

# SOLAR POWERED MICRO COLD STORAGE SYSTEM

HARVESTING THE SUN...TWICE



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11138729 | NOAH ASINGE  
11141133 | BASSEY, UKEME JOSEPH  
11138742 | OMKAR SHRIRAM GADHAVE  
11139645 | VIVAKE  
11138795 | ABOUELFADL MOHAMMED ABOUELFADL ELBESS



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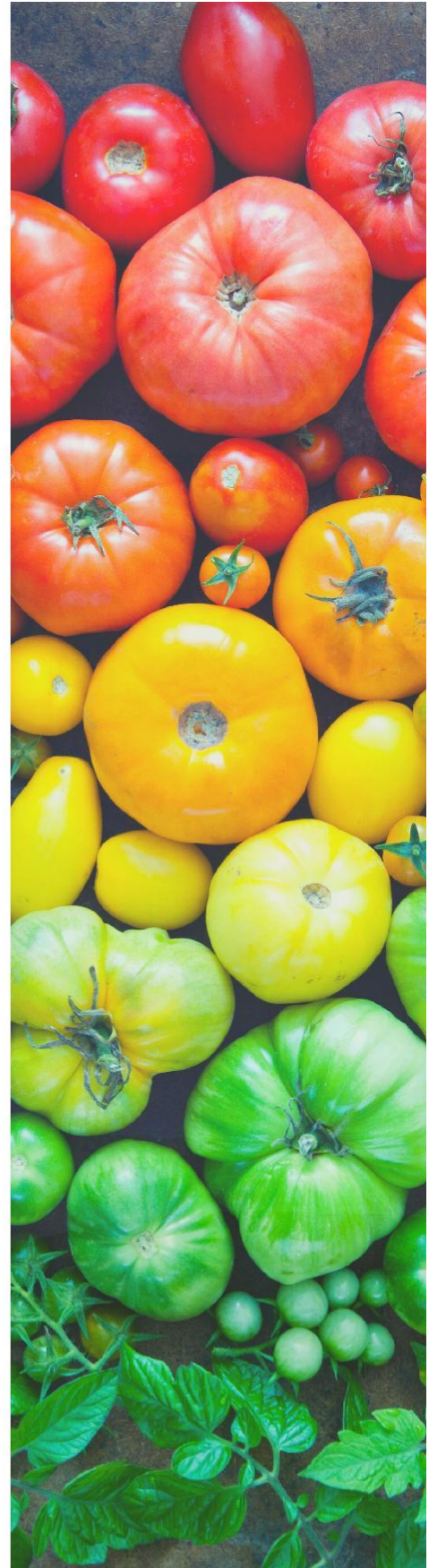
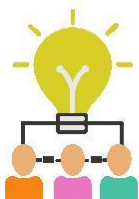
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## 1. Introduction

### 1.1 Sector overview

Over 60 % of India's land area is arable making it the second largest country in terms of total arable land in the world. Agriculture constitutes the most significant part of Indian Economy employing over 58% of its inhabitants<sup>1</sup>. The sector, along with fisheries and forestry, is one of the largest contributors to the Gross Domestic Product (GDP) with 16% and (10%) of total exports. It has undergone rapid transformation in the past two decades; the policies of globalization and liberalization have opened new avenues for agricultural modernization. This has led to not only commercialization and diversification, but also triggered various technological and institutional innovations owing to investments in sector. The agricultural products of significant economic value include rice, wheat, potato, tomato, onion, mangoes, sugarcane, beans, and cotton.

### 1.2 Cold storage for vegetables and fruits

With an annual production of 277 Million Metric Tonnes of fruits and vegetables, India ranks number 2 in the world after China and it is at the forefront on the global stage in terms of production hence providing a great opportunity for processing and cold chain innovations in perishables.<sup>2</sup> It is the world's largest producer of banana, papaya, mango, and guava; second largest producer of tomato, cabbage, and cauliflower.

## 2. Problem statement

Despite the high volumes of produce, India incurs a 30% loss of the fruits and vegetables, which goes to waste annually worth of INR 440 billion<sup>3</sup>. This accounts for one of the biggest food loss and waste with harvest and post-harvest losses in fruits and vegetables. The major reasons for these losses are lack of enough reliable and efficient cold storage infrastructure for farmers and other players along the agricultural value in India as required according to the estimates of National Centre for Cold Chain Development (NCCD)<sup>4</sup>.

Moreover, the rural area of country experience frequent power cuts leading to a higher cost operating expenses in the cold storage chain because it requires additional sources of power such as diesel generators. Furthermore, even the existing cold storage facilities in India are mainly for single commodity use. Therefore, adopting proven technology solutions for reliable and efficient cold storage infrastructure to help in reducing overall agricultural losses for increased revenues for fruits and vegetable farmers<sup>5</sup>.

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1 [https://www.researchgate.net/publication/305152477\\_Agricultural\\_Sector\\_Status\\_Challenges\\_and\\_its\\_Role\\_in\\_Indian\\_Economy](https://www.researchgate.net/publication/305152477_Agricultural_Sector_Status_Challenges_and_its_Role_in_Indian_Economy)

2 [https://www.yesbank.in/pdf/cold\\_chain\\_opportunities\\_in\\_india.pdf](https://www.yesbank.in/pdf/cold_chain_opportunities_in_india.pdf)

3 Minakshi Chakraborty, October 2020 Cold Storage in India Challenges and Prospects.

4 [https://energypedia.info/wiki/Small-scale\\_Cold\\_Storage\\_For\\_Fruit\\_and\\_Vegetables\\_in\\_India](https://energypedia.info/wiki/Small-scale_Cold_Storage_For_Fruit_and_Vegetables_in_India).

5 <http://transformationagenda.livemint.com/efficient-cold-chain.php>

### 3. Solution

#### 3.1. Innovation

A holistic approach to mitigate the alarming issue of global food wastage mainly mentioned above is addressed by SunCool Energy Pvt. Ltd that has developed a Solar Micro Cold Storage solution especially for agricultural communities as well as market infrastructure relevant in the food sector i.e. Mandis (Agri-produce Market). SunCool cold storage models is one of kind that is highly essential for small and marginal farmers, various cooperative, Farmer Producer Companies (FPOs) in India given their fundamental need of storage facility and financial limitation. This micro cold storage unit helps farmers in increasing their overall income through providing them with the access to on-farm harvest storage solutions hence reducing the huge amounts of wastage of perishable Agri-produce. It has alongside multiple benefits by retaining yield quality as well as sustainability to generate additional income source by selling excess electricity from solar PV system to the nearby customers.

#### 3.2. Objectives of the business

##### a) Increased in Shelf Life

Reduce the wastage occurring in perishable commodities esp. Vegetables, Fruits mainly in backward linkage at post-harvest stage & enhance its shelf life by maintaining appropriate moisture in controlled temperature. Shelf life can be raised from 2 days to 21 days using cold storeroom.

##### b) Improved Financial Return

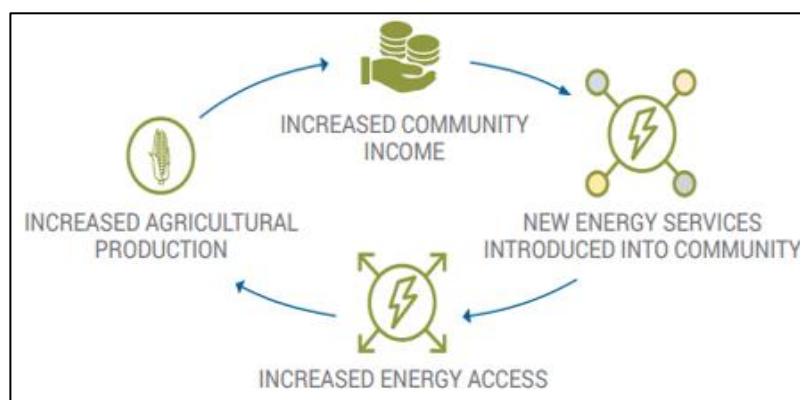
Retained quality and weight of Agri produce yields in demanding price of commodity by farmers in a market and thus boosting annual income about more than 30 % can be attained. Losses reduced to 2 % marginally paying in return additional earnings. Cold Storage shared among Farmer Produce Companies (FPOs) to buy with their consolidated funds and mutual understanding to share can generate direct share in monetary benefits of the farmers groups.

##### c) Improved Access to Energy

Harnessing solar energy to run cold storage reduces the demand to be met by grid supply as well as less dependency over it, which causes power outages more often in rural areas of India. Excess solar power can be stored and utilized during nights.

##### d) Reducing Carbon Footprints

Optimum energy utilization as well as shrinking food wastage right at the backend of entire supply chain reduces  $CO_2$  footprints mainly. As well as usage of energy efficient refrigeration technology, i.e. cleaner refrigerant contributes to controlling carbon impact over entire value chain.



*Figure 3.2-1: Agriculture and Energy Virtuous Cycle*

### **3.3. Focus Areas:**

- Assemble and Deliver efficient micro cold storage containers with solar PV system according to demand ranging from capacity 5 m<sup>3</sup> tonne to 25 m<sup>3</sup> with multiple variants by ensuring innovative product at affordable price for marginal farmers & various customer segments.
- Build awareness among farming community regarding significance of solar-based refrigeration micro scale technology.
- Facilitating consumer funding through banks, micro credit financial institutions and Corporate Social Responsibility (CSR) department of companies.

## **4. Mission, Vision Statements**

### **4.1 Our Vision**

To be a reliable solar powered micro cold storage service provider for increased income of farmers and food security through reduction of losses in agricultural value.

### **4.2 Mission**

SunCool Energy's mission is to increase access to affordable and clean energy dependent cold storage infrastructure amongst the players in the fruits and vegetable sub-sector.

Our mission is geared towards the realization of the United Nation Sustainable Development Goals:

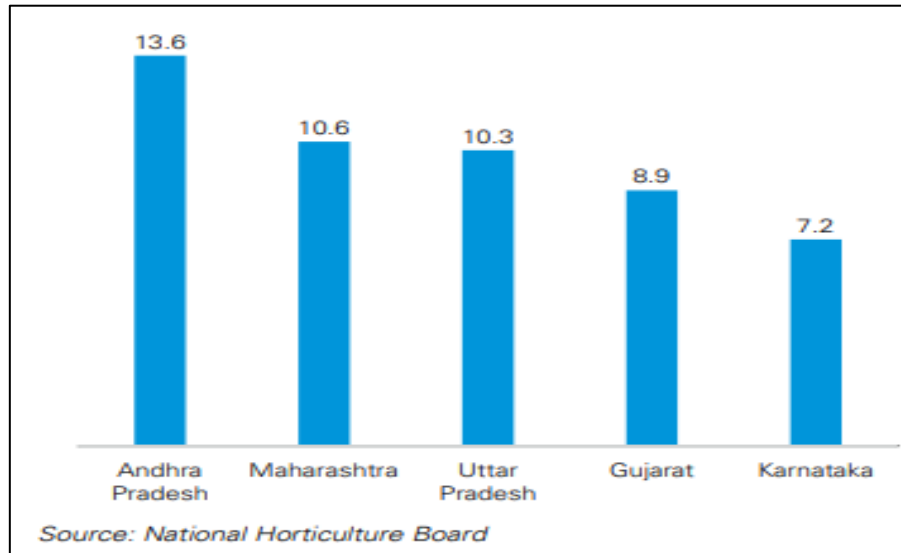
Goal 2 - End Hunger, Achieve Food Security and Improved Nutrition and Promote Sustainable Agriculture.

Goal 7 - Access to Affordable, Reliable, Sustainable and Modern Energy for all.

## 5. Market Study, Country Scenario, Govt. Subsidies

### 5.1 Target market

Maharashtra where our business area of Pune district is located is one of the five leading states in fruit and vegetable production in India as shown in *Figure 5.1-1*<sup>6</sup>. There is also a substantial quantity of vegetables being produced, hence necessitating cold storage. With a combined cold storage requirement of 6,273,000 MT for all the agricultural produce in the state, the infrastructure for 604,000 MT was available as of 2017 leaving a gap of 5,669,000 MT.



