Business Plan

Shared Solar Cold Rooms for Safe Food Storage

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Executive Summary

ENdep Limited is an Energy Service company (ESco) that focuses on clean energy projects development aimed at mitigating energy costs and improving rural livelihoods. The company is made up of a group of professionals including environmental entrepreneurs, engineers, food technologists and business development specialists who are seasoned through their many years of working in other private and government and non-governmental organisations.

The proposed project aims to build solar powered cold rooms using imported equipment / materials and install flake ice plants. Once the cold storage facility (ies) is complete, the company shall offer cold food storage service and sell flake ice to fishermen/women & fish traders along Lake Victoria. At a later stage of the project the company will expand to cold storage of meat, poultry, dairy, and horticultural crops.

The market size for fish cold storage in Mwanza is estimated at USD 11,336,000 which offers a lucrative business opportunity. On the other hand, most fish trading enterprises particularly those of women and youth cannot afford high upfront capital and running costs for cold storage facilities which creates a demand for affordable cold storage rental facility. Thus, the proposed model entails bundling the product (i.e. solar cold room) with a fish storage rental service as an offering to the fish traders paying affordable and competitive rental fee rate of USD 0.15 per kilogram per day. The plan is to start with fish storage around Lake Victoria and scale up country wide.

The project will be operated under the direct management of a project manager who is an experienced food technologist. ENdep's management team will provide an oversight, technical and administrative support to the project.

The estimated total project cost is **USD 620,273** with average annual operation and maintenance costs at USD 264,614.55. The estimated annual revenue is **USD 487,476.19** with an internal rate of return of **45%** and the breakeven point will be achieved after **eighteen months**.

1. The Business

1.1 General company description

ENdep Ltd is a turnkey Energy Service Company (ESco), a project developer and supplier of renewable energy and energy efficient equipment. We specialize in Waste Recycling Plants, Waste Heat Recovery Power Generation (WHRPG), anaerobic digestors, gasifiers, burners, incinerators, thermal Energy Storage, heat pumps, boilers, microturbines and other industrial systems. ENdep also provides consultancy on industrial equipment purchase, conducts energy audits and provides customized end-to-end solutions aimed at mitigating energy costs and increasing efficiency.

The company was incorporated in Tanzania in the year 2013 under the Company Act (R.E 2002) as a private company limited by shares. ENdep is owned by two founding directors who own 30% and 21% of the company shares, respectively. Initial resources for the company had been employed from the founding members before establishing an operating cashflow as result of the business dealings. ENdep's board of directors is resourced by a group of professionals including environmental entrepreneurs, food technologists, engineers and business development specialists who are seasoned through their many years of working in other private and government organisations.

1.2 Business Concept

The company's vision is to be a market leader in deployment of clean energy equipment to businesses in Tanzania and beyond necessary for contributing towards social and economic growth.

ENdep will build infrastructure and provide its customers with affordable, accessible and reliable cold food storage services to reduce their post-harvest loss and increase revenue. The business targets fish traders in need of cold storage facilities particularly women and youth. Most women and youth who aspire to engage into fish business face high upfront costs for purchasing deep freezers that may cost up to USD 463 which bigger portion would otherwise be utilized for purchasing, freezing and transport fish to lucrative markets. They also encounter challenges related to access and limited storage space from the existing grid connected storage rooms, each with maximum storage capacity of two tons.

Fish Traders who have managed to afford purchasing deep freezers, have challenges of limited storage capacity of 100 kg, frequent breakdowns of their freezers' compressors, interrupted power supply, electricity bills and fuel costs for backup generators. Our business is positioned to disrupt these challenges by offering the following value propositions:

- High capacity of up to 20 tons' storage
- Easy access to storage facility
- Quick and seamless packing and unpacking
- Good consignment identification
- Blast freezing
- Remote monitoring
- Affordable rental price
- Off-grid storage
- Handling hygiene according to international food standards
- Quality pre-screening
- Pre-booking arrangement and retainer services

These values will be delivered through the solar cold room acting as a channel to the customers. We expect the revenues to be generated from storage rental fees charged per kg per day; premium fees for pre-booking; premium fees for quality pre-screening; contract retainer fees. An additional revenue stream will be from either from the sale or rental of standalone solar power generator-BackPack that can be used to retrofit the existing grid/diesel powered cold rooms.

ENdep will also:

- Develop an employee training program to further enhance all employees' customer service skills
- Create and bring to market a unique service brand to differentiate from the traditional competitors
- Design a marketing plan to increase service purchase by current customers and attract new customers within the existing target markets
- Continue to improve operational efficiency and reliability by embracing new cold food storage technologies

Going forward, we intend to install a second solar cold room after one year. Depending on demand and the prevailing market conditions, we will allow flexibility on whether to continue investing in fish storage or move to fruits storage. The mid-term and long-term plan (after 5 years) is to diversify into the distributorship and sale of the solar cold rooms in-country for other agricultural products including meat, dairy, poultry, vegetables and horticultural crops. The solar cold rooms for other products than fish will also cater for small-holders and widely distributed across the value chain from farms to markets in Tanzania.

