useful content. Similar to social media, this channel can align with all three stages as shown in the graphic.

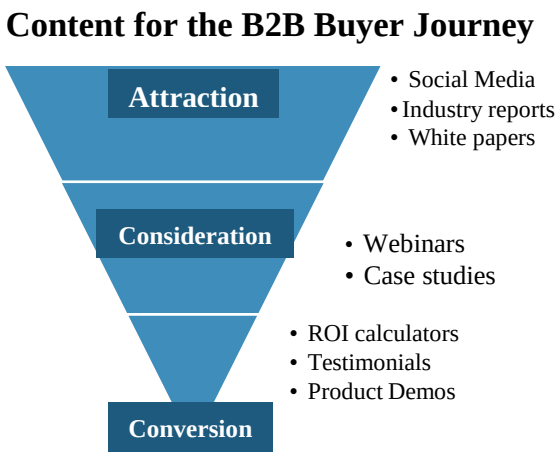


Figure 6: Content for each phase of the B2B buyer journey

Outbound Channels

Attending Industrial Conferences

RenoBlue will attend energy and infrastructure conferences to network with industries. Not only do 79% of attendees believe that conferences help them decide what to buy (Graphicolor Exhibits), but also, they are a particularly great opportunity to raise brand awareness among industry professionals. In addition, RenoBlue will conduct effective competitor analysis to benchmark and highlight its advantages. Lastly, our sales representatives will engage with targeted leads to forge business relationships. Thus, this channel primarily aligns with stage 1, attracting prospects.

Warm Email Prospecting

RenoBlue will execute warm email prospecting, an outreach strategy in which a personalized email is sent to a targeted customer to initiate a meeting. The 'warm' part means that there has been some past interaction. Individualized attention has become increasingly important: 76% of B2B buyers expect custom solutions (Forbes) and 88% of users agree they are more likely to respond (Dynamic Yield Research). Therefore, this channel will be a direct approach to stage 2, building engagement during the consideration phase.

Personal Selling

Upon a favorable email response, RenoBlue's sales representatives will meet with prospects face-to-face, aiming to understand their needs and provide custom solutions. With quality engagement, 80% of consumers are more willing to make a purchase (Epsilon). During these meetings, RenoBlue will provide demonstrations that emphasize why RenoBlue's product is distinctly better than its competitors. Personal selling will predominantly target stage 3, turning the email-response prospects into clients.

VII. REVENUE STREAMS

RenoBlue generates revenue through microgrid installation projects. There will be two types of contracts: cost-plus and fixed-price. A cost-plus contract is variable according to the amount of time and resources put into the project, while a fixed-price contract establishes a single-sum price. Additional revenue streams include federal government grants.

Fixed-Price Contracts

RenoBlue utilizes fixed-price contracts for standardized projects that are smaller-scaled. These structured projects have predictable outcomes, where a project's scope, such as cost of materials, can be accurately estimated. The payment form will be in two installments, where 50% will be an initial deposit and the remaining 50% will be paid once the microgrid is complete. This payment form simplifies the cash flow management, allowing RenoBlue to focus on the project with the valuable time. These contracts will initially be more common among commercial clients.

Advantages for Client	Advantages for Both Parties	Advantages for RenoBlue
- Can ensure there are enough funds and budget - Easy to understand	- Increased level of predictability - Provides stability from an unchanging price	- Provides a solid budget - Managers can create a clear plan with specific deadlines

Figure 7: Fixed-Price contract advantages

Cost-Plus Contract

A cost-plus contract is where the price is based upon production plus an additional percentage for profit. This type of contract covers direct costs, indirect costs, and profit. RenoBlue's additional profit percentage will be 10% and a monthly payment form.

These contracts are used for large-scale and customized-solution projects, where the overall scope of the work cannot be properly estimated in advance. Thus, this contract will be more frequently used with industrial users. However, fixed-price contracts are typically preferred because it's less meticulous to track expenses and generates higher profits. As RenoBlue becomes more experienced, it intends transitioning to use solely fixed-price contracts.

