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Alternative Energy SA

Electricity for all, for rapid urbanization

Prepared in 2024

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1. EXECUTIVE SUMMARY

Alternative Energy SA is a startup founded in 2024 that aims to establish decentralized, solar-powered microgrids in off-grid or grid-deficient regions of Cameroon, providing reliable and affordable electricity through a Pay-As-You-Go (PAYG) model.

The key components include large-scale solar power generation, a localized microgrid distribution network, and the implementation of the PAYG system.

The proposed business model is "Energy as a Service" (EaaS), where customers pay a recurring subscription fee or a performance-based contract rather than making an upfront capital investment.

The primary benefits include reliable and affordable electricity, scalable and replicable solution, economic and social development, and environmental sustainability

1.1. PROBLEM STATEMENT

Despite the national grid's higher accessibility in urban centers to the national grid compared to rural areas, power outages remain a significant concern, and many rural communities lack any connection to the grid at all. This lack of electricity access in off-grid and grid-deficient hinders economic and social development, and perpetuates environmental sustainability challenges in these underserved regions.

despite the higher accessibility of urban centers to the national grid compared to rural areas, power outages remain of great concern, not forgetting the inaccessibility of some rural areas to the national grid.

1.2. KEY PROPOSITION

We propose the implementation of solar-powered microgrids for a decentralized and reliable distribution system of electricity to off-grid and grid-deficient areas. The key components include

large-scale solar power generation, a localized microgrid distribution network, and the implementation of the PAYG system.

1.3. MARKET ANALYSIS

Cameroon's diverse climate conditions present significant opportunities for the deployment of solar-powered microgrids. The southern regions of the country are characterized by humid, equatorial conditions with temperatures ranging from 20-25°C, while the northern regions experience semi-arid and dry conditions with temperatures between 25-30°C. Interestingly, the optimum temperature range for photovoltaic solar panels to operate at peak efficiency is around 25°C, indicating that Cameroon's climate is well-suited for solar power generation

Statistics show that only about 32% of Cameroonian households have access to the national grid. There are three electrical grids in Cameroon. About 68% of the population of the 5 regions Center, Littoral, East, South-West, South are subscribed to one grid, about 20.2% of the population of the West and North-West regions are subscribed to the second grid, and only about 11.6% of the population of the Adamaoua, North and Far-North regions are subscribed to the third grid. Moreover, solar energy is one of the least consumed energy sources in Cameroon from statistics. This presents a need for a more decentralized grid system in areas of unreliable access to electricity.

1.4. KEY FEATURES AND BENEFITS

The benefits of this solution are that it is a reliable source of electrical energy, an affordable, scalable and replicable solution for expansion to off-grid and grid-deficient regions and areas in Cameroon through a Pay-As-You-Go (PAYG) model. Furthermore, it contributes to Cameroon's transition to clean, renewable energy.

1.5. FINANCIAL SUMMARY

The projected cost of this project is about \$4 million per megaWatt(MW). The breakpoint is estimated to be 12 years and revenue is generated from payments from customer subscription to the microgrid and selling spare power back to the microgrid..

2. COMPANY BACKGROUND

AltEnergy is a public limited liability company which was conceived in 2024 to address the challenges faced in extending the national grid to very remote areas in Cameroon, and the difficulties faced in ensuring smooth and consistent supply of energy to homes and other structures.

2.1. MISSION STATEMENT

Our mission is to provide reliable, affordable, and sustainable electricity through solar-powered microgrids.

2.2. VISION STATEMENT

Our vision is to improve the quality of life of Cameroonians and accelerate urbanization.

3. SERVICE DESCRIPTION

The service proposed is that of a micro-grid approach to tackle the electricity accessibility gap in different parts of the country. In this approach, community-based solar-powered microgrids will be established in off-grid and grid-deficient regions. The micro-grids would be embedded with energy storage systems to offer a controllable and predictable power source or load reliability, for the better management of electrical energy generation, consumption and storage, and for resilient and reliable power supply to communities.