1.3 Company business philosophy and vision

It is our strict policy and pride that, we are developing projects that bring about positive environmental, social and economic impact in addition to sustainability. In achieving this, we always collaborate with like-minded technology partners and investors.

With our continuous effort and hard work, we aim at eventually becoming the market leader in clean energy project development in Tanzania and beyond.

Our core company values include:

- Customer first: We strive to delight our customers
- Quality: We provide unparalleled quality services
- Efficiency: We keep our promise to deliver on time
- Team work: We respect the contribution of each team member
- Accountability: We take responsibility for what we do
- Environment: We contribute to the improvement of the environment and mitigate climate change impact

1.4 Food cold storage industry

An estimated one third of the global food supply is wasted. About 40% of that food loss occurs post-harvest, costing developing nations USD 310 billion a year for a total cost of over USD 1 trillion globally[1,2].

In developing nations, food waste and losses occur mainly at early stages of the food value chain and are directly impacted by inadequate storage and cooling facilities[3].

Africa has 60% of the world's arable land, yet African crop yields are five times less than the global average[4]. And more than 60% of the population of sub-Saharan Africa is smallholder farmers, and about 23% of sub-Saharan Africa's GDP comes from agriculture[5].

Nevertheless, the fight against hunger in Africa has experienced many successes in boosting agricultural production from improving seeds to disseminating solar-powered irrigation. There is increasing recognition by agricultural organizations and experts that lack of storage represents a major impediment to keeping all those harvests edible. It is a difficult problem because the smallholder farmers lack the resources to invest in cold or effective storage facilities.

In Tanzania, Food storage facilities are publicly or privately owned. They are used for both commercial and public purposes with varying capacities and conditions. Tanzania storage market is mainly composed of small and medium warehousing facilities.

Specifically, the food cold chain in Tanzania is underdeveloped. There is a cold storage for exports at Kilimanjaro airport, dedicated for the export of flowers, fruits and vegetables while Dar es Salaam airport has limited cold storage space for handling medicines and other non-food items. There is a limited reefer or cold chain facilities available at the Dar es Salaam port

[1] Fox, T., & Fimeche, C. (2013). Global food: Waste not, want not. London: Institution of Mechanical Engineers.

[2] Gustavsson, J., Cederberg, C., Sonesson, U., Van Otterdijk, R., & Meybeck, A. (2011). Global food losses and food waste. Rome: Food and Agriculture Organization of the United Nations (FAO).

[3] FAO. (2011). Global food losses and food waste—Extent, causes and prevention. Rome: Food and Agriculture Organization of the United Nations.

4Farm to Market Alliance, 2020. Available at < https://ftma.org/technologies-and-quality-inputs/>

[5] McKinsey & Company, 2019. Winning in Africa's agricultural market. Available at <https://www.mckinsey.com/industries/agriculture/our-insights/winning-in-africas-agricultural-market#>

while Tanganyika and Victoria lakes have a limited freezer capacity mainly used by the fishing industry. A few big farms and co-operatives have their own refrigerated reefers.

Another key barrier to the adoption of cold storage is the inadequacy of the electricity supply infrastructure, in terms of cost, reliability, reach and scale. Power is frequently rationed in Tanzania through load shedding, forcing farmers to power their operations with diesel generators which is costly.
Fish storage in Mwanza region is not an exception.

Fish traders encounter additional challenges related to access and limited storage space from the existing grid connected storage rooms that are currently estimated at 13, each with maximum storage capacity of two tons and employing an average of five workers. This happens in the context of an estimated annual fish harvest of 104,000 tons that translates to USD 11,336,000 available market for cold fish storage.

This market is expected to grow through the addition of over 10,000 tons per annum of fish from cage fish farming in Lake Victoria.

From the foregoing, the fish cold storage supply does not meet the demand and as such opens up an opportunity for further investment. Mwanza Region with a solar Global Horizontal Irradiance (GHI) of 5.51 kWh/m^2 against the backdrop of an unreliable power supply, provides a first entrant opportunity for solar cold rooms storage. ENdep will seize this opportunity, spurring competition in the same solar technology space that in turn will open up other business avenues for selling solar power conversion technology to the existing grid connected cold rooms.

1.5 Market Analysis

1.5.1.1 Market Size

The available market for cold fish storage in Mwanza region is estimated at USD 11,336,000 per year. Assuming a conservative estimate of 20 tons storage per day, 312 working days in a year, USD 0.15 storage charge per kilograms per day, it translates to annual revenues of USD 487,476.19. We project to add one solar cold room in two years, reaching a 20 tons per day storage capacity giving annual revenues of USD 974,952.38**.**

1.5.1.2 Market/Industry Trends

Fish harvest in Mwanza, currently estimated at 104,000 tons per annum is set to grow in the years to come. Despite the paucity of growth data, anecdotal information from within the

Ministry of Livestock and Fisheries show that cage fish farming in Lake Victoria will increase over 10,000 tons of fish harvest per annum. This trend offers a business opportunity for cold fish storage through providing rental services to fish traders who have lucrative markets for fresh fish in other regions in Tanzania.