*Figure 5.1-1: India's five leading states in vegetables and fruits production*

The district of is geographically the second largest district in the state with a geographical area of 15,683 sq. km. Pune district is divided into the 14 talukas with total 1,877 villages with a total population of 94.29 lakhs in 2011. As it is in other parts of India, there are Agriculture Produce Marketing Committees (APMCs) in Pune that ensure that farmers are not exploited by commission agents and post-harvest contractors so that they get a fair price on sale of their produce. They are usually 21-member bodies with 18 of them being farmers, voted by farmers, and one being the representative of the traders. Farmers belonging to areas that are marked under the purview of respective APMC with Mandis (markets) where their produce are sold off through an auction at regulated price<sup>7</sup>.

Over 11 of the Talukas in Pune districts have independently designated and shared APMCs. However, access to cheaper and reliable cold storage under the APMCs is still low and not evenly distributed hence living a gap that requires investment in cold storage as privately offered service in some parts of the districts as shown in the Table 5.1-1 below.

Taluka	Public cold storage facility
Pune City	5
Baramati	2
Junnar	3
Purandhar	2
Haveli	13

<sup>6</sup> [https://www.yesbank.in/pdf/indian\\_organic\\_sector-vision\\_2025.pdf](https://www.yesbank.in/pdf/indian_organic_sector-vision_2025.pdf)

<sup>7</sup> [http://krishi.maharashtra.gov.in/Site/Upload/Pdf/pune\\_cdap.pdf](http://krishi.maharashtra.gov.in/Site/Upload/Pdf/pune_cdap.pdf)



Khed	2
Bhor	0
Mulashi	0
Mawal	4
Velha	0
Daund	0
Indapur	1
Shirur	0
Ambegaon	1

Table 5.1-1: Distribution of the existing public cold storage in Pune District<sup>7</sup>

## 5.2 The existing old storage value chain

The supply chain of fruits and vegetables is highly complex characterized by high fluctuations in prices and constitutes of processes from production to delivery of the fresh produce to the end consumers, food processors, and retailers<sup>8</sup>. The stakeholders involved in the supply chain of fruits and vegetables mainly include farmers, local traders/wholesalers, transporters, processors, and retailers. Supply chain for fruits and vegetables are illustrated in the diagrams in Figure 5.2-1 below.

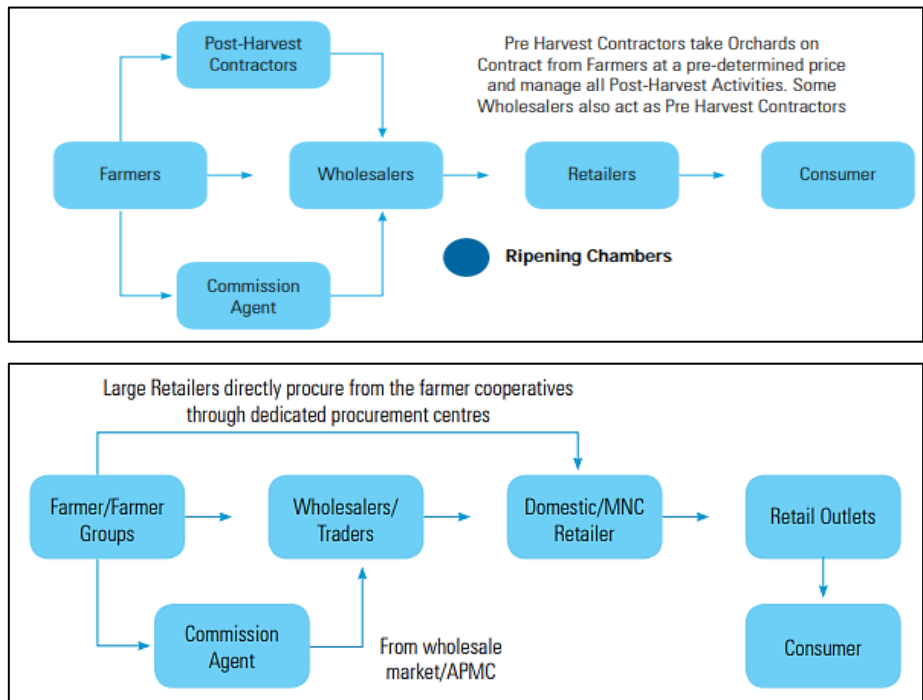


Figure 5.2-1: Common market value chains for vegetables and fruits in India

**Farmers:** These are the primary producers of the fruits and vegetables and they kick start the value chain.

**Cooperative societies:** These are generally formed to market the produce and provide linkages to the farmer with the destination market. Every grower pays some nominal fee to become a member of the society and charged 2-3% of the selling price of the produce sold. These cooperative societies are responsible for negotiating with the commission agents to get a fair price.

<sup>8</sup> [https://www.yesbank.in/pdf/indian\\_organic\\_sector-vision\\_2025.pdf](https://www.yesbank.in/pdf/indian_organic_sector-vision_2025.pdf)

**Commission Agents under APMCs:** These market most of the produce. It is through the commission agents under APMCs that the produce moves to wholesalers and then to retailers before reaching to final consumer.

**Post-harvest contractors (fruit merchants):** In this type of marketing arrangement, contractors make advance payments to the farmer. Activities starting from on farm procurement to final dispatch to consumers are borne by contractors. They facilitate aggregation, transportation to the destination market and payments to the farmers from the traders/commission agents for which they charge a commission of 2-3% of the value of the crop.

**Large scale retailer or companies:** These directly buy from progressive farmers. Such companies provide on farm extension services and other facilities to growers. The transportation cost is borne by them.

### 5.3 Subsidies

The Ministry of New and Renewable Energy extends a 30% subsidy to most solar powered cold storage and many other items, including solar lamps and solar heating systems.<sup>9</sup> This subsidy shall be the main attracting point for the primary customers who are the farmers and farmer groups.

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<sup>9</sup> <http://taiyangnews.info/markets/subsidy-for-solar-powered-cold-storages-in-india/>

## 6. Market Analysis

### 6.1. The target vegetable and fruits

The district is also identified as an Agriculture Export Zone (AEZ) for grapes & grapevine, floriculture pomegranates. However, the business will focus on mainly Grapes, Pomegranate, Orange, Mangoes, Bananas, Tomatoes, Okra, Cabbages and Cauliflower. Given the fact that the cold storage systems are multipurpose, there exists an opportunity for most of the fruits and vegetables grown in the district. The main crops and vegetables to be stored are grown in varying seasons distributed throughout the year and storage conditions as shown in the *Tables 6.1-1* and *6.1-2* below.

Fruit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grapes	Yellow	Yellow	Green	Green							Yellow	Yellow
Oranges	Yellow	Yellow	Yellow	Green	Yellow	Yellow			Yellow	Yellow	Yellow	Yellow
Bananas	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange
Pomegranate	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange	Light Orange
Mangoes			Yellow	Green	Green	Yellow						
Tomatoes	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green
Cauliflower	Green	Green	Yellow							Yellow	Yellow	Green
Cabbage	Green	Green	Yellow							Yellow	Yellow	Green
Okra	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow



*Table 6.1-1: Seasonality of some fruits and vegetables<sup>10</sup>*

Fruit	Storage Conditions		
	Temperature (° C)	Relative Humidity	Storage period (Shelf life)
<b>Grapes</b>	0 - 5 ° C (Holding Room)	93-95%	3-68 weeks
<b>Oranges</b>	4 - 5 ° C	85-90%	2-3 months
<b>Bananas</b>	13 - 14 ° C (Holding Room) 14 - 20 ° C (Ripening Room)	90-95%	4-6 weeks
<b>Pomegranate</b>	5 - 7 ° C (Holding Room)	92-94%	8 weeks

<sup>10</sup> [https://nccd.gov.in/PDF/CCSG\\_Final%20Report\\_Web.pdf](https://nccd.gov.in/PDF/CCSG_Final%20Report_Web.pdf)

<b>Mangoes</b>	12 <sup>0</sup> C	85-90%	2-3weeks
<b>Tomatoes</b>	7 - 10 <sup>0</sup> C	85-90%	1-3 weeks
<b>Cauliflower</b>	0 <sup>0</sup> C	90 – 95%	2-3 weeks
<b>Cabbage</b>	0 <sup>0</sup> C	90 -95%	3-6 weeks
<b>Okra</b>	7 – 10 <sup>0</sup> C	90 -95%	7-10 days

*Table 6.1-2: Storage conditions*

## 6.2. The target customers along the value chain

### *Individual Farmers and Farmer Groups or Cooperatives*

Some farmers who market their produce under cooperative and direct sale to large retailer companies need to keep their produce fresh after harvesting hence requiring reliable cold storage services especially in the remote areas where public facilities are lacking. Therefore, these shall be our primary customers and systems shall be directly sold to them.

### *Commission Agents and Farmers under APMCs*

In these courses of facilitating an extended shelf life of the produce to ensure completion of transaction between commission agents, farmers, and those player at the downstream part of the value chain which usually occurs at the PMSCA markets, there is need for rented cold storage services at the site. The fee can be paid on per kilo per day under the Pay-as-you-store business model.

## 6.2. Competitor Analysis

Pune district has many cold storage companies which installed different capacities in multiple locations. However, our business has two main competitors which are:

- a) **Promethean Power Systems Company** that is using the most economical way to chill, store and transport fresh fruits, vegetables, and other perishables. Promethean Cold Storage System uses a Thermal Storage approach that can store and release large amounts of thermal energy and can be applied to various cooling applications. It also has a battery backup capacity of up to 20 hours<sup>11</sup>
- b) **Ecozen Solutions Company**, which offers an economical and eco-friendly cold storage system. It is a 4kW solar powered multi-purpose cold storage container with a storage capacity of 1.8 tonnes. It can also operate using grid or alternative power supply from a generator set. If it is cloudy, the solar cold storage room automatically switches to the available alternative power supply. It has a unique thermal energy-based technology for optimum compressor usage which provides a battery backup of up to 30 hours<sup>12</sup>.

<sup>11</sup> <https://cooelectrica.com/products/cold-storage-solutions/>

<sup>12</sup> <https://www.ecozenolutions.com/ecofrost>

## 7. Introduction of the product

### 7.1 Proposed design

The concept of our cold room storage is based on a container with automatic temperature controllers and operated by smart based mobile application. This will allow the system to store vegetables and fruits for the duration during which farmer and dealers along the value chain can store the produce awaiting buying or selling without deterioration in quality. Our product model as shown in *Figure 7.1-1* will have a cold room storage capacity of 10 tonne. The advantage of container type rather than concrete one is that easy to move from one location to another and it require less space. Moreover, the power supply for the cooling unit technology and other electrical load are supplied by solar energy with battery system which makes it reliable and cost effective to operate in the long run. This model primarily designed for rural segments of players in the agricultural sector.



*Figure 7.1-1: An illustration of the proposed 10 MT solar cold storages system*

### 7.2. Assembly

The assembly and installation of the facility components shall be performed to a high professional and international standard and with the necessary flexibility according to customer requirements as follows:

- Assembly of PUF container
- Assembly of Refrigeration unit
- Installation of PV system(on-site)
- Assembly of electronic controllers
- Installation of program(software)
- Assembly all electrical installations

### 7.3. Technical specifications of the cold storage components

The technical specifications of the components are described and outlined (*Table 7.3 -1*) below:

#### **Polyurethane Foam (PUF) Container:**

Size of the chamber will be of 20 x 8 x 8 ft. for 10 MT capacity. With Insulated Panels 80mm thick and insulated with PUF plus equipped with handles, hinges and door locking. Phase change materials

(PCM) filled heat exchanger plates are lined up on the inner side cold room wall. A condensing unit will run on solar power and will cater to the cooling requirement of 24 hours by charging the plates by running for just 4-5 hours when the sun is available. The PCM plates will work during non-sun hours to cater the cooling requirements. of + 2 to + 4 °C for 16 – 20 hrs. per day.

### Cooling Unit

R-22/ R 404A refrigerant will be used for the cooling unit. Room temperature of 2 0C to 60 C will be maintained inside the chamber. The ambient temperature will be 400 C. The total refrigerant capacity will be 30,000 BTU/hr for 10MT capacity cool chamber. CoolBot, a special vapor compression control application will be utilized as a heart of entire model:

- Cooling unit consisting of standard air conditioning and small CoolBot controller.
- Applicability: Applicable across non-freezing temperature range; less moisture loss than conventional vapor compression; primarily cold storage.
- Energy use: Estimated to be about 25% more efficient than conventional units.