Advantages for Client	Advantages for Both Parties	Advantages for RenoBlue
- Often higher quality - Increased accountability that ensures no overcharging	- Provides incentive to complete the project on time and within budget	- Allows more design creativity - Predictable profitability - Provides better cost control

Figure 8: Cost-Plus contract advantages

Government Grants

For underdeveloped municipalities that cannot afford upfront investments, RenoBlue will seek funding from the government through grant applications. In addition to the Bipartisan Infrastructure

Bill, the White House announced a $2.3 billion program that funds grid resilience investments for states and tribes. From this new revenue stream, RenoBlue can secure contracts with low-income communities and lessen the financial burden. This operation plan was designed with Stephanie Bostwick, a manager at the NREL Energy Security and Resilience Center.

Lifetime Values

Lifetime values (LTVs) refer to the predicted monetary value a customer is expected to generate over their lifetime. These calculations allow a business to determine many financial decisions including profitability and marketing budget. The following equation will calculate the LTV:

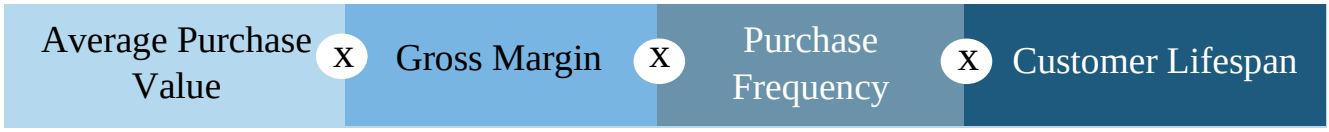


Figure 9: LTV equation

RenoBlue estimates that the average microgrid capacity purchased will be 0.5 MW, which has a unit price of $250,000. The gross margin is 65% across projects, the purchase frequency is once, and the customer lifespan (for a 0.5 MW microgrid) will be approximately 4 months. Therefore, LTV = ($250,000 * 0.65 * 1 purchase * 0.33 years) = **$53,625.**

VIII. COST STRUCTURE

Startup Costs

To begin operations, RenoBlue must pay legal fees and licenses in order to be recognized as an entity by the government. These licenses include federal business, state business, local business, professional, and sales tax. Next, the R&D costs are required to develop and enhance RenoBlue's microgrids. In these projections, RenoBlue will have already have an initial product developed so it can start projects in year one. Finally, the office space setup includes technology (computers, printers, etc.), accounting software, and other necessary supplies.

Asset	Amount Needed	Cost per Unit	Total Cost
Legal			
Business Registration	1	125	125
Liability	1	477	477
Licenses	5	150	750
Research and Development Cost			
Software & Hardware Development	1	80,000	80,000
Website	1	1,500	1,500
Design Software (Altium)	1	11,970	11,970
Project Management Software	1	850	850
Security	1	25,000	25,000
Office			
Office Space Setup	1	60,500	60,500
Accounting Software	1	500	500
Total Start-Up Cost:			**$ 181,672**

Human Resource Costs

Sunny will be the sales director and Krish will be a project manager. In the opening months of operations, RenoBlue intends to hire 8 employees in the positions outlined below. The engineers that RenoBlue will be looking for are electrical and software integration specialists. The salary values were created from IBIS World Salaries.

		2023	2024	2025
Employee	**Number**	**Annual Salary**		
Project Managers	1	95,000	99,750	104,738
Principal Engineers	1	90,450	94,973	99,721
Associate Engineers	2	65,666	68,949	72,397
Sales & Marketing Executives	1	60,710	63,746	66,933
Technicians	3	57,500	60,375	63,394
Average Monthly HR Cost		**$45,833**	**$48,124**	**$50,531**
Average Annual HR Cost		**$549,992**	**$577,492**	**$606,366**

Operating Costs

RenoBlue's monthly operation costs have been calculated based on research for assets required by engineering firms. For example, the lab equipment will be rented for the first few years of operations, but RenoBlue intends to pay for its own equipment within five years. Also, the monthly marketing budget was calculated by allocating 5% of the gross revenue (shown in Section IX: Detailed Financials) for marketing. The costs are general averages, and assets such as marketing and miscellaneous fees will vary slightly between months.