1.5.1.3 Customer Analysis

Our target customers are fish traders transporting frozen fish to markets away from Mwanza region. These customers are small scale entrepreneurs estimated at a total of 150 aiming to increase their income and livelihood through this market opportunity. They accustomed to facing challenges related to high upfront costs for buying freezers, limited cold storage rental facilities, frequent cold rooms breakdown, difficulty access to cold-rooms, attrition of stored fish quantity, mix-up of consignments, delays in packing and offloading, slow freezing leading to poor quality of fish post storage. These customers prefer an affordable, accessible and reliable cold storage service whereby they can fast freeze a large quantity with quick turnaround time and maintained fish quality and quantity in order to increase their revenue and profit.

1.5.1.4 Competitor analysis

There is a total of 13 cold fish storage facilities in Mwanza region, none with a storage capacity larger than 2 tons. The cold fish storages are connected to the national grid and back up with diesel generators. A few are equipped with a blast freezing option. They cold fish storages encounter frequent compressor breakdowns and power outages posing a risk to the stored fish and increased operational costs when back-up generators are run.

ENdep stands to offer Solar Powered Cold Rooms designed and manufactured in United States of America following International standards. They have been adapted to suit the African market and they offer the value propositions as described in the business concept.

1.5.1.5 SWOT analysis

Key Strengths: Our Company has a team of engineers and business leaders with experience and technical knowhow of Solar powered cold rooms technology, market demand and the business environment.

Weaknesses: Our sales and marketing team is not big enough to reach other potential customers. However, we are planning to engage a marketing agency to promote our service. Other weaknesses include limited financial resources to fully finance the purchase and operations of solar cold rooms and ability to fabricate the cold rooms locally.

Key Opportunities: Currently, there are limited food cold storage facilities in Tanzania. The ones that exist particularly in Mwanza face reliability challenges due to frequent power outage and compressors breakdown in addition to poor access and limited storage. As such, there is a demand for a reliable, accessible and large cold storage facility.

Key Threats: Delays in obtaining the project land and environmental impact assessment. However, due to its nature of being a flagship project, the threats can be mitigated by engaging the Mwanza region and Ilemela municipal leadership to expedite the procedures for obtaining the land and getting the environmental impact assessment done.
Other threats include low purchasing power of women and youth fish traders and low demand in fresh frozen fish.

(The top Opportunities that we will execute upon include: Market and sale our service to potential customers umbrella organisations such as Tanzania Fishers Union (TAFU)

1.6 Marketing Strategy

Promotion: We will set aside funds for advertising through local media and presentations in trade fairs and stakeholders conferences. We will also pay courtesy visits to the customers' umbrella organisation as described above under SWOT analysis.

Service: We will offer cold fish rental storage service to meet customers' preferences in terms of their jobs, pains and gains.

Pricing: We will employ a market penetration strategy to enable the fish traders' access and afford the service. The price will rise gradually as they gain more income from the savings made and increase their purchasing power. We are proposing USD 0.15 per kilograms per the

number of storage days. Nevertheless, we will allow promotional pricing for the customer storing more than two tons per day.

Distribution: The product (solar cold rooms) will act as a distribution channel for the service (cold rental storage).

2. Operational plan

The business intends to utilize solar powered cold rooms for storage of fish initially and later scale up to horticultural crops, meat, poultry and dairy for small holders, suppliers and aggregators through an innovative business model known as Product-Service System (PSS). By mutualizing the photovoltaic and cold equipment, and transforming a product offer (purchase of a cold room) into a service offer (cold space renting), the business will begin with one solar cold room for fish storage around Lake Victoria and add a second one after one year. The cold rooms will be strategically placed near the source of production to enable easy access and efficient logistics. They will extend the fish shelf life from six hours to three days and facilitate market entry for at least 150 women and youth fish traders to improve their economic livelihood and reduce a minimum of 7,233.42 tCO2eq in two years.

The initial solar cold room around Lake Victoria will directly deploy;

Unit	**Women**		**Men**	
	<25yrs	>25yrs	<25yrs	>25yrs
Manager		1		
Process I	2	1	1	
Process II		1	1	1
Packaging/offloading	1		1	
Cold Storage		1	1	
Technician				1
General cleanliness	1			
Gardening				1

2.1 Products

The solar cold room uses solar pv panels to convert solar energy into electrical energy that powers a compressor that cools a Prefabricated 40 ft heat insulated container down to 23.3°C below freezing. This temperature is suitable for fish storage that can be frozen within 8 to 12 hours. An option of blast freezing is available that can shorten the freezing time to 4 to 5 hours. We have another option of a standalone solar power generator-BackPack that can be used for technical scale up through retrofitting the existing main grid/diesel powered cold rooms. The Solar powered cold rooms have a lifetime of 20 years. All these options are mobile and simple to use. The blast freezing option will differentiate ENdep from the grid-connected competitors. The BackPack will be introduced afterwards as a spin off for additional revenues and stimulating market growth.