### Automatic Controller

These controllers are linked to sensors to regulate energy usage and running hours depending on various trigger points. Different products require different temperatures and humidity level maintenance. The temperature sensors must operate at 4.4VA, and control temperature at - 10 to + 5 Degree and the Humidifier within the range of HVAC, +/- 5% RH<sup>13</sup>.

### Software

Smart phone Application it will a fully encrypted cloud-based service and back hand with Java programming. Customers can log in account from any computer or device and handling their cold storage.

Sr. no.	Components	Specifications
1	PUF container	80mm, door, install (10*8*8) feet
2	Refrigeration	30,000 BTU/hour
3	Programmable Controller	Control with programing chip
4	Humidifier	HVAC, +/- 5% RH
5	Automatic Controller	4.4VA, - 10 to + 5 Degree
6	Lightning	12 volts
7	Software	Phone Application with Java programming

*Table 7.3 -1: Summary of the Components specifications*

## 7.4. The Solar PV energy supply system with a battery

The power rating of PV system is 5.6KW for 10 MT cold storage load. As, shown in *Table 7.4-1*, the Solar Panel with power rating of 375 watt and 24-volt and panel stand. Whereas Battery is Luminous with 150Ah (Ampere-hour) and Off Grid Hybrid Inverter is used for converting from DC to AC with rating of 7.5 KVA. Furthermore, Solar DC Wire and Connectors pair for connection <sup>13</sup>

S. Nr	Components	Specifications
1	Solar Panel	375-watt, 24-volt Mono Panel
2	Off Grid Hybrid Inverter	7.5 KVA
3	Panel Stand	2 row Design
4	Solar DC Wire	10 sq mm
5	MC4 Connectors pair	3 Wire In, 1 Wire Out
6	Battery	150AH

*Table 7.4-1: Summary of the Solar PV System Energy Supply Components*

<sup>13</sup> Loom solar in India. <https://www.loom solar.com/>

## 8. Real Estate

Land for Office and Warehouse infrastructure is searched in location in outskirts of the Pune City which holds a headquarter of SunCool Energy Pvt. Ltd. Resources like water availability and uninterrupted electrical supply along with spacious area assuming future expansion plan are most important criteria that has been considered while leasing a land.

Search was done via local reach, communications and web portals like 99acres.com etc.

- Finalized land comes under the Maharashtra Industrial Development Corporation (MIDC) near Pune where infrastructure is readily available.
- SunCool Energy will lease total land under 11,000 sq. ft. on contract for next 10 years. Machining and Assembling of cold storage container will be done in Warehouse that covers 10000 sq. ft of total land. On the other hand, 1000 sq. ft. land will be allotted for Office.
- Renovation of office needs to be done on the combined land that already has office space but vacant at the moment.

Total leased land – 11000 sq. ft.

Land deposit - ₹ 250,000.00 (2873.56 €)

Rental Price - ₹ 275,000.00/month (3160.91 €)

Office Renovation Costs + Furniture - ₹ 500,000.00 (5747.12 €)

## 9. Marketing Strategy

As it is for any other new business, marketing plays a major role in development of customer and partner network that used as channels of contact with the eco-system of operation. The strategy shall involve several means as follows.

- Online presence through a web site and social:** Online visibility of cold storage is one good approach to reach of our target customers. Since many people use internet and can find cold storage products and businesses around them by easily using search engines like google, setting up an online presence for easy marketing via our website will increase the online visibility of our business and get more business leads. We would also deploy the use of social media platforms like Facebook, Instagram, twitter and run google adverts.
- Electronic Media (Radio Advertisements):** Of the various media means of advertising, radio is cheapest but with the widest coverage in Pune district as it can reach most households. The advertisement shall be aired during the peak listenership hours of the day (6 – 10 am and 5 – 3 pm) to ensure a large outreach on the most popular station in the district. The advertisement of our product shall be as short jingles or any other interesting form to enhance memory retention value.
- Meetings and Exhibitions/Events:** Sending sales forces to meet various farmer groups at exhibitions, association meetings, APMC market yards, and well as other partners to sensitize them about our new product. Sales teams from the marketing department will demonstrate the use of the product and its advantages to these potential customers in all the above events, talk shows, and seminars.

- d) **Print and outdoor marketing:** Factsheets, product catalogues, posters, flyers, billboards and branding of company vehicles shall be some of the many ways to advertise our product as a new company in the market.

## 10. Unique Selling Proposition

SunCool's product unique selling propositions focuses on two areas as follows:

### Energy autonomous and less costly operation and maintenance

- The shelf life of solar cold storages is around 15 years. Conventional cold storages cost half that of solar-powered ones. However, they require grid power, which makes up around 20-30% of their running cost. Solar cold storages not only remove this cost but can also make a key difference in distant rural areas which are not yet electrified, or where power supply is poor.

### Pay-as-you store approach

- The customer shall access cold storage services without incurring the high investment cost of the system especially at the APMC market yards where many fruits are handled as both wholesale and retail transactions take place.

### Build Operate Transfer Model

- This is the most crucial concept that sets SunCool Energy apart from other competitors and envisions to gain as much business as it can by providing customer friendly service as per their own convenience. Build Operate Transfer model is a concept where SunCool Energy provides its solar refrigeration model to the customer (moreover small and marginal farmers) and especially for farmer's convenience and benefit.

**Build**, Assemble the product with company's own revenue



Install the model at farm



Rent out to variable customers with 1<sup>st</sup> priority to guarantor (major shareholder)



**Operate**, Attain Breakeven Point to meet cost and earnings (for e.g. 3 years)



Achieve Win Point in next e.g. 2 years (Profit generated)



**Transfer** the technology to Farmer (guarantor) after profit margin has been attained (Farmer gets ownership of model without any extra charges/fees).



## Community Model

- SunCool seek for its expertise in networking across rural parts of Maharashtra state while it aims to upscale its service wide across the state with its quality of services. Maharashtra state is said to have maximum no. of Farmer Producer Organizations (FPOs) which has a hue consortium at state level known as MAHAFFPC. SunCool Energy is blessed with such opportunity where it can expand its reach within the state effectively. Hence, community model will be provided under various schemes provided by Agricultural Ministry and Ministry of Food Processing Industries.
- Availing Community model will enhance awareness for the cold chain solution on a micro level, even farmers who cannot afford would be encouraged to buy it on consolidate basis. Apparently, product being among group of farmers shall produce more profit at low cost for individual farmer. Also, this can become self-sustainable business model for farmers that they can lease out to other farmers whenever cold storage is out of use during off harvest season.
- FPOs are instrument for the development of this business model which will stimulate its presence further across India.

## 11. Market entry

### 11.1 Challenges

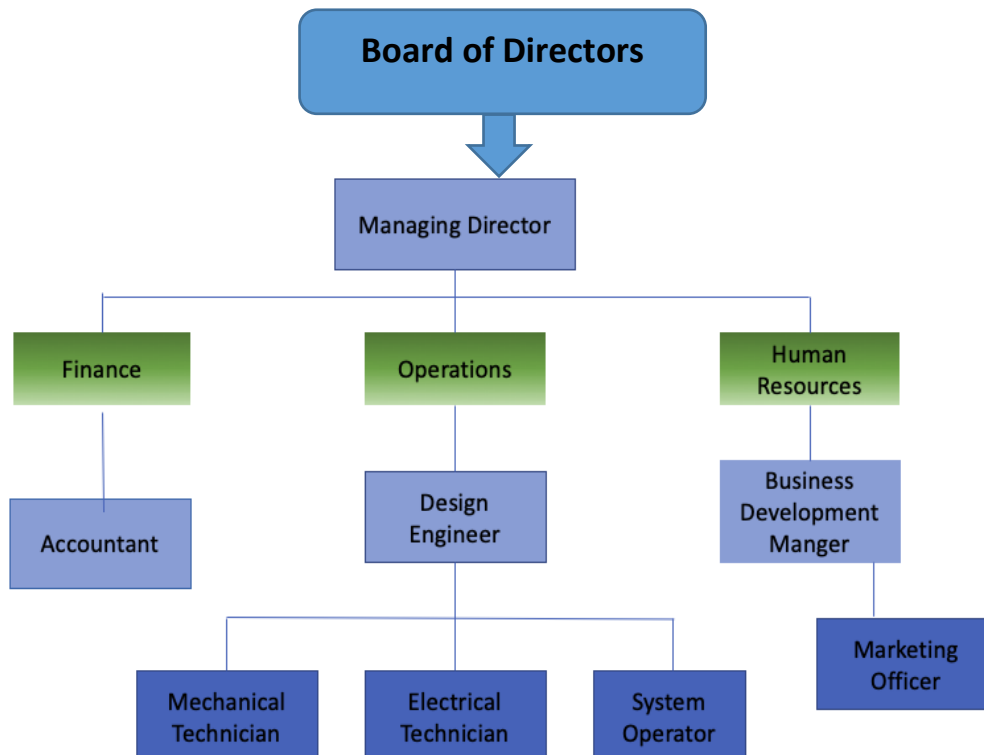
- a) In developing nations like India, vast, fragmented small holder farmers must face unabatingly price fluctuations for their perishable products like vegetables, fruits, flowers, and minimum awareness about embracing budding technology causing weak response to bear its costs are few utmost concerns, which new agro-tech enterprises find it difficult to establish trust & penetrate in.
- b) Inadequate infrastructure including roads, electricity supply, and scanty handling of post-harvest agricultural produce adds to the challenges which needs to be focused upon to facilitate such micro storages across major part of the country. Even every new enterprise face significant challenge that hinder day-to-day business operations such as cash flow maintenance, especially in case of initial period of growth.
- c) Further challenges in institutional and regulatory frameworks moreover sanctions for on-ground deployment of this technology from government and local authorities. Financial institutions like banks are reluctant to lend loan low-income farmers more often and hence cost bearing ability falls below.

### 11.2. Suitable solutions offered by the business strategy

- a) Delivering low-cost cold storage solution that cater to needs for all segments in agricultural producers as well as in markets will apparently help in controlling price alterations. Moreover, procuring perishable commodity with increased shelf life can be set off commodities according to demand in markets. This could mitigate wastage chances as well as benefit producers as well as consumers equally.
- b) Innovative and leveraging renewable energy operated storage solutions is considered as a crucial aspect to overcome energy accessibility issues in rural areas. Hence, adopting to non-conventional source to run cold storage containers would lower grid supply dependency and power outages to have an extra edge in such competitive market.

- c) Moreover, plan is to ensure continuous customer engagement by means of training and awareness building activities, and to attract and retain talent.
- d) Introducing different policy schemes for solar pumps, rooftop solar PV installations have encouraged consumers to become prosumers and gain multiple benefits. Similarly, launching effective subsidies and mechanisms integrating cold chain solutions harnessed by renewable energy could be need of an hour to accelerate market presence and its growth.
- e) To bridge significant gap between farmers and micro finance institutions, banks as well as governmental support; SunCool Energy Pvt. Ltd. will help to its customers and assist them to avail funding and be benefited with governmental subsidies. In addition to that serving to their demands such as leasing, so called as Pay as you Store concept, Pay in Installments or Fremium models can help drive faster recurring revenue and profit growth.
- f) Developing key partnerships and alliances with various corporates especially in CSR projects, local authority like Agri-Produce Market Committee (APMC) and governmental organizations such as Small Farmers Agri-business Consortium (SFAC), National bank for Agricultural & Rural Development (NABARD), Farmer Producer Organization (FPOs), Energy Saving Companies (ESCOs) etc. can be catalyst to build market growth.

## 12. Company Organizational Structure



*Figure 12 -1 Organizational structure of the company*

## 13. Revenue and Costs Analysis Description

### Cost Analysis

#### 13.1 Production Costs

Assembling entire Cold Storage mounted with Solar PV modules will require multiple equipment and appliances to fit in as mentioned in Product Technical parameters. Hence, assuming 10 years down the line, components such as PUF container, refrigeration unit and electronic controller parts would vary in costs slightly assuming inflation rate 2 %, even maturity of technology is considered leading to compensating the overall costs of such components. On the other hand, looking at the ongoing saturation in solar PV installations, cost of PV system will reduce by approx. 6.2 %.

In addition to that, also the software linked with micro controller in the container will need to be revised more often with technical advancements. Thus, rise in software costs are also incorporated in cost analysis without neglecting its mass application on increasing roll out of models eventually.