Asset	Amount Needed	Cost Per Unit
Payroll	Monthly Recurring	45,833
Payroll Tax and Benefits	Monthly Recurring	3,506
Office & Lab Rent	Monthly Recurring	5,975
Marketing	Monthly Recurring	3,500
Utilities	Monthly Recurring	750
Insurance	Monthly Recurring	500
Miscalleneous	Monthly Recurring	1,500
Monthly Operating Cost		**$ 61,564**
Annual Operating Cost		**$ 738,766**

Client Acquisition Costs

A client acquisition cost (CAC) is the approximate total cost of acquiring a new customer, and this value helps measure the return on investment for efforts in growing clientele. RenoBlue's CAC is **$7,000**. This number was calculated by taking the yearly marketing cost ($3500 * 12 months) and then dividing it by RenoBlue's estimated number of clients, which is approximately six in the first year. This value is higher than that of most businesses because microgrids are not conventional on the market yet, and it will cost more to acquire clients initially. However, over time, more funds will be allocated toward outbound channels to spread product and brand awareness quicker. Therefore, RenoBlue expects its CAC to decrease gradually as microgrids become more popular on the market.

IX. DETAILED FINANCIALS

A. Projected Income and Expenses

RenoBlue's projections below are conservative to ensure profitability is realistic and achievable. Even though RenoBlue looks to err on the side of caution, the forecasts demonstrate that RenoBlue will still experience annual profitability.

First Year Assumptions

The graph below highlights the assumptions for RenoBlue's first year of projects. In the first year, RenoBlue's unit prices for its microgrids will be $500,000/MW. RenoBlue anticipates that February and August, the colder and hotter months, will gain traction from underserved municipalities that would experience more frequent outages from the weather for RenoBlue to file grant applications.

	Cost Plus Contract	Fixed-Price Contract			Government Grants	
Number of Projects	1	3			2	
Capacities	1 MW	0.5 MW	0.5 MW	0.5 MW	0.25 MW	0.25 MW
Start Month	May	April	March	September	February	August
End Month	December	July	July	December	May	November
Profit Percentage	10%	13%			5%	

1. Projected income statements by month for the first year's operation

RenoBlue is considering the Cost of Goods Sold (COGS) to be the direct costs of the microgrid project, including production and material purchases. Regarding taxes, the employee tax and benefits is 7.65% for Social Security (6.20) and Medicare (1.45), and the business tax is 8.99%, which was reduced on January 1, 2023 from the original 9.99%. During months where net earnings will be negative, there will be no income tax calculated.

RenoBlue
Conservative Projected Monthly Income Statement 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2023
Operating Revenue													
Cost-Plus Contracts	-				62,500	62,500	62,500	62,500	62,500	62,500	62,500	62,500	500,000
Fixed-Price Contracts		-	125,000	125,000	-	125,000	125,000	-	125,000	-	-	125,000	750,000
Government Grants	-	150,000	-	-	-	-	-	150,000	-	-	-		300,000
Total Revenue	-	150,000	125,000	125,000	62,500	187,500	187,500	212,500	187,500	62,500	62,500	187,500	1,550,000
Cost of Goods Sold		85,155	57,405	57,405	25,000	56,905	55,405	46,355	46,355	16,355	15,500	50,355	512,195
Gross Profit	-	64,845	67,595	67,595	37,500	130,595	132,095	166,145	141,145	46,145	47,000	137,145	1,037,805
Operating Expenses													
Payroll	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	549,996
Payroll Taxes and Benefits	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	42,075
Office & Lab Rent	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	71,700
Marketing	3,500	3,500	3,500	3,500	3,500	3,500	3,000	3,000	3,000	3,000	3,000	3,000	39,000
Utilities	750	750	750	750	750	750	750	750	750	750	750	750	9,000
Insurance	500	500	500	500	500	500	500	500	500	500	500	500	6,000
Principal Loan	5,285	5,311	5,337	5,364	5,391	5,418	5,445	5,472	5,500	5,527	5,555	5,583	65,188
Miscallenous	3,000	2,500	2,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	21,000
Total Operations Expenses	68,349	67,875	67,401	66,928	66,955	66,982	66,509	66,536	66,564	66,591	66,619	66,647	803,959
Earning Before Interest & Tax	(68,349)	(3,030)	194	667	(29,455)	63,613	65,586	99,609	74,581	(20,446)	(19,619)	70,498	233,846
Loan Interest	(2,750)	(2,734)	(2,697)	(2,670)	(2,641)	(2,616)	(2,589)	(2,562)	(2,533)	(2,503)	(2,480)	(2,452)	(31,227)
Earnings Before Tax	(71,099)	(5,764)	(2,503)	(2,003)	(32,096)	60,997	62,997	97,047	72,048	(22,949)	(22,099)	68,046	202,619
Income Tax	-	-	-	-	-	5,484	5,663	8,725	6,477	-	-	6,117	32,466
Net Earnings	(71,099)	(5,764)	(2,503)	(2,003)	(32,096)	55,513	62,968	88,322	65,571	(22,949)	(22,099)	61,928	170,153
Margin		-3.8%	-2.0%	-1.6%	-51.4%	29.6%	33.6%	41.6%	35.0%	-36.7%	-35.4%	33.0%	11.0%