Additionally, the following accessories will form part of the equipment: -

1. Plastic trays
2. Plastic bins containers
3. Weighing balance
4. Shelves in the containers
5. White gum boots
6. Uniforms
7. Rain coats
8. Cleaning supplies

2.2 Services

Typically, a number of small-containerized solar cold rooms would either be distributed and sold to each customer or structured into a pay as you go model. However, our business will focus on industrial size solar powered cold rooms as a distribution channel to a rental cold storage service that can be utilized at economies of scale by up to 80 customers at once. Due to the market entry barriers faced by women and youth as mentioned above, the business model entails bundling the product – solar cold room with the service- fish storage rental as an offering to fish traders paid through a rental fee charged at an affordable and competitive rate of USD 0.15 per kg per day.

The business will offer high capacity of up to 40 tons storage; easy access to storage facility; quick and seamless receiving, packing and offloading; blast freezing; remote monitoring; better packaging; affordable storage price; mobile payment option; off-grid storage; handling hygiene according to international food standards; batch management; quality pre-screening and pre-booking arrangement. The relationship with our customers will be maintained through advertisements on radio on available services and promotions; customers yearly contracts; real-time data on individual customer batch condition and key account manager for customers storing two tons and more on a weekly basis. We expect the revenues to be generated from storage rental fees charged per kg per day; premium fees for pre-booking; premium fees for quality pre-screening; contract retainer fees and at a later stage sell of animal feeds from processed spoiled fish.

The following key resources will be needed to implement the business: - capital for equipment purchase and initial operation expenses; solar cold room; brand; security cameras; customer care skilled staff; jack pallets, pallets, shelves, crates and other accessories; fish cleaning area; remote monitoring software and plant vehicle. The following are key activities: - purchase solar cold rooms and accessories; product quality verification; brand creation and marketing; staff training; solar cold rooms maintenance; offloading, packing and loading products; temperature monitoring; security; revenue collection; cost control and complaints handling. The key resources and activities will be accomplished in partnership with Aldelano Solar Solutions, Tanzania Bureau of Standards, Marketing company and Tanzania Fishers Union (TAFU). The business model is depicted in the business model canvas below: -

<table>
<tr>
<td rowspan="2">KEY PARTNERS

1. EEP Africa
2. Aldelano solar solutions
3. Tanzania Bureau of Standards
4. USAID – Power Africa
5. Tanzania Investment Bank
6. Pfan
7. Tanzania Fishers Union (TAFU)
8. Marketing company
9. Vehicle suppliers
10. PASS Leasing
11. EFTA</td>
<td>KEY ACTIVITIES

1. Purchase and install Solar cold rooms and accessories
2. Staff training
3. Brand creation and Marketing
4. Maintain Solar cold rooms
5. Receiving, packing and offloading products
6. Monitor temperature
7. Monitor security
8. Revenue collection
9. Cost control
10. Complaints handling</td>
<td rowspan="2">VALUE PROPOSITIONS

1. High capacity of up to 20 tons storage
2. Easy access to storage facility
3. Quick and seamless offloading, packing and loading
4. Blast freezing
5. Remote monitoring
6. Quality packaging
7. Affordable storage price
8. Mobile payment
9. 3% Discount price for large quantities of more than 2 tons
10. Off grid storage
11. Handling hygiene meeting international standards
12. Batch management
13. Quality pre-screening
14. Pre-booking arrangement</td>
<td>CUSTOMER RELATIONSHIPS

1. Key account manager for customers storing 2 tons and more on a weekly basis
2. Customer yearly contracts
3. Realtime data on individual customer consignment condition
4. Advertisement on radio and TV media on available services and promotions
5. Education marketing during service launch and relevant industrial events</td>
<td rowspan="2">CUSTOMER SEGMENTS

1. Fishwives
2. Fishmongers
3. Fish markets
4. Hotels
5. Restaurants</td>
</tr>
<tr>
<td>KEY RESOURCES

1. Capital for equipment purchase and initial operation expenses
2. Solar Cold-rooms
3. Staff
4. Brand
5. Security cameras
6. Customer care skilled staff</td>
<td>CHANNELS

Distributed Solar cold rooms near lakes, sea, farms and markets</td>
</tr>
</table>

	7. Jack pallets, pallets, shelves, crates and other accessories 8. Washing area 9. Remote monitoring software 10. Plant vehicle			