4. SWOT ANALYSIS

4.1. STRENGTH

The strength of this business venture lies in the problems it seeks to solve namely;

- ❖ Accessibility: provide electricity to all including low income communities.

- ❖ Sustainability: It is environmentally friendly and sustainable as it is generated from renewable energy sources.
- ❖ Scalability: The solution is scalable and can be replicated across the country as the need arises.
- ❖ Independence: It can operate independently from the main power grid.
- ❖ It helps to make up for the power outages, acting as a secondary source of electricity in grid-deficient areas.
- ❖ Selling spare power back to the microgrid limits wastage by the solar PV system.

4.2. WEAKNESSES

Some of the weaknesses include;

- ❖ Despite being a pay-as-you-go model of payment, because the service is rendered as monthly subscriptions which are offered after payment, the consumer may overpay given that he has not gone through the mode of operation of the system in place.
- ❖ Microgrids are quite costly to build, and require special skills to operate and maintain.
- ❖ Microgrids include controls and communication systems that have cybersecurity risks.

4.3. OPPORTUNITIES

- ❖ Government Support: Potential for government incentives and subsidies for renewable energy projects.
- ❖ Technological Advances: Ongoing innovations in solar technology can reduce costs and improve efficiency.
- ❖ Partnerships: Opportunities to collaborate with NGOs, international organizations, and local governments.

4.4. THREATS

- ❖ Regulatory Changes: Changes in energy regulations could impact operations.
- ❖ Market Competition: Increasing competition from other renewable energy providers.
- ❖ Economic and Political Factors: Economic and political instability could affect funding and customer affordability.

Operational Risks

- ***Equipment Failure:**** Implement a robust maintenance schedule and have backup systems in place to minimize downtime.
- **Skilled Labor Shortage:** Invest in continuous training programs and offer competitive salaries to attract and retain skilled workers.

Financial Risks

- **Funding Shortfalls:** Secure diverse funding sources, including grants, loans, and equity investments. Maintain a contingency fund to cover unexpected expenses.

Market Risks

- **Competition:** Differentiate our services by emphasizing reliability, affordability, and sustainability. Stay ahead of competitors by continuously innovating and improving our technology
- . - **Regulatory Changes:** Monitor regulatory developments closely and ensure compliance with all relevant laws and standards. Engage with policymakers to advocate for favorable regulations.