2. Projected cash flow by month for the first year's operation

RenoBlue expects an ending net balance of approximately **$222,923**. Even though these are conservative figures, RenoBlue still has a strong positive cash flow, indicating that the company can healthily meet short-term financial obligations.

RenoBlue
Conservative Projected Cash Flows Statement 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2023
Beginning Cash Balance	-	383,666	463,057	433,208	319,110	312,014	293,182	405,920	327,157	325,708	319,114	312,515	
Cash Inflows													
Owners Funds	150,000	-	-	-	-	-	-	-	-	-	-	-	150,000
Loan Proceeds	550,000	-	-	-	-	-	-	-	-	-	-	-	550,000
Revenue	-	150,000	125,000	125,000	62,500	187,500	187,500	212,500	187,500	62,500	62,500	187,500	1,550,000
Total Cash Inflows	700,000	150,000	125,000	125,000	62,500	187,500	187,500	212,500	187,500	62,500	62,500	187,500	2,250,000
Available Cash Balance	700,000	533,666	588,057	558,208	381,610	499,514	480,682	618,420	514,657	388,208	381,614	500,015	2,250,000
Cash Outflows													
Startup Expenses	181,672	-	-	-	-	-	-	-	-	-	-	-	181,672
Cost of Goods Sold	63,563	-	84,750	169,500	-	131,250	-	213,440	113,375	-	-	201,875	977,753
Payroll	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	45,833	549,996
Payroll Taxes and Benefits	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	3,506	42,075
Office & Lab Rent	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	5,975	71,700
Marketing	3,500	3,500	3,500	3,500	3,500	3,500	3,000	3,000	3,000	3,000	3,000	3,000	39,000
Utilities	750	750	750	750	750	750	750	750	750	750	750	750	9,000
Insurance	500	500	500	500	500	500	500	500	500	500	500	500	6,000
Miscallenous	3,000	2,500	2,000	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	21,000
Subtotal	308,299	62,564	146,814	231,064	61,564	192,814	61,064	274,504	174,439	61,064	61,064	262,939	1,898,196
Other Cash Outflows													
Income Tax	-	-	-	-	-	5,484	5,663	8,725	6,477	-	-	6,117	32,466
Principal Loan	5,285	5,311	5,337	5,364	5,391	5,418	5,445	5,472	5,500	5,527	5,555	5,583	65,188
Loan Interest Expense	2,750	2,734	2,697	2,670	2,641	2,616	2,589	2,562	2,533	2,503	2,480	2,452	31,227
Subtotal	8,035	8,045	8,034	8,034	8,032	13,518	13,697	16,759	14,510	8,030	8,035	14,152	128,881
Total Cash Outflows	316,334	70,609	154,848	239,098	69,596	206,332	74,761	291,263	188,949	69,094	69,099	277,091	2,027,077
Ending Cash Balance	383,666	463,057	433,208	319,110	312,014	293,182	405,920	327,157	325,708	319,114	312,515	222,923	222,923