COST STRUCTURE	**REVENUE STREAMS**
1. Capital cost for purchase of Solar cold rooms, accessories and security cameras 2. Short to medium term land lease 3. Long term land purchase and yearly rental fees 4. Staff salaries 5. Packaging materials and other consumables 6. Water bills 7. Internet connection	1. Storage rental fees charged per kg per day 2. Premium fees for pre-booking 3. Premium fees for quality pre-screening 4. Contract retainer fees 5. Sell of animal feeds

2.2.1 Service delivery procedures

Receiving, processing, packing, storing and offloading of fish will be done as quickly as possible as unnecessary delay may cause thawing or temperature rises, increasing the rate of quality deviation and reducing shelf life. As such, there should be division of labour for both females and males throughout the process so as to speed up the process. Most females will be at processing tables and overall cleanliness while movement of bulk materials will be mostly done by males. Process I unit will entail receiving, sorting and cleaning of fish and process II unit will grade, weigh and blast freeze. The next steps will be packaging, cold storage and offloading from the cold room to refrigerated trucks. Arrangement will be made in such a way that there will be task sharing and task shifting among process I, process II, packaging, cold storage and offloading units.

3. Entrepreneur & Team

3.1 The entrepreneur

Dr. Rugola is an environmental entrepreneur with vested interest in energy efficiency and renewable energy sub-sectors. He is the founder and managing director of ENdep with over 8 years' experience in energy efficiency and renewable energy. He has developed and implemented renewable energy projects, one of which- a pay as you go solar project in the outskirts of Dar es Salaam. He will provide an oversight to the project and receive further business and technical guidance from the board of directors comprised of experts in renewable energy business and food safety. Notably, Prof. Goodluck Urassa who is a co-founder of IMED foundation has designed and provided leadership in numerous renewable energy projects in Tanzania including building sustainable local energy enterprises serving the poor project. And Mr. Michael Mhina is a food safety specialist, currently serving as head of chemical residues section, National Fish Quality Control Laboratory.

Dr. Rugola will be responsible for the smooth implementation of the project, overseeing administrative and technical tasks, liaising with project partners and the equipment suppliers. He will also coordinate the CO2 reduction verification assessment; environmental and social impact assessment for the project

3.2 The Team

A team consisting of head of technical services, head of finance and administration, operations and logistics manager and project manager will assist Dr. Rugola in the implementation. The organisation structure and the description of each team member is hereunder depicted: -

Fig 1: Project Team Organogram

Dr. Victor Minja – Head of Technical Services

He has more than 5 years of proven capabilities in strategic and operational planning, managing a diverse team of staff as well as completing projects on time and within budget limits. He will coordinate the project technical services.

Mr. Frank Elly – Head of Finance and Administration

He is a CPA holder and will be responsible for managing the project's finances including reporting. He will also lead efforts to market and promote solar cold room technology to other food sub-sectors and stakeholders.

Ms. Diana Mwanamboka – Operations and Logistics Manager

She is an expert in logistics and warehousing. She will coordinate the clearing and forwarding of the solar cold room and guide the project's operations.

Ms. Halima Ugomba – Project Manager

She has over 5 years' experience working at different capacities in food processing industries including maintaining cold chains for food. She will be instrumental into ensuring first class customer service and fish handling hygiene in accordance with international food standards. She will prepare job descriptions for other workers that will be reviewed by Rugola to ensure equal opportunities are given to women and youth She will be responsible for supervising the daily operations of the project activities.

4. Benefits and Risk Analysis

4.1 Benefits Analysis

The project will extend the fish shelf life from six hours to three days and facilitate market entry for at least 150 women and youth fish traders to improve their economic livelihood and reduce CO2 emissions. Furthermore the project will provide an opportunity for employment to the local community members. The end beneficiaries are fish consumers far from the source that will be able to eat fresh fish at an affordable price.

4.2 Risk Analysis

Risk	Likeliness of it happening	Potential Impact	Measures taken to counteract/minimize risk
Technical risk: Underperforming equipment	Low	Business not operational	18 months warranty; 3 year service agreement
Financial risk: Initial Low sales due to few customers	Medium	Business not viable	Brand creation and promotion; marketing; effect off-take agreements
Operational: Poor customer care	Low	Loose customers confidence	Sustained staff training on customer care
Downtime spoilage	Low	Lose customers confidence	Automatic backup generator
Payment default	Medium	Reduce revenue	Batch release after bank deposit and mobile payment

Batching disputes	Low	Lose customers confidence	Install and utilise batch management system
Political risk: Project land expropriation by government	Low	Project not feasible	Tanzania investment law and being a signatory of MIGA provides guarantee to project private ownership; Land acquisition to follow government procedure and municipal plan

5. Funds required and their uses

ENdep Limited is seeking to raise USD 238,000 in order to capitalize, purchase a solar coldroom, cover initial startup expenses and cover working capital expenses for 18 months. Additional capital of USD 1,364,505.42 may be required to expand the project pipeline and to expand activities on varying levels of the business in the next five years.