5. MARKET ANALYSIS

5.1 MARKET PLANNING

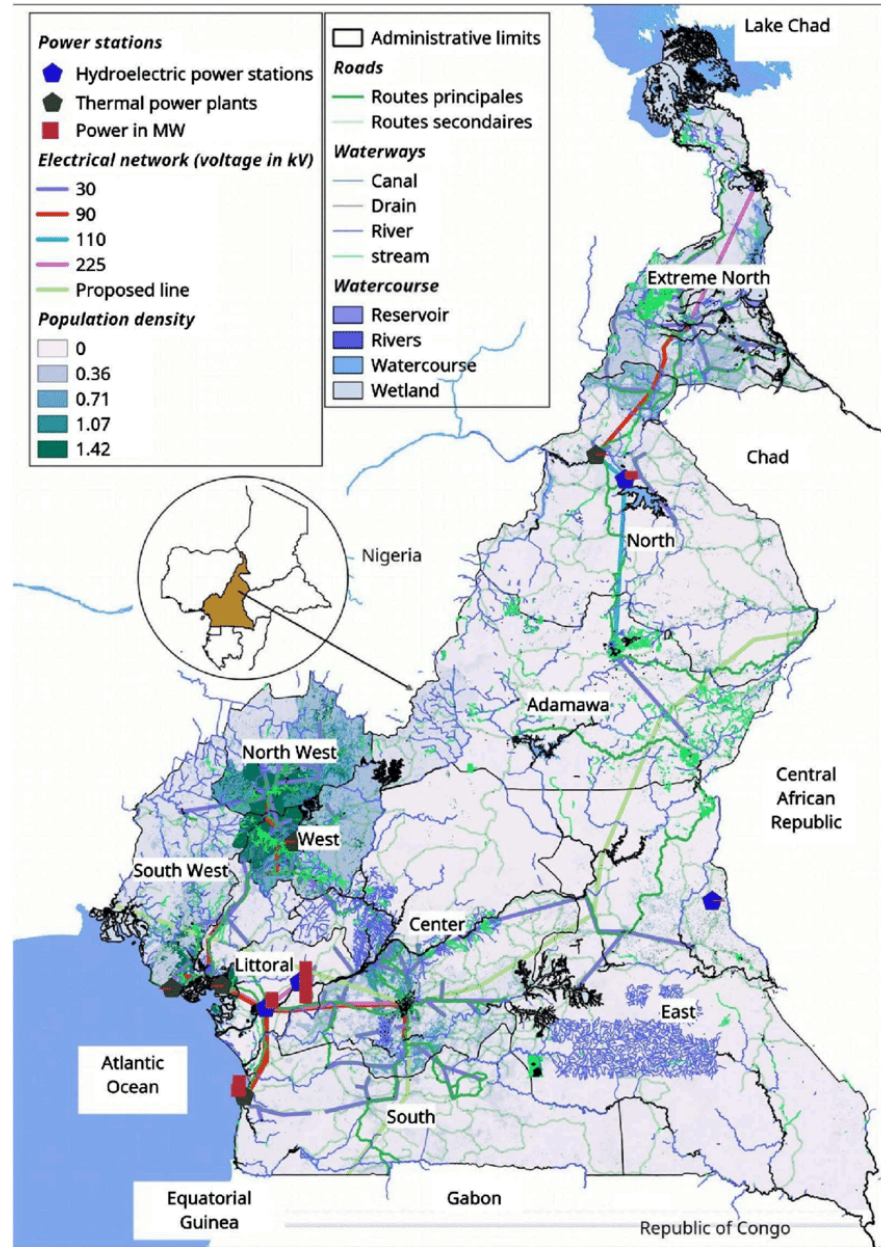


Figure 1: Electrical Energy Distribution in Cameroon

Source: Research gates, Creative Commons Attribution.

From the diagram, it is seen that there are very few hydroelectric power stations, and thermal power plants. The electric network in terms of power generated is unevenly distributed, and is concentrated in populous areas (SOUTH, SOUTH-WEST, LITTORAL). Most of the energy produced is from biomass, petroleum products and electricity.

The 3 electrical grids in Cameroon have a percentage subscription of about 32%.