3. Projected balance sheet, end of first year

RenoBlue estimates **$2,164,135** in total assets for the first year. The value of the machinery and equipment used to create microgrids had a 14.29% annual depreciation rate accounted into their overall value. Finally, RenoBlue's combined value of liabilities and equity also are valued at **$2,164,135.**

RenoBlue
Balance Sheet
Projected as of December 31, 2023

ASSETS		**LIABILITIES**	
Current Assets		Current Liabilities	
Cash	222,923	Accounts Payable	45,926
Accounts Receivable	1,550,000	Taxes	32,466
Prepaid Expenses	265,134	Salaries	549,996
Total Current Assets	2,038,057	Long Term Loan	484,810
Non-current Assets		Total Current Liabilities	1,113,198
Machinery & Equipment	105,865		
(Depreciation)	(5,365)	**SHAREHOLDERS' EQUITY**	
Intangible Assets	25,578	Common Share	1,050,937
Total Non-current Assets	126,078	Total Equity	1,050,937
Total Assets	**2,164,135**	**Total Liabilities & Equity**	**2,164,135**

4. Projected three-year plan

As each year of operation progresses, RenoBlue anticipates completing 2-4 more projects, including one 1-MW capacity project each year. These projects would be a result of microgrids' growing popularity and RenoBlue's increasing brand awareness. After Year 1, RenoBlue also intends to annually invest 25% of its revenue into R&D. RenoBlue looks to improve its microgrids and develop new products such as smart meters.

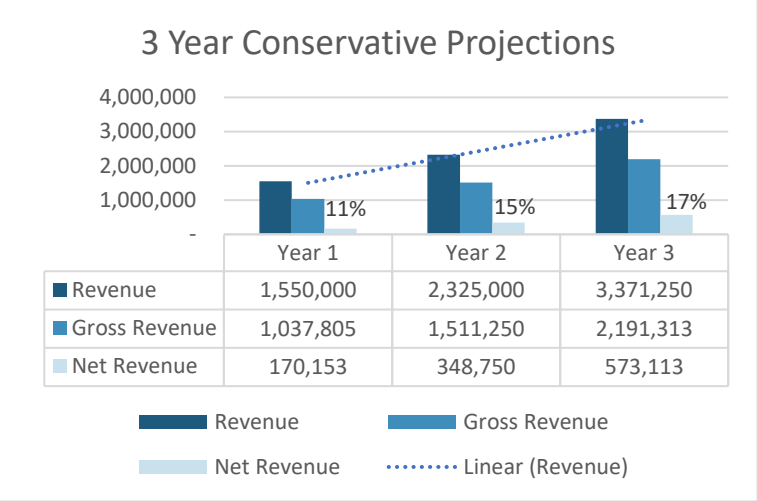


Figure 10: RenoBlue's 2023-2025 projections

5. A brief description of the planned growth of the proposed business

As shown in the forecast above, RenoBlue anticipates its net margin to increase from 11% in 2023 to 17% in 2025. RenoBlue is projected to reach a total sales revenue of $1,550,000 in its first year, and assuming 2-4 more projects annually, the increasing revenue trend will also be stable. During year three, RenoBlue will expand operations to New York, ranked as a global center of industry. During this time, RenoBlue's product will be continually developed from R&D, and these efforts are expected to eventually decrease unit prices by over half. From the lowered prices, RenoBlue aims to open its product to a broader market of customers including neighborhoods and entertainment establishments.

B. Proposed Plan to Meet Capital Needs

RenoBlue's personal and internal sources will be derived from Sunny Chen and Krish Gupta, as owners of RenoBlue, each investing $75,000 for a collective **$150,000.**

External sources include grant applications and a loan request. Under the Bipartisan Infrastructure Bill, a $1.2 trillion infrastructure law, RenoBlue can tap into $73 billion via grant applications. Furthermore, RenoBlue can acquire federal government funds for R&D, which RenoBlue will invest more in after its first years of operation.