ENdep is seeking to raise this capital in the form of mezzanine, and is open to negotiate shareholding opportunities against such invested capital. ENdep would seek and prefer a working partner that can invest in the company, and bring further acumen, deal-sourcing capabilities and further experience to the table.

5.1 Terms

ENdep intends to pay as much of its after tax profits as dividend as will be available after retaining such sums and repaying such borrowings owing to third parties as shall be necessary to meet the requirements reflected in the budget and business plan, taking into account monies required for investment opportunities. There is no fixed date on which entitlement to dividends arises and the date of payment will be recommended by the board and approved by the shareholders at the time of declaration.

Considering the above, the dividend policy is to pay out at least 50% of earnings after tax.

We are targeting 69% returns in 10 years. The business promoters propose the following exit routes for the prospective investor:

- Venture Capitalist/Private Equity Investor /Trade Sale: The latest high investment interest in impact investments should provide a good exit opportunity, safe exit arrangement.
- A second proposal is to sell the shares to the developers through the right of first option
- A third option is to create a platform for shareholders to be able to trade the company's shares on Dar Es Salaam Stock Exchange's Enterprises Growth Market Segment

5.2 Funds raised & conditions of availability

The proposed project has raised a grant equivalent to $ 382,273 from EEP Trust fund and $ 50,000 potential equity investor.

5.3 Financial Projections

These project financial forecasts have been prepared based on the following conservative assumptions:

Forecasted Sales Variables and Cost of Finance

Description	Value
Investment	30% debt, 70% grant
Price per kg per day	USD 0.15
Kg stored per day	10,000
Storage days per year	312
Sales projections	USD 482,273 per annum
Staff	15
Maintenance costs	2%
Bank interest	5%

Shared Solar Coldroom for Safe Food Storage - Capital/Financing Structure		
Debt	$188,000.00	30.3%
Equity	$50,000.00	8.1%
Grant	$382,273.00	61.6%
Total Capital	**$620,273.00**	**100%**

Capital Expenditure

Solar coldroom	$226,109.05
Land	$102,590.04
Buildings	$15,000.00
Motor Vehicle	$78,260.87
Depreciation	$39,013.11
	$460,973.06

Operational Expenditure

Plant operational expenses	$92,869.57
Personnel expenses	$96,000.00
Finance cost	$0.00
Miscellenous expenses	$9,443.48
	$198,313.05

Shared Solar Coldroom for Safe Food Storage - Cashflow Forecast

Cash Inflows					
Description	Year 1	Year 2	Year 3	Year 4	Year 5
Total forecasted sales	$0.00	$487,476.19	$487,476.19	$487,476.19	$487,476.19
Owner's Equity	$50,000.00	$0.00	$0.00	$0.00	$0.00
Equity Investor	$0.00	$0.00	$0.00	$0.00	$0.00
Start up loan	$188,000.00	$0.00	$0.00	$0.00	$0.00
Secured Grant	$382,273.00	$0.00	$0.00	$0.00	$0.00
Total Cash Inflows	$620,273.00	$487,476.19	$487,476.19	$487,476.19	$487,476.19

Cash Outflows					
Description	Year 1	Year 2	Year 3	Year 4	Year 5
Land acquisition	$102,590.04	$0.00	$0.00	$0.00	$0.00
Solar Coldroom	$193,500.35	$0.00	$0.00	$0.00	$0.00
Plant operational expenses	$92,869.57	$18,870.01	$18,870.01	$18,870.01	$28,870.01
Personnel expenses	$96,000.00	$96,000.00	$96,000.00	$96,000.00	$96,000.00
Civil + installation works	$32,608.70	$0.00	$0.00	$0.00	$0.00
4X4 Utility Vehicle	$78,260.87	$0.00	$0.00	$0.00	$0.00
Office+residential Building	$15,000.00	$0.00	$0.00	$0.00	$0.00
Financing cost	$0.00	$54,349.04	$54,349.04	$54,349.04	$54,349.04
Miscellenous expenses	$9,443.48	$5,743.50	$5,743.50	$5,743.50	$5,743.50
Taxes	$0.00	$70,000.00	$70,000.00	$70,000.00	$70,000.00
Dividends	$0.00	$0.00	$0.00	$0.00	$0.00
Total Cash Outflows	$620,273.00	$244,962.54	$244,962.54	$244,962.54	$254,962.54

Net Cashflow	**$0.00**	**$242,513.65**	**$242,513.65**	**$242,513.65**	**$232,513.65**

Shared Solar Cold room for Safe Food Storage - Cashflow Forecast

Cash Inflows					
Description	Year 1	Year 2	Year 3	Year 4	Year 5
Total forecasted sales	$0.00	$487,476.19	$487,476.19	$487,476.19	$487,476.19
Owner's Equity	$50,000.00	$0.00	$0.00	$0.00	$0.00
Equity Investor	$0.00	$0.00	$0.00	$0.00	$0.00