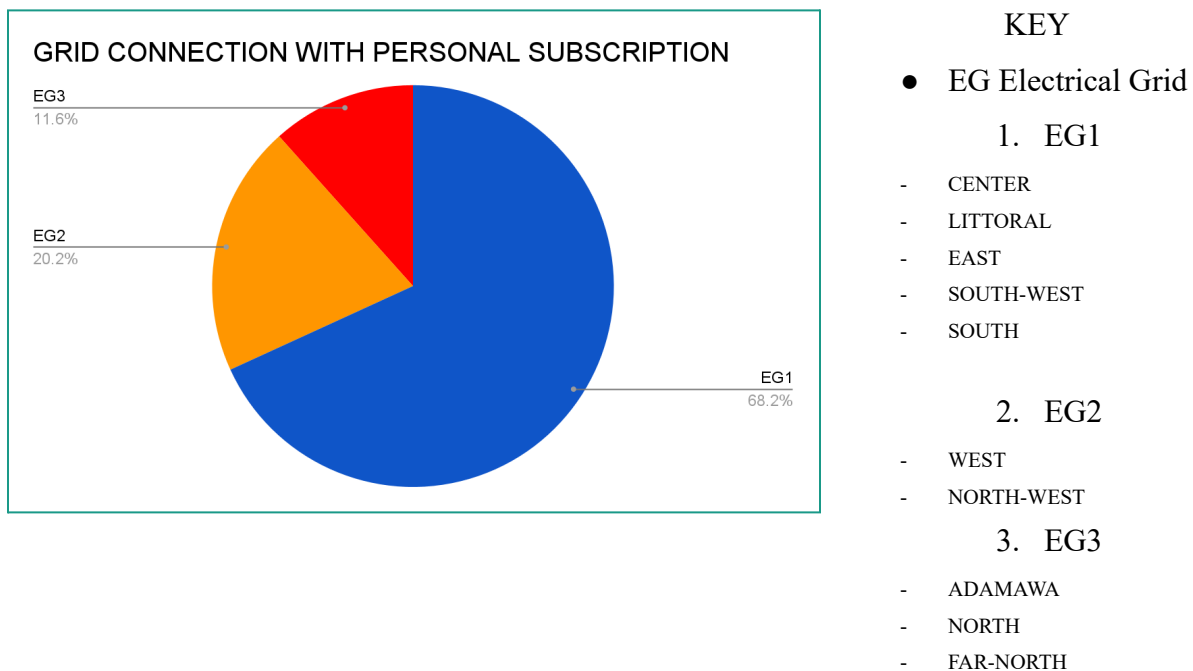


Figure 2: Personal subscriptions to the nation's electrical grids
Source: Household access to the public electricity grid in Cameroon, 2024,
www.sciencedirect.com

Only about 32% of the population in Cameroon are subscribed to the national grid. Of the grids, 68.2% of the population of the regions covered by EG1 are subscribed to it, 20.2% of EG2 are subscribed, and 11.6% are subscribed to EG3.