The second external source is a request for a **$550,000** loan with a seven-year payment term at an interest rate of 6% to cover the startup expenses and provide liquid capital when monthly net revenues will be negative during RenoBlue's first year. RenoBlue will start to reimburse in our first year of operations, starting with $8,035 in the first month, and slowly increasing with each monthly payment. The amortization schedule for this loan is outlined above. The total amount of money that will be paid back is $674,915.

Payment Schedule for RenoBlue			
Year	**Principal Paid**	**Interest Paid**	**Loan Balance**
Begin	$0	$0	$550,000
2023	$65,190	$31,227	$484,810
2024	$69,211	$27,206	$415,599
2025	$73,479	$22,937	$342,120
2026	$78,011	$18,405	$264,109
2027	$82,823	$13,593	$181,286
2028	$87,931	$8,485	$93,355
2029	$93,355	$3,062	$0
Totals	**$550,000**	**$124,915**	

X. KEY METRICS

RenoBlue's key metrics will evaluate overall performance through a variety of interdependent indicators, where the performance of one metric can significantly impact the result of the others.

Proposal Win Rate

Proposal win rate measures the percentage of the total project proposals accepted by prospects, and RenoBlue's initial benchmark is **15%**. Because microgrids require larger investments and are new to the market, the lower percentage number is indicative of RenoBlue's conservative projections. After a few years of operation, accelerated by the microgrid industry's growth, RenoBlue expects its proposal win rate to eventually increase to 20-25%. If it drops below 15%, then an evaluation will be conducted to determine whether changes should be done to costs, services, or company image.

Customer Satisfaction Score (CSAT)

A CSAT score measures customer satisfaction with a survey that uses a scale of 1 to 5. To ensure a higher completion rate, RenoBlue will keep its survey short with two questions (with optional open-ended comments): "How satisfied were you with your experience at RenoBlue?" and "Did the product meet your timely expectations?"

This metric is easy for RenoBlue to measure, easy for clients to answer, and produces a quantitative metric of how satisfied they are with qualitative feedback explaining why. RenoBlue is striving for a CSAT score of **85%** or higher to differentiate itself from others in the industry, who typically have 70-80% (American Customer Satisfaction Index). RenoBlue acknowledges that CSAT scores are subject to response bias, extraneous circumstances, and provide limited detail. Therefore, RenoBlue will combine this score with other metrics such as client retention rate to gain a more complete understanding of customer satisfaction.

Profitability Ratios

Profitability ratios measure the financial performance of a business. These ratios are important as they provide investors and other stakeholders with an indication of the financial health of the company. Examples of profitability ratios that RenoBlue will look at are return on assets, gross margin, return on equity, and net margin. In particular, RenoBlue is aiming conservatively for a **10-15%** net margin and **65%** gross margin in its first few years of operation.

Sales Backlog

Sales backlog examines the number of sales orders that a company has received, but has not completed yet. This metric measures the amount of future business RenoBlue has in its pipeline, otherwise known as gross revenue. The backlog will be tracked by the number of scheduled future projects. It is ideal that the backlog consists of **2-4** projects at any given time, in order to ensure operation for the following 8 months. If the sales backlog is low, then RenoBlue will focus more on outbound marketing strategies to attract and secure more prospects.

XI. COMPETITIVE ADVANTAGE

The shared weakness of RenoBlue's competitors is that their microgrids, typically between $2 to $3 million/MW, are expensive and limited to small markets. RenoBlue's advantage is that our microgrids are **more affordable and accessible** because of our novel technology. The following competitive advantages were developed with the aid of Dr. Greg Mowry, the co-founder of Renew Power Systems Inc. and architect of the University of St. Thomas microgrid.

Product Differentiation

So far, it has been thought that every microgrid project has a different product because of the varying nature of client desires, energy sources, sizes, etc. This behavior leads to expensive costs and excessive hours spent on designing the project. RenoBlue's solution is creating a **scalable** and **modular** microgrid by using the **same controls** that allow energy sources to be interchangeable.