Start up loan	$188,000.00	$0.00	$0.00	$0.00	$0.00
Secured Grant	$382,273.00	$0.00	$0.00	$0.00	$0.00
Total Cash Inflows	$620,273.00	$487,476.19	$487,476.19	$487,476.19	$487,476.19

Cash Outflows					
Description	Year 1	Year 2	Year 3	Year 4	Year 5
Land acquisition	$102,590.04	$0.00	$0.00	$0.00	$0.00
Solar Coldroom	$193,500.35	$0.00	$0.00	$0.00	$0.00
Plant operational expenses	$92,869.57	$18,870.01	$18,870.01	$18,870.01	$28,870.01
Personnel expenses	$96,000.00	$96,000.00	$96,000.00	$96,000.00	$96,000.00
Civil + installation works	$32,608.70	$0.00	$0.00	$0.00	$0.00
4X4 Utility Vehicle	$78,260.87	$0.00	$0.00	$0.00	$0.00
Office+residential Building	$15,000.00	$0.00	$0.00	$0.00	$0.00
Financing cost	$0.00	$54,349.04	$54,349.04	$54,349.04	$54,349.04
Miscellenous expenses	$9,443.48	$5,743.50	$5,743.50	$5,743.50	$5,743.50
Taxes	$0.00	$70,000.00	$70,000.00	$70,000.00	$70,000.00
Dividends	$0.00	$0.00	$0.00	$0.00	$0.00
Total Cash Outflows	$620,273.00	$244,962.54	$244,962.54	$244,962.54	$254,962.54

Net Cashflow	**$0.00**	**$242,513.65**	**$242,513.65**	**$242,513.65**	**$232,513.65**

ENdep Limited Forecasted Profit & Loss Statement for the next 10 years

10-Year Profit and Loss Statement											
REVENUE	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Year 7**	**Year 8**	**Year 9**	**Year 10**
REVENUE											
Storage fees		**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**
Total Revenue	**$ -**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**	**$ 487,476.19**
EXPENDITURES											
Operational Costs For The Plant											
ESIA	**$ 8,695.65**										
CO2 emmission reduction consultant fee	**$ 21,739.13**										
Travel and Accomodation expenses	**$ 20,000.00**	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00	$ 10,000.00
Training and Capacity Building		$ -	$ -				$ -	$ -	$ -	$ -	$ -
Marketing	**$ 30,434.78**										
Audit fee	**$ -**	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00	$ 5,000.00
Legal fee	**$ 12,000.00**										
Total Annual Operational Costs	**$ 92,869.57**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**	**$ 15,000.00**
Operational Costs For the plant											
Annual O&M Costs for the plant		$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01	$ 3,870.01
Battery replacement					$ 10,000.00				$ 10,000.00		
Depreciation		$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11	$ 39,013.11
	$ -	**$ 42,883.11**	**$ 42,883.11**	**$ 42,883.11**	**$ 52,883.11**	**$ 42,883.11**	**$ 42,883.11**	**$ 42,883.11**	**$ 52,883.11**	**$ 42,883.11**	**$ 42,883.11**
Total Operational Costs	**$ 92,869.57**	**$ 57,883.11**	**$ 57,883.11**	**$ 57,883.11**	**$ 67,883.11**	**$ 57,883.11**	**$ 57,883.11**	**$ 57,883.11**	**$ 67,883.11**	**$ 57,883.11**	**$ 57,883.11**

Management Costs											
Manager allowance	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00
Plant supervisor Salary	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00	$ 10,800.00
Plant Technicians Salary	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00
Accountant Salary	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00
Labourers salaries	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00	$ 39,600.00
Total Management Costs	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**	**$ 96,000.00**
Other Miscellaneous Costs	**$ 9,443.48**	**$ 7,694.16**	**$ 7,694.16**	**$ 7,694.16**	**$ 8,194.16**	**$ 7,694.16**	**$ 7,694.16**	**$ 7,694.16**	**$ 8,194.16**	**$ 7,694.16**	**$ 7,694.16**
Financing Cost											
Loan Armotization				**$ 53,896.24**	**$ 53,896.24**	**$ 53,896.24**	**$ 53,896.24**	**$ 53,896.24**			
Tax											
Estimated		**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**	**$ 70,000.00**
Total Expenditures	**$ 198,313.04**	**$ 231,577.27**	**$ 231,577.27**	**$ 285,473.51**	**$ 295,973.51**	**$ 285,473.51**	**$ 285,473.51**	**$ 285,473.51**	**$ 242,077.27**	**$ 231,577.27**	**$ 231,577.27**
Net Profit/Loss	$ - 620,273.00	$ 255,898.93	$ 255,898.93	$ 202,002.68	$ 191,502.68	$ 202,002.68	$ 202,002.68	$ 202,002.68	$ 245,398.93	$ 255,898.93	$ 255,898.93
Net Profit/Loss	$ - 620,273.00	$ 255,898.93	$ 255,898.93	$ 325,898.93	$ 315,398.93	$ 325,898.93	$ 325,898.93	$ 325,898.93	$ 315,398.93	$ 325,898.93	$ 325,898.93