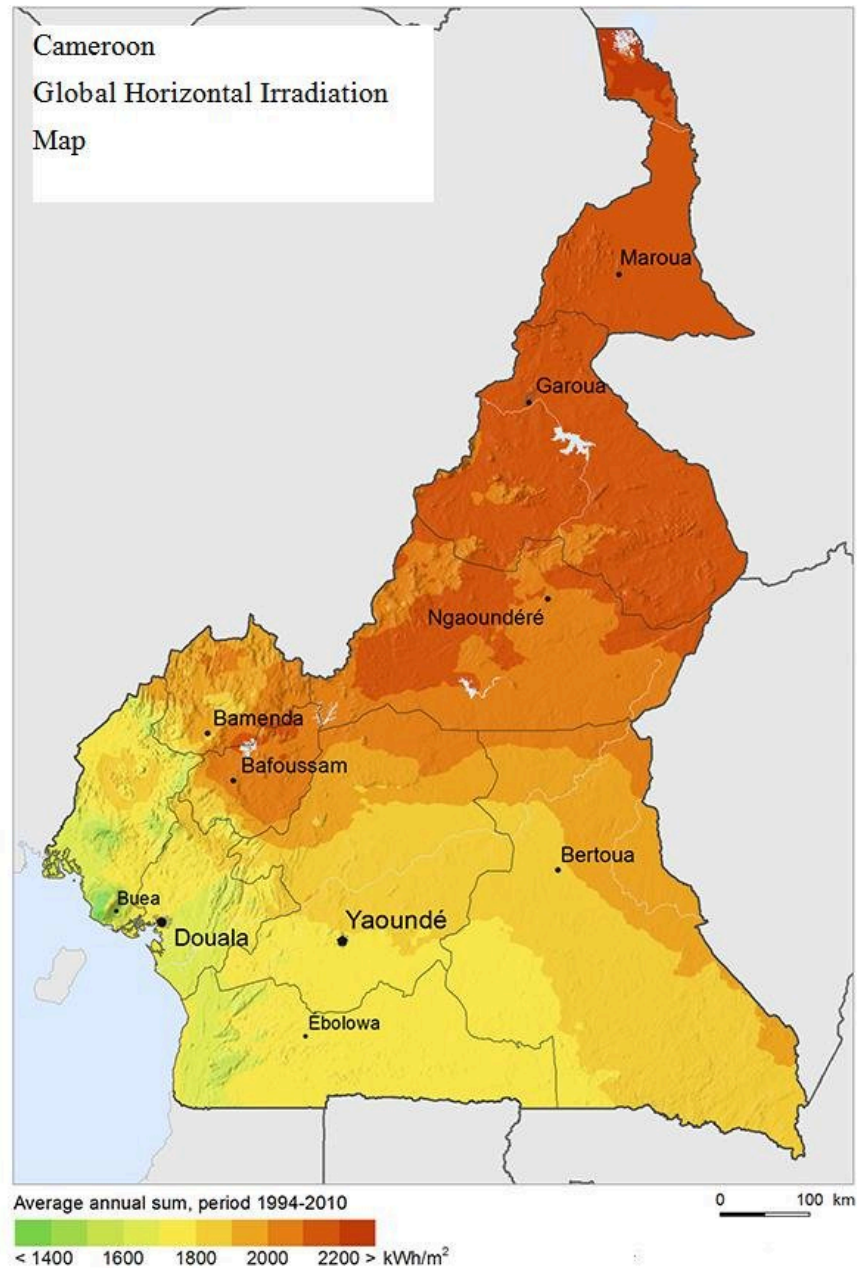


Figure 3: Irradiation in Cameroon
Source: Andrew Lucas, Research gate

The figure shows the irradiation of Cameroon. Cameroon is a tropical country making electrical energy production from solar radiation very reliable. The potential of solar energy generation in Cameroon is over 5GW.

The solar micro-grids can be built more in the northern part of the country as those areas are grid-deficient and highly irradiated, also building a few in other parts of the country to make up for electricity outages as seen in figure 1.

While building the solution, it is of great importance to keep in mind the problem that is to be solved. For this, engaging with the local communities to understand their energy needs and hence help planning and decision-making address more accurately the problem at hand.

5.2 COMPETITOR ANALYSIS

Of the total electrical energy produced in Cameroon, 78.29% is produced by ENEO S.A Cameroon, while 21.71% is produced by independent producers (GLOBELEQ, ALTAAQA Sinohydro China and AGGREKO)(source: www.rees-journal.org).

The producer ENEO SA is already quite established in the country though it is a foreign company as it has over the years penetrated the market and striven to satisfy its customers through various additional products, services, offers and customer service. But the challenges of Cameroonians still seem not to have been significantly mitigated. Some of which are power outages, high cost of accessing energy as perceived by some, low rates of electrification plan, poor maintenance and architecture. Therefore, altEnergy stands a good chance in the market as far as solving some of these problems are concerned. The challenge will be to gain a wider market.

Aside from being the main energy producer in Cameroon, there is a wide use of solar panels and other sources of energy for electricity production. In this way, there is a need to have a competitive advantage such as making our service more affordable to the population.

6. OPERATIONS PLAN

The goal of altEnergy is to provide reliable and affordable electricity to Cameroonian households. The objective is to build localized electricity generation and distribution networks, powered by solar energy.

Supply Chain Management: We will partner with reputable solar equipment manufacturers and logistics providers to ensure timely delivery of high-quality components.

Staffing and Training:

- Recruit and train local technicians and engineers on the installation and maintenance of solar microgrids.
- Establish ongoing training programs to keep staff updated on the latest technologies and best practices.

6.1. PROCEDURE

To do this, PhotoVoltaic(PV) arrays, energy storage systems and local distribution networks are leveraged.

Micro-grids are built in target areas to supply households with electricity, whose source is independent of that of the national grid and is renewable. The microgrid is embedded with a system for energy storage to provide a reliable and on-demand supply of energy. Since the energy can be used on-demand, it therefore implies it is a pay-as-you-go method implemented for consumers to have power over the amount of energy they consume.

The procedure is summarized in the steps below:

1. Design and Planning: Develop detailed plans for each microgrid installation based on community needs and site assessments.
2. Procurement: Source solar panels, batteries, inverters, and other necessary equipment.
3. Installation: Deploy installation teams to set up the microgrids, including energy storage systems.
4. Maintenance: Implement a regular maintenance schedule to ensure system reliability and longevity.
5. Customer Service: Provide 24/7 support for customers, including troubleshooting and emergency repairs.