Scalable and Modular Controls → Increased Accessibility

RenoBlue's design uses a stackable control system. The controls are programmed with intelligence in their software; their intrinsic intelligence allows them to **connect** and **self-synchronize** the voltage from a mix of power sources, automatically adjusting the power flow as needed.

A scalable and modular system overcomes the greatest obstacle to microgrid contracts, which is the comparatively high cost. Therefore, RenoBlue will become an attractive option for customers who are looking to quickly and cost-effectively upgrade their energy infrastructure. With this model, RenoBlue can accomplish more projects a year, and more importantly, provide microgrids to those who find alternative market choices inaccessible.

Example Scenario

Operationally, RenoBlue will produce 100-kilowatt (kW) and 250-kW capacity controls (250 kW is 0.25 MW). We can apply this modularity to an example customer scenario to showcase the efficiency advantage over competitors. For instance, a customer could be contracted for a 0.5 MW microgrid with a wind and solar power. Later on, they may decide to reduce their capacity to 0.25 MW and remove the wind resource. With scalable technology, RenoBlue can quickly remove a 250-kW control without impacting existing energy distribution.

A normal microgrid could take months to make this implementation change, but RenoBlue would only take a matter of weeks. Regardless of increasing or decreasing energy consumption, our controls intelligently detect the change in power flow and redistribute it accordingly. This type of operation model offers a direct reduction in both engineering activity and resulting costs.

This feature also solves the reliability problem mentioned in Section IV: Unique Value Proposition, regarding the control center. Traditional microgrid systems fail if the central control system is affected, but using multiple intelligent controls allow RenoBlue's microgrids to continue running if said situation occurs. Finally, at the end of the microgrid's lifespan of around 15-20 years, RenoBlue can easily replace the controls.

XII. CONCLUSION

RenoBlue is a pioneer engineering company that delivers reliable, resilient, and renewable energy. Its unparalleled technology, service, and affordability will warrant a strong start-up. It is requesting a $550,000 financial loan paid back over a seven-year term at a 6% interest rate, which will help ensure a positive cash flow in the first year of operations. The founders, Sunny and Krish, will also personally invest $150,000, and this combined capital will cover initial operating costs.

RenoBlue is forecasted to grow steadily as it expands its operational scope, specifically targeting industrial, commercial, and residential facilities prone to costly energy bills and outage disturbances. RenoBlue will have a strong position in the microgrid market because of the key points summarized in the following table. From this foundation, RenoBlue aims to promote its competitive advantages through social media, content marketing, and active outreach. RenoBlue is forecasting a 11% net margin for the first year of operation.

Key Points	Result
Scalable and Modular Technology	Decreases engineering activity, improves project timelines, and reduces overall costs
Affordable and Accessible Services	Separates RenoBlue from other competitors by providing solutions that encompass a wide range of customer needs
Reliable, Resilient, Renewable	Promotes a green environment for clients while having a continuous and resilient energy source

Overall, RenoBlue's microgrids include the traditional benefits of a localized energy network, while also differentiating through accessible affordability. Not only do microgrids enhance resilience within the grid, but they also provide clean energy in accordance to new green initiatives by the government. These self-sufficient systems set up large establishments to continuously have power, even if the main grid is unavailable, bringing clear benefits to both the environment and customer.

RenoBlue's microgrids are distinctively unique in that its use of scalability and modularity expands customer segments, reduces costs, and provides a new revenue stream for clients. RenoBlue will dominate the rapidly expanding microgrid market and transform electricity delivery, paving the path for a new grid.

XIII. BIBLIOGRAPHY

Personal Interviews

Professor Beibei Dong: Associate Professor of Marketing at Lehigh University (17 Nov. 2022)

Dr. Wenxin Liu: Director of Smart Microgrid and Renewable Technology Laboratory (27 Nov. 2022)

Stephanie Bostwick: Project Manager at NREL Energy Security and Resilience Center (19 Dec. 2022)

Dr. Greg Mowry: Professor of Electrical & Computer Engineering, Designed the St. Thomas Microgrid, Founder of Renew Power Systems Inc (20 Dec. 2022), (6 Jan. 2023)

- **Patent**: Mowry, Greg, et al. Self-Synchronizing Devices, Systems, and Methods. US Patent 11,228,183 B2, United States Patent and Trademark Office, 22 Jan. 2022.