Overall Production cost with its cost-breakup for individual component is in *Appendix Table 2*.

#### 13.2 Administrative Costs

During calculating Administrative costs, we considered the office furniture plus electrical appliances and computers as a part of the initial investment costs. The amount shown in the first-year accounts for stationary office material plus unexpected costs. However, in the 6<sup>th</sup> year, we considered hiring one more design engineer and one more marketing officer, considering, getting new computers to all the staff as shown in below calculations. The land rent is also included in the administrative costs. An 11000 Sq. ft. area including the office and the workshop is considered for company staff and assembling the cold storage units. Additionally, an annual increase of 10% in land rent was taken into consideration. Table of calculations is in Appendix under *Appendix Table 6*.

#### 13.3 Depreciation Costs

Depreciation rates according to the Income Tax department of India varies every fiscal year due to evolving market conditions and to boost economic status of a country. Below mentioned data defines assumptions for calculating depreciation of all acquired assets by a company. Rates taken here are as per Income Tax Act, 1961 for AY 2020-21. It is apparent that depreciation rates are unaccountable on fixed asset like a land, hence not taken into consideration.

Depreciation rate on automobiles - 15 %

Depreciation rate on Furniture and Office - 10 %

Depreciation rate on Office Equipment (Laptops, Printers, Stationary etc.) - 40 %

Depreciation rate on Machinery and Tools - 30 %

Depreciation rate on Intangible Assets like Company Trademark - 25 % <sup>14</sup>

(<https://cleartax.in/s/depreciation-income-tax-act#Dep>)

Depreciated prices are attached in Appendix under *Appendix Table 7*.

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<sup>14</sup> <https://www.unionbankofindia.co.in/english/union-start-up.aspx>

### 13.4 Marketing Costs

Given the fact that this is a new business, in the first year of operation all the means of marketing which include outdoor branding<sup>15</sup>, exhibitions, radio<sup>16</sup>, social media, website<sup>17</sup> and face to face business development meetings shall be invested in. This is aimed at introducing the new product through intensive market outreach and increasing visibility of the company in public. However, with time there will be a decrease in the investment of resources in some means like outdoor and social media marketing to only concentrate on those means that thought to be strategically targeting the primary segments of potential clients like radio adverts and business development meetings. Additionally, annual subscription fees for web hosting shall continuously be paid to have the website running as the online reference of the company and a webmail system to have active email addresses for communication in the company. Calculations are attached in Appendix Table 8.

### 13.5 Cost of Financing

With a required total investment of ₹ 17,506,354.28, the business will be financed with a debt share of 70% which is ₹ 12,254,448.00 and the 30% (₹ 5,251,906.28). A start up loans from Union Bank was considered with a 10-year repayment period and interest rate of 6.8% with no mandatory collateral<sup>18</sup>. Although the moratorium period is not more than 3 years, it assumed that the servicing the land would start from the first year of operation. While the Equity part of the financing required is to be raised through crowd funding (15%) & contributions from the 5 directors (15%).

Calculations are attached in *Appendix Table 8*.

### 13.6 Labour costs

The business model kicks off with the board of directors and other permanent staff making a total of 14 employees for the first year. As the business develops and grows bigger, there becomes a need to hire ore hands. Two more systems operators are hired in the second year with that number doubling in the third year.

By the fifth and sixth year respectively, there is a planned increased on the number of system operators, marketing officers, electrical and mechanical technicians as displayed in *Appendix Tables 10 and 11*.

### 13.7 Variable cost Analysis

Variable costs include mainly Installation Charges, Product Insurance, Logistics used while shipping the model on site as well as Operations and Maintenance Costs. Cost analysis of such costs also assumes hike in service charges annually with increasing inflation rate.

Product Insurance charges also entails security by a farmer while buying so that any unforeseen incidents with product can be covered under this insurance that avoids farmer to pay extra money but receive fully operational model in return.

Operations & Maintenance charges (2% of product cost) incorporates onetime payment of this service while purchasing of model by a farmer. This will be done until next 5 servicing of the

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<sup>15</sup> <https://www.merahoardings.com/hoardings/maharashtra-boards/>

<sup>16</sup> <https://www.themediaant.com/radio/community-radio-pune-advertising>

<sup>17</sup> <https://webdesignerpune.com/punewebdesign-pricing.shtml>

<sup>18</sup> <https://www.unionbankofindia.co.in/english/union-start-up.aspx>

cold storage at consumer end, thus reducing extra charges later on. Variable Costs Table is attached in *Appendix Table 3*.

### 13.8 Product cost

Product Cost is calculated by initially taking all the circumstances that may be needed for a unit model to be sold out to the consumer. Hence, by considering all resources involved in a product selling that consists of Production/Assembly costs, Labor Costs, Administrative costs, Marketing Costs, Finance costs as well as all previously stated Variable costs.

The price for every component is shown in *Appendix Table 5*.

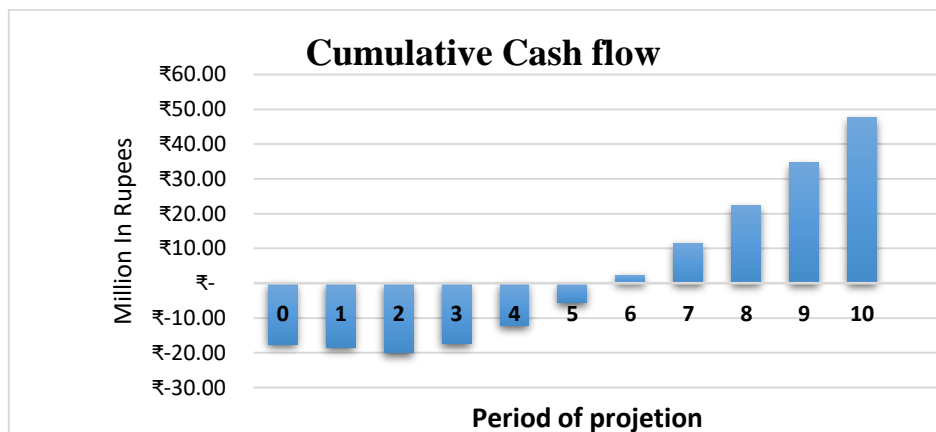
## 14. Revenue Analysis

### 14.1 Net Present Value and Internal Rate of Return

Initial Investment	₹ 17,506,354.28	€ 201222.46
Net Present Value	₹ 22,171,705.55	€ 254847.19
Internal Rate of Return	19.5%	
Payback period	6 years	

*Table 14.1 -1 Economic viability parameter of the business*

As shown in *Table 14.1-1* above, SunCool with an initial investment of ₹ 17506354.28 was found to be profitable within the first 3 years of the 10-year projection period at a discount rate of 6.8%. This could be achieved with an Internal Rate of 19.5% and a Net Present Value of ₹ 22171705.55. It is time that within a payback period of 6 years the initial sum of money invested could be recovered as shown in *Figure 14.1-1* below. This is attributed to the growth in the profit margin due the decrease in costs that comes with the increasing production hence achieving economies of scale in the business operation over the period of ten years. Additionally, the 30% subsidy from government on every system could be a key factor in facilitating the growth in sales as well as a source of extra income for the company in of leasing the component under the Pay-as-you-store.



*Figure 14.1 -1: The business flow over the 10 years of projection*

### 14.2 Profitability Index

The profitability index (PI) rule is a decision-making exercise that helps evaluate whether to proceed with a project. The index itself is a calculation of the potential profit of the proposed project. The rule

is that a profitability index or ratio greater than 1 indicates that the project should proceed. A profitability index or ratio below 1 indicates that the project should be abandoned. The formula for PI is the sum of future cash flows divided by the initial cost of the project.

In our calculations as shown in Table 14.2-1, the cash flow without considering a discount rate accounted for 3.48, however, we assumed a discount rate of 6.8%, which resulted in a PI of 5.32.

<b>Business Cash flow</b>	<b>No discount rate</b>	<b>With discount rate 6.8%</b>
Cash flow in Year 1	₹ -954,100.02	₹ -1,018,978.82
Cash flow in Year 2	₹ -1,460,602.48	₹ -1,665,998.24
Cash flow in Year 3	₹ 2,503,002.54	₹ 3,049,123.73
Cash flow in Year 4	₹ 5,259,557.11	₹ 6,842,805.35
Cash flow in Year 5	₹ 6,606,619.17	₹ 9,179,848.98
Cash flow in Year 6	₹ 7,909,263.46	₹ 9,634,957.43
Cash flow in Year 7	₹ 9,155,912.81	₹ 13,587,174.86
Cash flow in Year 8	₹ 10,802,920.78	₹ 17,121,427.07
Cash flow in Year 9	₹ 12,290,247.10	₹ 20,803,223.56
Cash flow in Year 10	₹ 12,959,424.81	₹ 23,427,556.85
Sum of Future Cash Flows	₹ 65,072,245.28	₹ 100,961,140.77
Initial Investment	₹ 17,506,354.28	₹ 17,506,354.28
<b>Profitability Index of the project</b>	<b>3.72</b>	<b>5.78</b>

Table 14.2-1: Illustration of the profitability index

## 15. Opportunities and Risk Evaluation

### 15.1 Opportunities

The country's cold storage capacity and cold storage real estate stock are set to grow significantly and could double by 2023, according to real estate consultancy CBRE. In 2019, the storage capacity in the country was 37-39 million tonnes. Following the Covid-19 outbreak, the cold storage segment is expected to witness robust demand on the back of a surge in online grocery and fresh food sales. Andhra Pradesh, Telangana, Uttar Pradesh, West Bengal, Gujarat, Punjab, Bihar, Madhya Pradesh, Maharashtra, Haryana, and Karnataka accounted for 91 percent of the total cold storage capacity in India in 2019. The overall cold storage real estate stock is estimated to touch 1,400-1,500 million sq. ft. by 2023<sup>19</sup>.

Despite India being a leading producer of fruits and vegetables, the processing levels are at a meagre 2% with a 5-16% wastage loss across different crops. Such a high level of wastage is primarily due to inefficient storage, inadequate logistics and poor post-harvest management. Of the 2% processing, about 40-50% is carried out through the organized segment, which in turn is dominated by small scale industries (around 85%). This offers an opportunity to invest in initiatives that help increase processing levels, reduce wastages, R&D for the development of processed varieties, packaging, innovative on-farm preservation systems and skill development. Andhra Pradesh, Maharashtra, Uttar Pradesh, Gujarat, and Karnataka constitute about 47% of total fruit production in India<sup>20</sup>.

As large parts of India face regular power supply cuts, the operations of cold storage units get impacted and here comes our innovation and the opportunity to overcome this issue and provide cold storage solutions fed by solar power.