Shared Solar Cold room for Safe Food Storage - Balance Sheet Forecast					
Assets	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Non-current Assets					
Property, Plant & Equipment					
Solar Cold room	$226,109.05	$203,498.14	$180,887.24	$158,276.33	$135,665.43
Motor Vehicle	$78,260.87	$62,608.67	$46,956.47	$31,304.27	$15,652.07
Buildings	$15,000.00	$14,250.00	$13,500.00	$12,750.00	$12,000.00
Land	$102,590.04	$102,590.04	$102,590.04	$102,590.04	$102,590.04
Depreciation (N1)	-$39,013.11	-$39,013.11	-$39,013.11	-$39,013.11	-$39,013.11
Total Non-Current Assets	$382,946.85	$343,933.75	$304,920.64	$265,907.54	$226,894.43
Current Assets					
Cash/Bank	$39,013.10	$281,526.76	$281,526.76	$281,526.76	$271,526.76
Prepayments	$198,313.05	$0.00	$0.00	$0.00	$0.00
Total Assets	**$620,273.00**	**$625,460.50**	**$586,447.40**	**$547,434.29**	**$498,421.19**
Equity & Liabilities					
Owner's equity	$50,000.00	$223,175.26	$221,762.16	$213,149.05	$209,235.95
Equity (Investor)	$0.00	$0.00	$0.00	$0.00	$0.00
Retained Earnings (N2)	$0.00	$181,885.24	$181,885.24	$181,885.24	$174,385.24
Total Owner's equity	$50,000.00	$405,060.50	$403,647.40	$395,034.29	$383,621.19
Long-term Liabilities					
Deferred Grant Income	$191,136.50	$0.00	$0.00	$0.00	$0.00
Start up loan	$150,400.00	$112,800.00	$75,200.00	$37,600.00	$0.00
Deferred Income Tax	$0.00	$0.00	$0.00	$7,200.00	$7,200.00
Current Liabilities					
Current portion of start up loan	$37,600.00	$37,600.00	$37,600.00	$37,600.00	$37,600.00
Deferred Grant Income	$191,136.50	$191,136.50	$0.00	$0.00	$0.00
Income Tax Payable	$0.00	$70,000.00	$70,000.00	$70,000.00	$70,000.00
Accruals	$0.00	$0.00	$0.00	$0.00	$0.00
Total Owner's Equity & Liabilities	**$620,273.00**	**$625,460.50**	**$586,447.40**	**$547,434.29**	**$498,421.19**

Discounted Cash Flow Analysis

WACC	5%
NPV	$ 1,748,589.94
Equity IRR	35%
Project IRR	45%
ROCE	61%
Payback Period (Years)	1.54
DSCR	6.05
ICR	29.83
Average Life span (Years)	20

Cost-Volume-Profit Analysis

Sales Margin Computation

Net Revenue	$ 198,015.81
Revenue	$ 487,476.19
Margin (%)	41%

Operating Margin Computation

Operating Income (EBIT)	$ 255,898.93
Revenue	$ 487,476.19
Margin (%)	52%

Break Even Point Analysis

Details	**USD/unit**
Sales price	$ 48.23
Variable cost	$ 21.05
Contribution	$ 27.18
Budgeted sales (units)	10,000.00
Total Contribution	271,816.31
Total Revenue	$ 482,273.00
Contribution to sales	0.56361502
Fixed costs	$ 421,959.96
Break Even Point in Sales	**$ 748,666.98**
Break Even Period (years)	**1.55**

6. Conclusion

ENdep is at a competitive edge to undertake the technological project and execute it effectively and efficiently given its experience of successes in renewable energy business undertakings. Competency and dedication of the management and operational teams, new technology in the targeted market and the availability of the market makes it a reality to achieve the targeted goals and objectives.

The business as per projections is financially viable and expected to grow exponentially.

As the DCF analysis suggests the project will be able to recoup the initial investment in just 1.5 years equivalent to approximately 18 months, while the break-even period is only 18 months. Therefore, the projected can be executed with pre-existing business risks and pay-off.

The positive NPV of USD 1,748,589.94 suggests that the project is profitable, sustainable and scalable within a short period of time, with a possibility of diversifying the portfolio from the current proposed fish cold storage room to other areas such as horticultural crops, dairy products and poultry.

A 61% return on capital employed and a project internal rate of return of 45% gives confidence on profitability of the project.

Profitability ratios of 41% and 52% from sales margin and operational margin respectively gives a green light for the project as profits must fall to an average of 46.5% for the project to start making losses.

The model makes it possible for the project to meet both its short-term and long-term obligations and hence an assurance of compliance on the project contracts such as financing obligations and employment obligations.