6.2 MARKETING STRATEGY

For marketing these services, we would employ advertisement, promotion based on the number of times a user subscribes to the services offered.

Market Segmentation

Our target market is the rural and semi-urban communities with limited or unreliable access to the national grid.

Marketing Channels

- Social Media: Utilize platforms like Facebook, Instagram, and Twitter to reach a wider audience and engage with communities.
- Local Advertising: Use radio, local newspapers, and community events to promote our services.
- Partnerships: Collaborate with local governments, NGOs, and community organizations to increase outreach and credibility.

Customer Acquisition Strategy:

- Pilot Projects: Showcase successful pilot projects and use testimonials from satisfied customers.
- Promotional Offers: Provide introductory discounts and referral incentives to encourage early adoption.
- Community Engagement: Organize workshops and seminars to educate communities about the benefits of solar microgrids and how to use them effectively.

6.3 TIMELINE

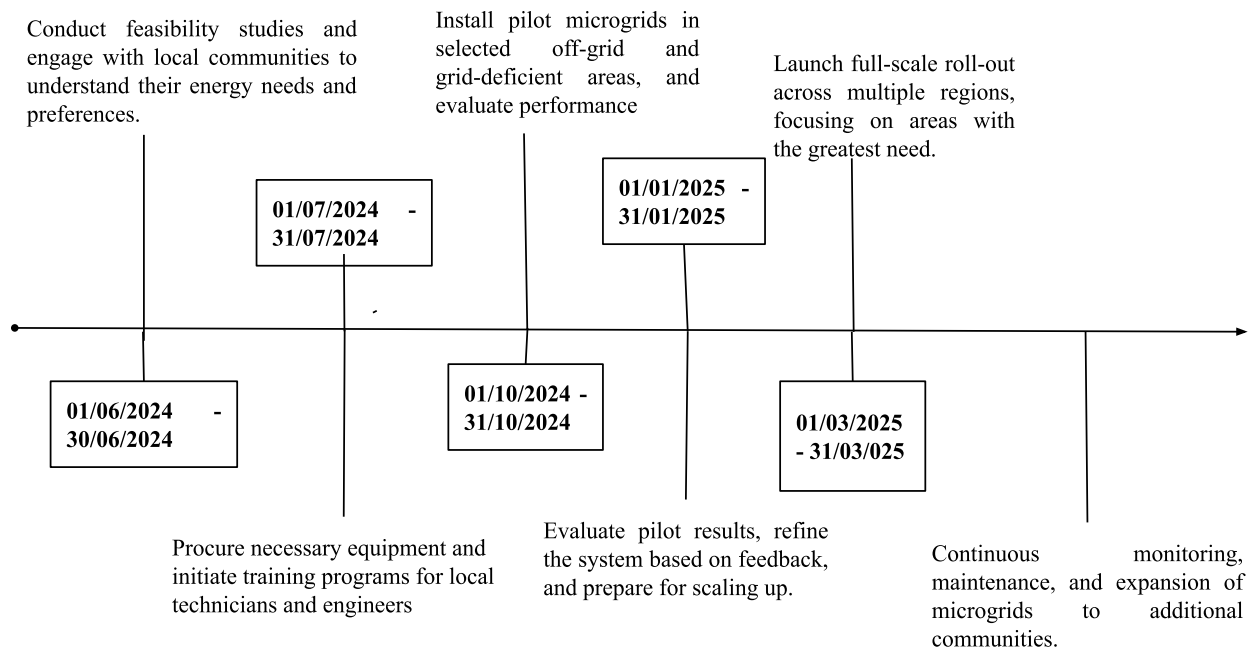


Figure 4: Estimated timeline for the project

7. FINANCIAL PLANNING

The proposed business model is "Energy-as-a-Service" (EaaS), where customers pay a recurring subscription fee or a performance-based contract rather than making an upfront capital investment.

7.1 BUDGETING

7.1.1. COST

The estimated cost for the various components are given in the tables below in terms of the percentage of total funds.