19 <https://www.thehindubusinessline.com/news/cold-storage-capacity-set-to-double-by-2023-says-cbre/article32832878.ece>

20 [https://www.yesbank.in/pdf/indian\\_organic\\_sector-vision\\_2025.pdf](https://www.yesbank.in/pdf/indian_organic_sector-vision_2025.pdf)

## 15.2 Risk Evaluation

What is the risk?	Who might be harmed and how?	What further action is necessary?	Action by whom?
<b>Falling goods</b>	Staff may suffer injuries such as fractures and bruise from falling stock	Instruct staff to immediately report any concerns they have about the condition of racking to the manager or a supervisor	Mechanical supervisor
<b>Electricity</b>	Staff may suffer shock and burns injuries from faulty electrical equipment or installation	Check wiring connections and make sure of proper installations	Electrical supervisor
<b>Extreme cold Accidental lock-in in the cold store</b>	Employees and others may suffer death or serious injury from prolonged exposure to cold temperatures if accidentally locked in the cold store	Periodic checks to ensure clear access to emergency exit maintained, and that door is operational.	Design Engineer
<b>Accidental release of refrigerant(ammonia)</b>	Employees and others may suffer fatal respiratory irritation following exposure to ammonia. Exposure to even low concentrations can cause severe eye and throat irritation	<ul style="list-style-type: none"> <li>■ Ensure that any work on the system where there is a potential for ammonia release is done by at least two people (second person to help in an emergency)</li> <li>■ Monthly checks on vapor detectors and alarms</li> </ul>	Managing Director
<b>Manual handling</b>	Staff may get injuries or back pain from handling heavy objects such as pallets	Remind staff that roll cages with defective wheels must be taken out of use for repair	Managing Director
<b>Unfamiliarity with site risks</b>	Visitors, including contractors, farmers, may suffer injury or ill health through a lack of awareness of risks on site	Discuss with supervisors if the permit-to-work system is operating effectively and if there is scope to improve it	Managing Director

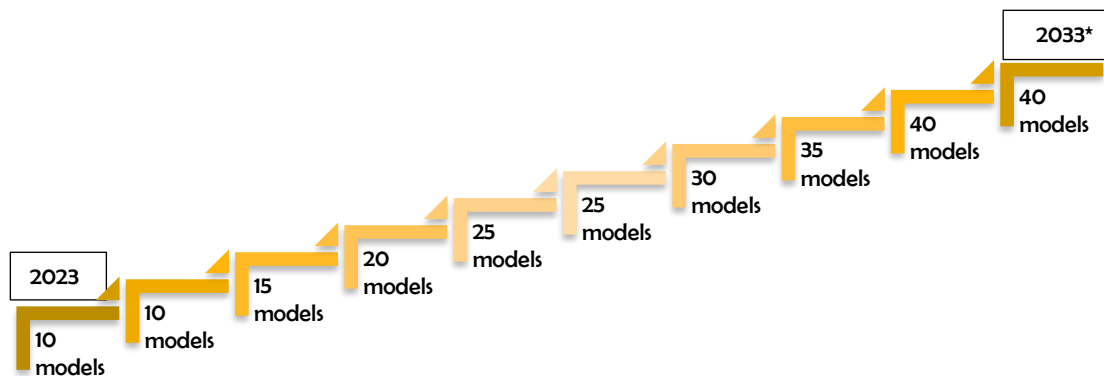
Table 15.2-1: Risk Evaluation <sup>21</sup>

<sup>21</sup> <https://www.hse.gov.uk/risk/casestudies/pdf/coldstorage.pdf>

## 16 Prospects for expansion

- SunCool Energy is highly optimistic about the expansion plan in upcoming decade to forge its market presence across various states of India and determine to meet out to customers demand in diversified segment of food value chain regarding locally cultivated products.
- SunCool Energy promises to fulfill expectations from its customer base and generate consistent profits to widen its arms and relentlessly deploy additional cold storages every year.
- It would also look forward to secure preliminary funding and grants from venture capitalists that will escalate further expansion plans.

By envisaging its growing market demand, expansion of model rollout is designed with a target to establish at least 250 models within a decade as shown in *Figure 16-1*. Moreover, SunCool plans to expand its human resource capital for increment in model lot, which also entails erecting similar and advanced variants in variable capacities (5m<sup>3</sup>-25 m<sup>3</sup> tonne). Below displayed is the projection map of product allocation to expand annually within a decade, especially in India.



*Figure 16-1: Product rollout expansion plan*

*\*As considered for cost & revenue analysis. Higher product rollout is subjected to upcoming funding opportunities and evolving market conditions. (Minimum quantity is assumed by far)*

## 17. Business Development Strategy

Business plan outlined in this report reflects its potential to generate positive cash flows starting from 3<sup>rd</sup> year while attaining its Break Even Point within 6 years. However, to magnify the profit and foster company's growth, strategic plan is designed by thorough continuous market analysis and learning curve that our enterprise would achieve eventually.

### 17.1 Future Vision

SunCool Energy envisions optimistic growth rate of planned pathway while adopting to stimulating market scenarios and evolving to agricultural ecosystem in India. It also envisages opportunity to expand PAN India in coming decade and furthermore abroad mainly in agriculture intensive developing nations.

### 17.2 Developmental Strategy:

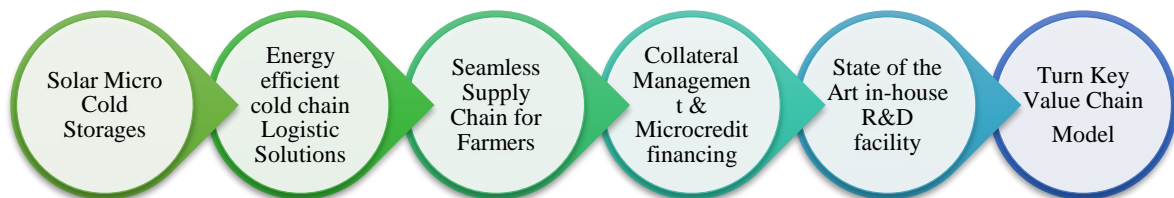
Considering market evolution, SunCool determines in creating its presence in bundling of services focusing cold chain solution across entire food value chain from backward linkage to forward linkage.



It aims to develop a logistic solution for future needs energized by solar for transporting vegetable and fruits into bigger clusters of markets from rural or semi urban areas.

- a) Facilitation of farmer community to market linkages and enabling them to decide their commodity price directly via network of buyers can be instrumental in development of entire value chain. Connecting cold chain logistic solution to reduce gap between producer and consumer and removing barrier of commission demanding intermediaries is one of the major plans SunCool aims to incorporate in its development that will also enable farmers to start micro food enterprises and become AgriPreneurs.
- b) Facilitation of consumer financing through flourished network of micro credit institutions will play a vital role in business development. To unlock hidden potential in vulnerable areas, Collateral Management will specifically act as an ad hoc solution to mitigate financial constraints owing to lack of liquidity. SunCool will look forward to gaining essential support from such firms for farmer's betterment.
- c) Most importantly, owning state of the art Research and Development (R&D) team and exploring recent interventions to improve solar cold storage model and similar subsidiaries will be highly indispensable strategic move ahead of the time.

Thus, SunCool aims to emerge as one top solution in the sector of agricultural supply chain right from producers to consumers to entail food security as well as sustainable economic prosperity of the targeted customer base.



*Figure 17-1 Business Development Strategy*

## 18. Conclusion

There are already existing public and private sector cold storage services producers who pose competition to the SunCool's business niche in Pune District and the state of Maharashtra. However, the business intends to use its unique selling proposition and the strategies put in place to offer competitive solar powered cold storage services for increased farmers' income and food security.

### 18.1 End Goal:

End Goal Is Not Only Generating Exorbitant Business Out Of This Model But Also To Create A Positive Impact, Making The Lives And Times They Have Truly Matter!



## Appendixes

### 1. COST ANALYSIS

Appendix 1: Cost Analysis Sheet

<b>10 Year Cost Analysis</b>											
COST COMPONENTS	YEAR 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Expected Income		₹ 17,853,285.72	₹ 18,734,600.61	₹ 27,354,957.70	₹ 33,390,116.26	₹ 38,782,457.88	₹ 44,056,589.25	₹ 49,136,636.45	₹ 56,078,029.80	₹ 62,328,963.41	₹ 64,894,153.33
Investment Expenditure	₹ 17,506,354.28										
Depreciation Costs	40.00%	₹ 1,224,042.20	₹ 974,729.00	₹ 794,627.95	₹ 660,226.04	₹ 556,791.88	₹ 474,966.83	₹ 408,700.06	₹ 353,994.36	₹ 308,141.36	₹ 269,252.95
Cost of Financing		₹ 2,058,747.26	₹ 1,975,417.02	₹ 1,892,086.77	₹ 1,808,756.52	₹ 1,725,426.28	₹ 1,642,096.03	₹ 1,558,765.79	₹ 1,475,435.54	₹ 1,392,105.29	₹ 1,308,775.05
Labour Costs		₹ 4,352,679.48	₹ 5,193,231.25	₹ 5,712,554.38	₹ 6,763,403.25	₹ 7,439,743.58	₹ 10,678,099.93	₹ 11,745,910.99	₹ 13,633,216.36	₹ 14,996,537.39	₹ 16,496,191.80
Variable costs on Product		₹ 499,644.80	₹ 530,954.80	₹ 849,354.75	₹ 1,211,670.20	₹ 1,625,333.50	₹ 1,748,645.13	₹ 2,263,419.20	₹ 2,854,619.05	₹ 3,533,670.06	₹ 3,834,480.03
Production Costs		₹ 6,732,240.00	₹ 6,472,739.00	₹ 9,343,990.50	₹ 12,002,014.00	₹ 14,467,107.50	₹ 13,952,742.50	₹ 16,177,995.00	₹ 18,256,647.50	₹ 20,201,520.00	₹ 19,593,812.00
Marketing Costs		₹ 619,400.00	₹ 443,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00
Administrative Costs		₹ 3,320,632.00	₹ 3,650,632.00	₹ 4,013,632.00	₹ 4,412,932.00	₹ 4,852,162.00	₹ 5,911,623.00	₹ 5,866,783.30	₹ 6,451,398.43	₹ 7,094,475.07	₹ 7,801,859.38
Loss carried forward		₹ -	₹ 954,100.02	₹ 1,460,602.48	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -
Profit before tax		₹ -954,100.02	₹ -1,460,602.48	₹ 2,944,708.87	₹ 6,187,714.25	₹ 7,772,493.14	₹ 9,305,015.84	₹ 10,771,662.12	₹ 12,709,318.57	₹ 14,459,114.23	₹ 15,246,382.13
Tax (GST)	15.00%			15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Profit after Tax		₹ -954,100.02	₹ -1,460,602.48	₹ 2,503,002.54	₹ 5,259,557.11	₹ 6,606,619.17	₹ 7,909,263.46	₹ 9,155,912.81	₹ 10,802,920.78	₹ 12,290,247.10	₹ 12,959,424.81
Cash Flow (Net Profit + Depreciation)		₹ 269,942.18	₹ -485,873.48	₹ 3,297,630.49	₹ 5,919,783.15	₹ 7,163,411.05	₹ 8,384,230.29	₹ 9,564,612.87	₹ 11,156,915.14	₹ 12,598,388.46	₹ 13,228,677.76

## Appendix 2: Production costs

Product	year 1	year 2	year 3	year 4	year 5	year 6	year 7	year 8	year 9	year 10
PUF container	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664	₹ 123,664
Refrigeration	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000	₹ 100,000
Programmable Controller	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500	₹ 3,500
Lightning	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880	₹ 5,880
Humidifier	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000	₹ 20,000
Automatic Controller	₹ 380	₹ 380	₹ 380	₹ 380	₹ 380	₹ 380	₹ 380	₹ 380	₹ 380	₹ 380
software	₹ 1,250	₹ 1,250	₹ 1,250	₹ 1,250	₹ 1,250	₹ 765	₹ 765	₹ 765	₹ 765	₹ 765
PV system with battery	₹ 418,550	₹ 392,600	₹ 368,259	₹ 345,427	₹ 324,010	₹ 303,922	₹ 285,079	₹ 267,431	₹ 250,850	₹ 235,297
Total per unit	₹ 673,224	₹ 647,274	₹ 622,933	₹ 600,101	₹ 578,684	₹ 558,110	₹ 539,267	₹ 521,619	₹ 505,039	₹ 489,486
No. of Model	10	10	15	20	25	25	30	35	40	40
Total cost in year	₹ 6,732,240	₹ 6,472,739	₹ 9,343,991	₹ 12,002,014	₹ 14,467,108	₹ 13,952,760	₹ 16,178,016	₹ 18,256,679	₹ 20,201,548	₹ 19,579,440

## Appendix 3: Variable costs

Cost Component	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Transport	₹ 4,000	₹ 4,400	₹ 4,840	₹ 5,324	₹ 5,856	₹ 6,442	₹ 7,086	₹ 7,795	₹ 8,574	₹ 9,432
Insurance	₹ 20,000	₹ 22,000	₹ 24,200	₹ 26,620	₹ 29,282	₹ 32,210	₹ 35,431	₹ 38,974	₹ 42,872	₹ 47,159
installation cost	₹ 12,500	₹ 13,750	₹ 15,125	₹ 16,638	₹ 18,301	₹ 20,131	₹ 22,145	₹ 24,359	₹ 26,795	₹ 29,474
O&M	₹ 13,464	₹ 12,945	₹ 12,459	₹ 12,002	₹ 11,574	₹ 11,162	₹ 10,785	₹ 10,432	₹ 10,101	₹ 9,797
Variable unit cost product	₹ 49,964	₹ 53,095	₹ 56,624	₹ 60,584	₹ 65,013	₹ 69,946	₹ 75,447	₹ 81,561	₹ 88,342	₹ 95,862
no of model	₹ 10	₹ 10	₹ 15	₹ 20	₹ 25	₹ 25	₹ 30	₹ 35	₹ 40	₹ 40
Total cost in Year	₹ 499,645	₹ 530,955	₹ 849,355	₹ 1,211,670	₹ 1,625,334	₹ 1,748,645	₹ 2,263,419	₹ 2,854,619	₹ 3,533,670	₹ 3,834,480