Websites & Other Sources

Collom, Mike. "Microgrid Implementation: Steps for Success." EnTech Solutions, 5 Oct. 2022, energybyentech.com/blog/microgrid-implementation-steps-for-success/. Accessed 22 Jan. 2023.

Heilweil, Rebecca. "The US power grid isn't ready for climate change." *Vox*, 3 July 2021, www.vox.com/recode/2021/7/3/22560691/power-grid-climate-change-heat-wave.

Koolbeck, Maddie, et al. "Microgrids can be a building block to more resilient communities." *Slipstream*, 28 July 2022, slipstreaminc.org/research/microgrids-resilient-communities.

Lee, CC., Maron, M. & Mostafavi, A. Community-scale big data reveals disparate impacts of the Texas winter storm of 2021 and its managed power outage. *Humanit Soc Sci Commun* 9, 335 (2022). https://doi.org/10.1057/s41599-022-01353-8

Pan, Weiqi, and Yang Li. *Improving Power Grid Resilience Under Extreme Weather Conditions With Proper Regulation and Management of DERs—Experiences Learned From the 2021 Texas Power Crisis*. 1 July 2022. Frontiers in Energy Research. *Frontiers*, https://doi.org/10.3389/fenrg.2022.921335

XIV. APPENDIX

SWOT Analysis

Strengths	Weaknesses
People: A small installation team allows for streamlined communication, agile services, and lower overhead costs	**People:** Microgrid's requires specific types of engineers (software, control, mechanical), making it difficult to find skilled employees
Resources: RenoBlue's model utilizes robust battery storages, renewable energy, and intelligent controls, allowing for efficient energy management	**Resources:** A dependence on a single supplier for components such as batteries could leave RenoBlue vulnerable to supply chain disruptions and price fluctuations
Innovation: A technologically advanced model, new to the market, that uses software intelligence, scalability, and modularity	**Innovation:** Valuing a particular model makes RenoBlue more resistant to change and adopting new technologies that could improve competitiveness
Marketing: Inbound and outbound channels fosters personal relationships and efficiently reaches targeted leads	**Marketing:** Microgrids are complex and difficult to understand, so marketing efforts will not be immediately apparent to customers unfamiliar with the technology
Operations: RenoBlue's cost-effective model enables flexibility and easily adaptable changes	**Operations:** If a key personnel leaves the company or is unavailable, it will disrupt ongoing projects
Finance: Positive monthly income occurs at the half year mark and the revenue streams diversifies RenoBlue's income	**Finance:** RenoBlue's various operating expenses and monthly loan payments lead to lower net margins
Opportunities	**Threats**
Political: The government offers a large pool of funding for RenoBlue to tap into, allowing it to expand its customer base	**Political:** Regulatory barriers limit RenoBlue's ability to expand its business to different states, where policies may differ
Economics: Philadelphia is the largest economy in PA ranked by GDP, creating a more favorable business climate	**Economics:** A high GDP and strong economy comes with rising competition, higher costs, and regulatory changes
Social: A growing interest in sustainability leads to increased demand for renewable energy solutions	**Social:** A lack of awareness about microgrids makes it more difficult to gain support and secure clients
Technological: Machine learning, AI, and IoT technology enables more sophisticated energy management systems	**Technological:** New innovations are constantly emerging, posing a challenge for RenoBlue to stay alerted with recent trends and remain competitive
Legal: Many utility companies are adopting policies that allow for microgrid integration into the power grid	**Legal:** Changing regulations on how microgrids will work in conjunction with the power grid creates uncertainty around RenoBlue's future revenue
Ethical: RenoBlue's affordable and accessible services can provide reliable energy to underserved communties, tribes, and remote areas	**Ethical:** There are ethical debates related to data privacy, where consumers are concerned about how microgrids store and use data