Component	Description	% of Total Estimated Cost
Equipment and Installation costs	Procurement and labor costs.	75%
Construction management	Construction Oversight and project management costs.	15%
Design and Engineering	Surveying the electrical system; running supporting analysis; creating plans; environmental compliance documents, and permit applications	10%
Total		100%

Table 1: Percentage cost of components and their description

Component	Equipment Costs
Conventional generation(natural gas, oil, diesel)	54%-76%
Renewable generation	10%
Energy storage	9%-15%
Control systems	3%

Soft costs(engineering construction, commissioning, regulatory costs)	2%-9%
Additional electrical infrastructure	<1%

Table 2: Percentage cost of additional components.

The total cost of implementation is about \$4 million dollars.

7.1.2 REVENUE

Some of the sources of revenue for the proposed solution include:

1. Payments from customer subscription to the microgrid. When a customer subscribes to a microgrid and he uses less energy than he paid for, it serves as a source of income to the company. But of course a manual is provided where the cost of electricity per MW is given.
2. Selling spare power back to the microgrid can be used as a source of income as the spare power can be sold. This also limits wastage by the solar PV system.

7.1.3. FINANCIAL FORECASTING

The price of electricity for households is approximately XAF50 per kWh and this price varies based on the residence if it is an enterprise and so on. The population of Cameroon is about 28 million.

if 1kWh of energy is consumed per household daily, the total revenue is

$$\begin{aligned} & \text{XAF50} \times 28,000,000 \\ & = \text{XAF } 1,400,000,000 \text{ daily} \end{aligned}$$

And $1,400,000,000 \times 365$

$$= \text{XAF } 511,000,000,000 \text{ as revenue yearly.}$$

The growth projection is in line with a forecast of 15% expansion per year, to reach an annual market value of \$23.5 billion dollars.

7.1.4. FUNDING OPTIONS FOR THE STARTUP

Some funding options for the business include:

- ★ Fundings and grants from NGOs.
- ★ External investment by investors willing to partner with the company.
- ★ Sales of shares to shareholders and the public.
- ★ Selling back energy into the micro grid and reinvestment.

8. DOCUMENTATION AND BUSINESS CREATION PROCEDURE IN CAMEROON

In the dynamic landscape of Cameroon's energy sector, entrepreneurs looking to establish an energy company find themselves at the fore-front of the transformative industry. In the heart of Africa, Cameroon emerges as a strategic hub for energy related ventures.

8.1 ENERGY COMPANY REGISTRATION PROCESS IN CAMEROON

8.1.1. PRELIMINARY LEGAL STEPS

This involves conducting thorough feasibility studies before initiating the registration process, in order to understand the market dynamics and set ourselves up for success .The appropriate legal structure for the company is chosen considering liability, taxation, operational flexibility, and the company's business goals.

8.1.2. ESSENTIAL DOCUMENTS FOR REGISTERING AN ENERGY COMPANY IN CAMEROON

To register an energy company with the Cameroon government the following documents are to be prepared:

- A comprehensive business plan outlining the company's objectives, strategies, and financial projections.
- A Memorandum of Association
- An Article of Association.

- Documentation confirming the business' address and compliance with zoning regulations for energy-related activities.

8.1.3 APPLICATION PROCEDURES FOR POWER GENERATION LICENSES IN CAMEROON

An application for a license is prepared by the company, and submitted accordingly.

In addition to these, the company must ensure have legal compliance and sustainable practices such as:

- ❖ Compliance with environmental impact assessment.
- ❖ Compliance to the regulations related to renewable energy initiatives.

9. LEGAL STRUCTURE OF THE BUSINESS

altEnergy is registered as a public limited liability company , and can own and transfer property, enter contracts and be held liable for crimes. In this legal structure, the owners personal liability for the company's actions are limited, and continuity of the moral entity is ensured without dependence on the founders, owners or shareholders.

Again, it makes it easier to meet a growing business' capital-funding needs, as numerous investors can contribute as shareholders of the company. This legal structure is efficient in a capitalist economy as it protects the interest of the private actors, and prices can be freely set on demand and supply, so that the best interest of the society is served.