#### Appendix 4: PV System Cost

Sr. No	Components	Quantity	Specifications	Manufacturer	Cost per unit	Total cost
1	Solar Panel	15	375-watt, 24-volt Mono Panel	Loom solar	₹ 12,000	₹ 180,000
2	Off Grid Hybrid Inverter	1	7.5 KVA	Luminous Solar	₹ 68,000	₹ 68,000
3	Panel Stand	6	2 row Design	Loom solar	₹ 3,000	₹ 18,000
4	Solar DC Wire	15 meters	10 sq mm	Loom solar	₹ 233	₹ 3,500
5	MC4 Connectors pair	1	3 Wire In, 1 Wire Out	Loom solar	₹ 1,050	₹ 1,050
6	Battery	8	150AH	Luminous	₹ 18,500	₹ 148,000
						₹ 418,550

#### Appendix 5: Product cost

S.No	Components	Quantity	Specifications	Manufacturer	cost per unit	Total cost
1	PUf container	1	80MM, door,install (10*8*8) feet	HARIOM	₹ 123,664	₹ 123,664
2	Refrigeration	1	30,000 BTU/hr for 10MT	blue star	₹ 100,000	₹ 100,000
3	Programmable Controller	1	On/Off Control	Kathir Automation Solutions	₹ 3,500	₹ 3,500
4	Automatic Controller	4	4.4VA, - 10 to + 5 Degree	RajGuru Electronics	₹ 95	₹ 380
5	Humidifier	1	HVAC, +/- 5% RH	RajGuru Electronics	₹ 20,000	₹ 20,000
6	Lightning	42 meters	12 volt	Khadiza Electricals	₹ 140	₹ 5,880
7	software	1	Phone Application	Bp Experts	₹ 1,250	₹ 1,250

## Appendix 6: Administrative Costs

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Office equipment	₹ 20,632.00	₹ 20,632.00	₹ 20,632.00	₹ 20,632.00	₹ 20,632.00	₹ 596,940.00	₹ 20,632.00	₹ 20,632.00	₹ 20,632.00	₹ 20,632.00
Land rent	₹ 3,300,000.00	₹ 3,630,000.00	₹ 3,993,000.00	₹ 4,392,300.00	₹ 4,831,530.00	₹ 5,314,683.00	₹ 5,846,151.30	₹ 6,430,766.43	₹ 7,073,843.07	₹ 7,781,227.38
Total	₹ 3,320,632.00	₹ 3,650,632.00	₹ 4,013,632.00	₹ 4,412,932.00	₹ 4,852,162.00	₹ 5,911,623.00	₹ 5,866,783.30	₹ 6,451,398.43	₹ 7,094,475.07	₹ 7,801,859.38

## Appendix 7: Depreciation costs

DEPRICIATION COSTS												
Sr. No	Resources	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1	Car	₹ 550,000.00	₹ 412,500.00	₹ 348,150.00	₹ 293,838.60	₹ 247,999.78	₹ 209,311.81	₹ 176,659.17	₹ 149,100.34	₹ 125,840.69	₹ 106,209.54	₹ 89,640.85
2	Office Furniture	₹ 500,000.00	₹ 450,000.00	₹ 405,000.00	₹ 364,500.00	₹ 328,050.00	₹ 295,245.00	₹ 265,720.50	₹ 239,148.45	₹ 215,233.61	₹ 193,710.24	₹ 174,339.22
3	Office Equipment	₹ 534,384.00	₹ 320,630.40	₹ 192,378.24	₹ 115,426.94	₹ 69,256.17	₹ 41,553.70	₹ 24,932.22	₹ 14,959.33	₹ 8,975.60	₹ 5,385.36	₹ 3,231.22
4	Machinery & Tools	₹ 42,374.00	₹ 29,661.80	₹ 20,763.26	₹ 14,534.28	₹ 10,174.00	₹ 7,121.80	₹ 4,985.26	₹ 3,489.68	₹ 2,442.78	₹ 1,709.94	₹ 1,196.96
5	Intangible Assets (Trademark etc)	₹ 15,000.00	₹ 11,250.00	₹ 8,437.50	₹ 6,328.13	₹ 4,746.09	₹ 3,559.57	₹ 2,669.68	₹ 2,002.26	₹ 1,501.69	₹ 1,126.27	₹ 844.70
TOTAL		₹ 1,641,758.00	₹ 1,224,042.20	₹ 974,729.00	₹ 794,627.95	₹ 660,226.04	₹ 556,791.88	₹ 474,966.83	₹ 408,700.06	₹ 353,994.36	₹ 308,141.36	₹ 269,252.95

### Appendix 8: Marketing costs over the 10 years of projection

Items	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Outdoor marketing (Branding)	₹ 100,000.00	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -
Exhibitions	₹ 100,000.00	₹ 100,000.00	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -
Face to face marketing (Business Development Meeting)	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00	₹ 250,000.00
Social media marketing	₹ 50,000.00	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -
Advertising (Radio)	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00	₹ 87,600.00
Website domain registration and design	₹ 26,000.00	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -	₹ -
Website hosting and maintenance	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00	₹ 5,800.00
<b>Total Amount</b>	₹ 619,400.00	₹ 443,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00	₹ 343,400.00

### Appendix 9: Financing costs

Year	Balance of debt	Repayment of bank loan	Interest	Total
0	₹ 12,254,448.00	₹ -	₹ -	₹ -
1	₹ 11,029,003.20	₹ 1,225,444.80	₹ 833,302.46	₹ 2,058,747.26
2	₹ 9,803,558.40	₹ 1,225,444.80	₹ 749,972.22	₹ 1,975,417.02
3	₹ 8,578,113.60	₹ 1,225,444.80	₹ 666,641.97	₹ 1,892,086.77
4	₹ 7,352,668.80	₹ 1,225,444.80	₹ 583,311.72	₹ 1,808,756.52
5	₹ 6,127,224.00	₹ 1,225,444.80	₹ 499,981.48	₹ 1,725,426.28
6	₹ 4,901,779.20	₹ 1,225,444.80	₹ 416,651.23	₹ 1,642,096.03
7	₹ 3,676,334.40	₹ 1,225,444.80	₹ 333,320.99	₹ 1,558,765.79
8	₹ 2,450,889.60	₹ 1,225,444.80	₹ 249,990.74	₹ 1,475,435.54
9	₹ 1,225,444.80	₹ 1,225,444.80	₹ 166,660.49	₹ 1,392,105.29
10	₹ 0.00	₹ 1,225,444.80	₹ 83,330.25	₹ 1,308,775.05
	₹ 42,890,567.99	₹ 12,254,448.00	₹ 4,583,163.55	₹ 16,837,611.55



Appendix 10: Labour costs over 10-year period of projection

Employee	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Managing Director	₹685,440.00	₹753,984.00	₹829,382.40	₹912,320.64	₹1,003,552.70	₹1,103,907.95	₹1,214,298.75	₹1,335,728.63	₹1,469,301.49	₹1,616,231.64
Design Engineer	₹368,280.00	₹405,108.00	₹445,618.80	₹490,180.68	₹539,198.75	₹1,186,237.25	₹1,304,860.95	₹1,435,347.05	₹1,578,881.76	₹1,736,769.94
Electrical Technicians	₹556,319.88	₹611,951.87	₹673,147.06	₹740,461.77	₹814,507.95	₹1,194,611.65	₹1,314,072.82	₹1,445,480.10	₹1,590,028.11	₹1,749,030.92
Mechanical Technicians	₹370,879.92	₹407,967.91	₹448,764.70	₹493,641.17	₹543,005.29	₹895,958.73	₹985,554.60	₹1,084,110.06	₹1,192,521.07	₹1,311,773.18
Business Development Manager	₹581,119.92	₹639,231.91	₹703,155.10	₹773,470.61	₹850,817.67	₹935,899.44	₹1,029,489.38	₹1,132,438.32	₹1,245,682.15	₹1,370,250.37
Marketing Officers	₹887,839.92	₹976,623.91	₹1,074,286.30	₹1,181,714.93	₹1,299,886.42	₹2,144,812.59	₹2,359,293.85	₹2,595,223.24	₹2,854,745.56	₹3,140,220.12
Accountant	₹267,180.00	₹293,898.00	₹323,287.80	₹355,616.58	₹391,178.24	₹430,296.06	₹473,326.21	₹520,658.83	₹572,724.71	₹629,997.18
Office Administrator	₹267,180.00	₹293,898.00	₹323,287.80	₹355,616.58	₹391,178.24	₹430,296.06	₹473,326.21	₹520,658.83	₹572,724.71	₹629,997.18
System Operators	₹368,439.84	₹810,567.65	₹891,624.42	₹1,460,380.29	₹1,606,418.32	₹2,356,080.20	₹2,591,688.22	₹3,563,571.30	₹3,919,928.43	₹4,311,921.27
<b>Total</b>	<b>₹4,352,679.48</b>	<b>₹5,193,231.25</b>	<b>₹5,712,554.38</b>	<b>₹6,763,403.25</b>	<b>₹7,439,743.58</b>	<b>₹10,678,099.93</b>	<b>₹11,745,910.99</b>	<b>₹13,633,216.36</b>	<b>₹14,996,537.39</b>	<b>₹16,496,191.80</b>

Appendix 11: Company 10-year employment plan

Employee	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Managing Director	1	1	1	1	1	1	1	1	1	1
Design Engineer	1	1	1	1	1	2	2	2	2	2
Electrical Technicians	3	3	3	3	3	4	4	4	4	4
Mechanical Technicians	2	2	2	2	2	3	3	3	3	3
Business Development Manager	1	1	1	1	1	1	1	1	1	1
Marketing Officers	2	2	2	2	2	3	3	3	3	3
Accountant	1	1	1	1	1	1	1	1	1	1
Office Administrator	1	1	1	1	1	1	1	1	1	1
System Operators	2	4	4	6	6	8	8	10	10	10
<b>Total</b>	<b>14</b>	<b>16</b>	<b>16</b>	<b>18</b>	<b>18</b>	<b>24</b>	<b>24</b>	<b>26</b>	<b>26</b>	<b>26</b>

## 2. REVENUE ANALYSIS

### Appendix 12: NPV and IRR Calculation

Discount rate	6.8%										
year	0	1	2	3	4	5	6	7	8	9	10
Investment	₹ 17,506,354.28										
Costs		₹ 18,807,385.74	₹ 19,241,103.07	₹ 22,949,646.35	₹ 27,202,402.01	₹ 31,009,964.74	₹ 34,751,573.41	₹ 38,364,974.33	₹ 43,368,711.24	₹ 47,869,849.18	₹ 49,647,771.21
Revenue		₹ 17,853,286.00	₹ 18,734,600.61	₹ 27,354,957.70	₹ 33,390,116.26	₹ 38,782,457.88	₹ 44,056,589.25	₹ 49,136,636.45	₹ 56,078,029.80	₹ 62,328,963.41	₹ 64,894,153.33
Annual Cash flow	₹ -17,506,354.28	₹ -954,099.74	₹ -1,460,602.48	₹ 2,503,002.54	₹ 5,259,557.11	₹ 6,606,619.17	₹ 7,909,263.46	₹ 9,155,912.81	₹ 10,802,920.78	₹ 12,290,247.10	₹ 12,959,424.81
Cumulative Cash flow	₹ -17,506,354.28	₹ -18,460,454.02	₹ -19,921,056.50	₹ -17,418,053.96	₹ -12,158,496.85	₹ -5,551,877.68	₹ 2,357,385.78	₹ 11,513,298.59	₹ 22,316,219.37	₹ 34,606,466.47	₹ 47,565,891.28
Discount Factor	1.00	0.94	0.88	0.82	0.77	0.72	0.67	0.63	0.59	0.55	0.52
Present Value	₹ -17,506,354.28	₹ -893,351.82	₹ -1,280,529.32	₹ 2,054,695.80	₹ 4,042,631.58	₹ 4,754,698.79	₹ 5,329,770.71	₹ 5,777,006.81	₹ 6,382,211.17	₹ 6,798,597.66	₹ 6,712,328.45
Net present value	₹ 22,171,705.55										
IRR	19.5%										

### Appendix 13: Investment Break-up

INVESTMENT	
Start-up Costs	
Land Deposit	₹ 250,000.00
Company Registration	₹ 7,500.00
Copyrights & Trademark	₹ 6,500.00
Notary and Documentation	₹ 1,000.00
Fixed and Current Assets	
Office & Warehouse Renovation	₹ 500,000.00
Car	₹ 550,000.00
Property Insurance	₹ 70,000.00
Office Administrative Material	₹ 534,384.00
Assembly Material for 10 models	₹ 15,524,596.28
Logistics	₹ 20,000.00
Equipment Costs	
Universal kit	₹ 3,240.00
Diagnostic test	₹ 5,400.00
Grinder	₹ 2,194.00
Drill machine	₹ 1,045.00
Hammer drill	₹ 1,575.00
Heat gun	₹ 1,328.00
Air blower	₹ 487.00
Electric screw driver	₹ 918.00
Operator Protection Kit	₹ 16,187.00
Unexpected Costs	₹ 10,000.00
<b>Total Investment</b>	<b>₹ 17,506,354.28</b>

Appendix 14: Balance Sheet

OPENING BALANCE STATEMENT			
ASSETS		LIABILITIES	
Cash Out		Investment Capital	
Start-up Costs	₹ 265,000.00	Share Equity	₹ 5,251,906.28
Fixed Assets		Long term Liability	
Office & Warehouse	₹ 500,000.00	Bank Loan	₹ 12,254,448.00
Car	₹ 550,000.00		
Machineries and Equipments	₹ 42,374.00		
Current Assets			
Assembly Components	₹ 15,524,596.28		
Office material & Logistics	₹ 554,384.00		
Liquidity			
Cash	₹ 70,000.00		
Total (in INR & Euro)	₹ 17,506,354.28	Total (in INR & Euro)	₹ 17,506,354.28
	201,222.46 €		201,222.46 €

**The Companies Act, 2013**  
**A Company Limited by Shares**

**Articles of Association Of**  
**SunCool Energy Pvt. Limited**

*Preliminary*

1.
  - a. Regulations in Table – F in the first schedule in the Companies Act, 2013 shall apply to this company except in so far as they are not inconsistent with any of the provisions contained in these regulations and except in so far as they are hereinafter expressly or impliedly excluded or modified. The clauses 18, 26, 36, 37, 38, 40 41 and 80 to 88 of Table F be excluded.

*Interpretation*

- I.** (1) In these regulations—
  - (a) –the Act means the Companies Act, 2013,
  - (b)** –the Company means SUNCOOL ENERGY PVT. LIMITED, a Company Incorporation under section 8 of Companies Act, 2013.
  - (c) –the seal means the common seal of the company.
  - (d) –Share means equity share
- (2) Unless the context otherwise requires, words or expressions contained in these regulations shall bear the same meaning as in the Act or any statutory modification thereof in force at the date at which these regulations become binding on the company.

**Private Limited Company**

- II.** 1. The Company is a –Private Company within the meaning of Section 2(68) of the Companies Act, 2013 and means a Company having a minimum paid up share capital as may be prescribed, and which by its articles-
  - a. Restricts the right to transfer its shares;
  - b. Provided that where two or more persons hold one or more shares/ membership rights in the Company jointly, they shall, for the purpose of this clause be treated as a single member:  
Provided further that –

- Persons who are in the employment of the Company and
- Person who, having been formerly in the employment of the Company, were members of the Company while in that employment and have continued to be members after the employment ceased, shall not be included in the number of members and
- Prohibits any invitation to the public to subscribe for any securities of the Company.

*Share capital*

**III. 1.** The Authorized Share Capital of the Company is as per Clause 8 of the Memorandum of Association.

Subject to approval of Central Government and subject to confirmation by the Tribunal and subject to the provisions of Section 66 of the Act, the Company may from time to time, by special resolution, reduce its share capital.

Subject to the provisions of the Act and these Articles, the shares in the capital of the company shall be under the control of the Directors who may issue, allot or otherwise dispose of the same or any of them to such persons, in such proportion and on such terms and conditions and at such time as they may from time to time think fit.

**2. (i)** Every person whose name is entered as a member in the register of members shall be entitled to receive within two months after incorporation, in case of subscribers to the memorandum or after allotment or within one month after the application for the registration of transfer or transmission or within such other period as the conditions of issue shall be provided,—

- (a) one certificate for all his shares without payment of any charges; or
- (b) several certificates, each for one or more of his shares, upon payment of twenty rupees for each certificate after the first.

(ii) Every certificate shall be under the seal and shall specify the shares to which it relates and the amount paid-up thereon.

(iii) In respect of share or shares held jointly by several persons, the company shall not be bound to issue more than one certificate, and delivery of a certificate for a share to one of several joint holders shall be sufficient delivery to all such holders.

**3.** (i) If any share certificate be worn out, defaced, mutilated or torn or if there be no further space on the back for endorsement of transfer, then upon production and surrender thereof to the company, a new certificate may be issued in lieu thereof, and if any certificate is lost or destroyed then upon proof thereof to the satisfaction of the company and on execution of such indemnity as the company deem adequate, a new certificate in lieu thereof shall be given. Every certificate under this Article shall be issued on payment of twenty rupees for each certificate.

#### *Lien*

- 8.** (i) The company shall have a first and paramount lien—
- (a) on every share (not being a fully paid share), for all monies (whether presently payable or not) called, or payable at a fixed time, in respect of that share; and
  - (b) on all shares (not being fully paid shares) standing registered in the name of a single person, for all monies presently payable by him or his estate to the company:

#### *Calls on shares*

**9.** (i) The Board may, from time to time, make calls upon the members in respect of any monies unpaid on their shares and not by the conditions of allotment thereof made payable at fixed times:

Provided that no call shall exceed one-fourth of the nominal value of the share or be payable at less than one month from the date fixed for the payment of the last preceding call.

(ii) Each member shall, subject to receiving at least fourteen days' notice specifying the time or times and place of payment, pay to the company, at the time or times and place so specified, the amount called on his shares.

(iii) A call may be revoked or postponed at the discretion of the Board.

**10.** A call shall be deemed to have been made at the time when the resolution of the Board authorizing the call was passed and may be required to be paid by installments.

**11.** The joint holders of a share shall be jointly and severally liable to pay all calls in respect thereof.



**13.** (i) Any sum which by the terms of issue of a share becomes payable on allotment or at any fixed date, whether on account of the nominal value of the share, shall, for the purposes of these regulations, be deemed to be a call duly made and payable on the date on which by the terms of issue such sum becomes payable.

(ii) In case of non-payment of such sum, all the relevant provisions of these regulations as to payment of expenses, forfeiture or otherwise shall apply as if such sum had become payable by virtue of a call duly made and notified.

#### ***Transfer of shares***

**15.** (i) The instrument of transfer of any share in the company shall be executed by or on behalf of both the transferor and transferee.

(ii) The transferor shall be deemed to remain a holder of the share until the name of the transferee is entered in the register of members in respect thereof.

**16.** The Board may, subject to the right of appeal conferred by section 58 decline to register—

- (a) the transfer of a share, not being a fully paid share, to a person of whom they do not approve; or
- (b) any transfer of shares on which the company has a lien.

**17.** The Board may decline to recognize any instrument of transfer unless—

- (a) the instrument of transfer is in the form as prescribed in rules made under subsection (1) of section 56;
- (b) the instrument of transfer is accompanied by the certificate of the shares to which it relates, and such other evidence as the Board may reasonably require to show the right of the transferor to make the transfer; and
- (c) the instrument of transfer is in respect of only one class of shares.

#### ***Transmission of shares***

**18.** (i) On the death of a member, the survivor or survivors where the member was a joint holder, and his nominee or nominees or legal representatives where he was a sole holder, shall be the only persons recognized by the company as having any title to his interest in the shares.

(ii) Nothing in clause (i) shall release the estate of a deceased joint holder from any liability in respect of any share which had been jointly held by him with other persons.

**19.** (i) Any person becoming entitled to a share in consequence of the death or insolvency of a member may, upon such evidence being produced as may from time to time properly be required by the Board and subject as hereinafter provided, elect, either—

(a) to be registered himself as holder of the share; or

(b) to make such transfer of the share as the deceased or insolvent member could have made.

(ii) The Board shall, in either case, have the same right to decline or suspend registration as it would have had, if the deceased or insolvent member had transferred the share before his death or insolvency.

**20.** (i) If the person so becoming entitled shall elect to be registered as holder of the share himself, he shall deliver or send to the company a notice in writing signed by him stating that he so elects.

(ii) If the person aforesaid shall elect to transfer the share, he shall testify his election by executing a transfer of the share.

(iii) All the limitations, restrictions and provisions of these regulations relating to the right to transfer and the registration of transfers of shares shall be applicable to any such notice or transfer as aforesaid as if the death or insolvency of the member had not occurred and the notice or transfer were a transfer signed by that member.

#### ***Forfeiture of shares***

**21.** If a member fails to pay any call, or installment of a call, on the day appointed for payment thereof, the Board may, at any time thereafter during such time as any part of the call or installment remains unpaid, serve a notice on him requiring payment of so much of the call or installment as is unpaid.

**22.** The notice aforesaid shall—

(a) name a further day (not being earlier than the expiry of fourteen days from the date of service of the notice) on or before which the payment required by the notice is to be made; and

(b) state that, in the event of non-payment on or before the day so named, the shares

in respect of which the call was made shall be liable to be forfeited.

**23.** If the requirements of any such notice as aforesaid are not complied with, any share in respect of which the notice has been given may, at any time thereafter, before the payment required by the notice has been made, be forfeited by a resolution of the Board to that effect.

**24.** (i) A forfeited share may be sold or otherwise disposed of on such terms and in such manner as the Board thinks fit.

(ii) At any time before a sale or disposal as aforesaid, the Board may cancel the forfeiture on such terms as it thinks fit.

25 (i) A person whose shares have been forfeited shall cease to be a member in respect of the forfeited shares, but shall, notwithstanding the forfeiture, remain liable to pay to the company all monies which, at the date of forfeiture, were presently payable by him to the company in respect of the shares.

(ii) The liability of such person shall cease if and when the company shall have received payment in full of all such monies in respect of the shares

29 (i) A duly verified declaration in writing that the declarant is a director, the manager or the secretary, of the company, and that a share in the company has been duly forfeited on a date stated in the declaration, shall be conclusive evidence of the facts therein stated as against all persons claiming to be entitled to the share;

(ii) The company may receive the consideration, if any, given for the share on any sale or disposal thereof and may execute a transfer of the share in favour of the person to whom the share is sold or disposed of;

(iii) The transferee shall thereupon be registered as the holder of the share; and

(iv) The transferee shall not be bound to see to the application of the purchase money, if any, nor shall his title to the share be affected by any irregularity or invalidity in the proceedings in reference to the forfeiture, sale or disposal of the share.

30 The provisions of these regulations as to forfeiture shall apply in the case of non-payment of any sum which, by the terms of issue of a share, becomes payable at a fixed time, as if the same had been payable by virtue of a call duly made and notified.

#### *Alteration of capital*

**26.** The company may, from time to time, by ordinary resolution increase the share capital

by such sum, to be divided into shares of such amount, as may be specified in the resolution with the prior approval of Central Government.

### ***General meetings***

**31.** All general meetings other than annual general meeting shall be called extraordinary general meeting.

**32. (i)** The Board may, whenever it thinks fit, call an extraordinary general meeting.

**(ii)** If at any time directors capable of acting who are sufficient in number to form a quorum are not within India, any director or any two members of the company may call an extraordinary general meeting in the same manner, as nearly as possible, as that in which such a meeting may be called by the Board.

### ***Proceedings at general meetings***

**33. (i)** No business shall be transacted at any general meeting unless a quorum of members is present at the time when the meeting proceeds to business.

**(ii)** Save as otherwise provided herein, the quorum for the general meetings shall be as provided in section 103.

**34.** The chairperson, if any, of the Board shall preside as Chairperson at every general meeting of the company.

**35.** If there is no such Chairperson, or if he is not present within fifteen minutes after the time appointed for holding the meeting, or is unwilling to act as chairperson of the meeting, the directors present shall elect one of their members to be Chairperson of the meeting.

**36.** If at any meeting no director is willing to act as Chairperson or if no director is present within fifteen minutes after the time appointed for holding the meeting, the members present shall choose one of their members to be Chairperson of the meeting.

### ***Procedure where a juristic person is a member of the company***

**37.** A body corporate may be represented at the meeting of the Company in any of the manners set out in Section 113 of the Companies Act, 2013 but in each case either a copy of the resolution of the said body corporate duly certified by one of its principal officers, or the instrument of proxy shall be filed with Company at least forty eight hours before the commencement of the meeting.

### ***Adjournment of meeting***

**38.** (i) The Chairperson may, with the consent of any meeting at which a quorum is present, and shall, if so directed by the meeting, adjourn the meeting from time to time and from place to place.

(ii) No business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which the adjournment took place.

(iii) When a meeting is adjourned for thirty days or more, notice of the adjourned meeting shall be given as in the case of an original meeting.

(iv) Save as aforesaid, and as provided in section 103 of the Act, it shall not be necessary to give any notice of an adjournment or of the business to be transacted at an adjourned meeting.

### ***Voting rights***

**39.** (a) on a show of hands, every member present in person shall have one vote; and  
(b) on a poll, the voting rights of members shall be in proportion to his share in the paid-up equity share capital of the company.

**40.** A member may exercise his vote at a meeting by electronic means in accordance with section 108 and shall vote only once.

**41.** (i) In the case of joint holders, the vote of the senior who tenders a vote, whether in person or by proxy, shall be accepted to the exclusion of the votes of the other joint holders.

(ii) For this purpose, seniority shall be determined by the order in which the names stand in the register of members.

**42.** No member shall be entitled to vote at any general meeting unless all calls or other sums presently payable by him in respect of shares in the company have been paid.

### ***Proxy***

**43.** The instrument appointing a proxy and the power-of-attorney or other authority, if any, under which it is signed or a notarized copy of that power or authority, shall be deposited at the registered office of the company not less than 48 hours before

the time for holding the meeting or adjourned meeting at which the person named in the instrument proposes to vote, or, in the case of a poll, not less than 24 hours before the time appointed for the taking of the poll; and in default the instrument of proxy shall not be treated as valid. Proxy appointed cannot be the member of the Company.

***Board of Directors***

**44.** Unless and until otherwise determined by the Company in General Meeting the number of Directors shall not be less than two and not be more than twelve including Directors nominated by financial institutions. The following shall be the First directors of the Company

**1] OMKAR SHRIRAM GADHAVE**

**2] VIVAKE**

**3] BASSEY UKEME JOSEPH**

**4] NOAH ASINGE**

**5] AOUELFADL ELBESS**

All the above directors of the Company are not liable to retire by rotation, unless resolved otherwise.

**45.** (i) The remuneration of the directors (not being member) shall, in so far as it consists of a monthly payment, be deemed to accrue from day-to-day.

(ii) In addition to the remuneration payable (not being member) to them in pursuance of the Act, the directors (not being member) may be paid all travelling, hotel and other expenses properly incurred by them—

(a) in attending and returning from meetings of the Board of Directors or any committee thereof or general meetings of the company; or

(b) in connection with the business of the company.

**46.** The company may exercise the powers conferred on it by section 88 with regard to the keeping of a foreign register; and the Board may (subject to the provisions of that section) make and vary such regulations as it may think fit respecting the keeping of any such register.

**47.** (i) Subject to the provisions of section 149, the Board shall have power at any time, and from time to time, to appoint a person as an additional director, provided the number of the directors and additional directors together shall not at any time exceed the maximum strength fixed for the Board by the articles.

(ii) Such person shall hold office only up to the date of the next annual general meeting of the company but shall be eligible for appointment by the company as a director at that meeting subject to the provisions of the Act.

### ***Proceedings of the Board***

**48.** (i) The Board of Directors may meet for the conduct of business, adjourn and otherwise regulate its meetings, as it thinks fit.

(ii) A director may, and the manager or secretary on the requisition of a director shall, at any time, summon a meeting of the Board.

**49.** (i) Board of directors will decide Chairman of all board and general meetings of the company in their meetings.

(ii) If no such Chairperson is elected, or if at any meeting the Chairperson is not present within five minutes after the time appointed for holding the meeting, the directors present may choose one of their number to be Chairperson of the meeting.

**50.** (i) The Board may, subject to the provisions of the Act, delegate any of its powers to committees consisting of such member or members of its body as it thinks fit.

(ii) Any committee so formed shall, in the exercise of the powers so delegated, conform to any regulations that may be imposed on it by the Board.

**51.** All acts done in any meeting of the Board or of a committee thereof or by any person acting as a director, shall, notwithstanding that it may be afterwards discovered that there was some defect in the appointment of any one or more of such directors or of any person acting as aforesaid, or that they or any of them were disqualified, be as valid as if every such director or such person had been duly appointed and was qualified to be a director.

**52.** Save as otherwise expressly provided in the Act, a resolution in writing, signed by all the members of the Board or of a committee thereof, for the time being entitled to receive

notice of a meeting of the Board or committee, shall be valid and effective as if it had been passed at a meeting of the Board or committee, duly convened and held.

***Chief Executive Officer, Manager, Company Secretary or Chief Financial Officer***

**53.** Subject to the provisions of the Act,—

(i) A chief executive officer, manager, company secretary or chief financial officer may be appointed by the Board for such term, at such remuneration and upon such conditions as it may think fit; and any chief executive officer, manager, company secretary or chief financial officer so appointed may be removed by means of a resolution of the Board;

(ii) A director may be appointed as chief executive officer, manager, company secretary or chief financial officer.

**54.** A provision of the Act or these regulations requiring or authorizing a thing to be done by or to a director and chief executive officer, manager, company secretary or chief financial officer shall not be satisfied by its being done by or to the same person acting both as director and as, or in place of, chief executive officer, manager, company secretary or chief financial officer.

***The Seal***

**55.** (i) The Board shall provide for the safe custody of the seal.

(ii) The seal of the company shall not be affixed to any instrument except by the authority of a resolution of the Board or of a committee of the Board authorized by it in that behalf, and except in the presence of at least two directors and of the secretary or such other person as the Board may appoint for the purpose; and those two directors and the secretary or other person aforesaid shall sign every instrument to which the seal of the company is so affixed in their presence.

***Accounts***

**59.** (i) The Board shall from time to time determine whether and to what extent and at what times and places and under what conditions or regulations, the accounts and books of the company, or any of them, shall be open to the inspection of members not being directors.



(ii) No member (not being a director) shall have any right of inspecting any account or book or document of the company except as conferred by law or authorized by the Board or by the company in general meeting.

#### ***Winding up***

**60.** If upon a winding up or dissolution of the company, there remains, after the satisfaction of all the debts and liabilities, any property whatsoever, the same shall not be distributed amongst the members of the company but shall be given or transferred to such other company having objects similar to the objects of this company, subject to such conditions as the Tribunal may impose, or may be sold and proceeds thereof credited to the Rehabilitation and Insolvency Fund formed under section 269 of the Act.

#### ***Indemnity***

**61.** Every officer of the company shall be indemnified out of the assets of the company against any liability incurred by him in defending any proceedings, whether civil or criminal, in which judgment is given in his favor or in which he is acquitted or in which relief is granted to him by the court or the Tribunal.

#### ***Secrecy***

**62.** Every Director, Chief Executive Officer, Secretary, Auditor, Consultant or any other officer or employee of the Company shall, if so required by the Directors, before entering upon duties, sign a declaration pledging to observe a strict secrecy restriction respecting all the affairs of the Company.

**63.** Subject as conferred by law no member not being a Director shall be entitled to visit or inspect any accounts, books, documents or works of the Company without the permission of the Directors or require discovery of any of Company's trade secrets or any other matter which would in the opinion of the Directors be expedient in the interest of the Company not to disclose.

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## EMPLOYMENT CONTRACT

THIS AGREEMENT, made as of the \_\_\_\_ day of \_\_\_\_, 20\_\_.

Between:

**SunCool Energy LTD**, referred to as "the Employer"

-- and --

(Employee Name) of **SunCool Energy LTD**, referred to as "the Employee"

The Employee and the Employer wish to enter into an employment agreement governing the terms and conditions of employment;

THIS AGREEMENT in consideration of the premises and mutual covenants and agreements outlined in this document and for other good and valuable consideration, it is agreed by and between the parties as follows:

### **Term of Employment**

The employment of the Employee shall commence on (Date) and continue for an indefinite term until terminated in accordance with the provisions of this agreement.

### **Probation**

The parties agree that the initial three (3) month period of this agreement is "probationary" in the following respects:

- the Employer shall have an opportunity to assess the performance, attitude, skills and other employment-related attributes and characteristics of the Employee;
- the Employee shall have an opportunity to learn about both the Employer and the position of employment;

Either party may terminate the employment relationship at any time during the initial three-month period without advance notice or justifiable reason, in which case there will be no continuing obligations of the parties to each other, financial or otherwise. If the employee has not been available to work the full probationary period the length of the probation may be extended at the discretion of the Company.

### **Compensation and Benefits**

In consideration of the services to be provided during the term of employment, the Employee shall be paid a base salary **₹29,700.00** in equal (State appropriate intervals: weekly or semi-monthly) instalments, less applicable statutory deductions. In addition, the Employee is entitled to receive benefits in accordance with the Employer's standard benefit package and applicable entitlement requirements, as amended from time to time.

### **Duties and Responsibilities**

The Employee shall be employed in the capacity of **Design Engineer**, the current duties and responsibilities of which are set out in Schedule "A", forming part of this agreement. These duties and responsibilities may be amended from time to time in the sole discretion of the Employer, subject to formal notification of same being provided to the Employee.

### **Termination of Employment**

Subsequent to completion of the probationary term of employment referred to previously in this document, the Employer may terminate the employment of the Employee at any time for just cause at common law, in which case the Employee is not entitled to any advance notice of termination or compensation in lieu of notice.

The Employer may terminate the Employee's employment at any time without just cause upon the Employer providing to the Employee the prescribed minimum notice and severance pursuant to the Employment Standards Act or other successor statute as amended and this shall be the maximum notice to which the Employee is entitled either under the statute or at common-law.

The Employee may terminate his employment at any time by providing the Employer with at least two (2) weeks advance notice of his/her intention to resign.

### **Restrictive Covenant**

Following the termination of the employment of the Employee by the Employer, with or without cause, or the voluntary resignation by the Employee, the Employee shall, for a period of one year following the said termination or voluntary withdrawal, within the Province / Territory of **Pune**, refrain from either directly or indirectly soliciting or attempting to solicit the business of any client or customer of the Employer for his own benefit or that of any third person or organization, and shall refrain from either directly or indirectly attempting to obtain the withdrawal from the employment by the Employer of any other Employee of the Employer having regard to the same geographic and temporal restrictions. The Employee shall not directly or indirectly divulge any financial information relating to the Employer or any of its affiliates or clients to any person whatsoever.

### **Confidentiality**

The Employee acknowledges that, in the course of performing and fulfilling his/her duties here under, he/she may have access to and be entrusted with confidential information concerning the present and contemplated financial status and activities of the Employer, the disclosure of any of which confidential information to competitors of the Employer would be highly detrimental to the interests of the Employer. The Employee further acknowledges and agrees that the right to maintain the confidentiality of such information constitutes a proprietary right which the Employer is entitled to protect. Accordingly, the Employee covenants and agrees with the Employer that he/she will not, during the continuance of this agreement, disclose any of such confidential information to any person, firm or corporation, nor shall he/she use same, except as required in the normal course of his engagement hereunder, and thereafter he/she shall not disclose or make use of the same.

### **Assignment**

This agreement shall be assigned by the Employer to any successor employer and be binding upon the successor employer. The Employer shall ensure that the successor employer shall continue the provisions of this agreement as if it were the original party of the first part.

### **Severability**

Each paragraph of this agreement shall be and remain separate from and independent of and severable from all and any other paragraphs herein except where otherwise indicated by the context of the agreement. The decision or declaration that one or more of the paragraphs are null and void shall have no effect on the remaining paragraphs of this agreement.

### **Notice**

Any notice required to be given hereunder shall be deemed to have been properly given if delivered personally or sent by pre-paid registered mail as follows:

To the Employee: [address]

To the Employer: [address]

And if sent by registered mail shall be deemed to have been received on the 4th business day of uninterrupted postal service following the date of mailing. Either party may change its address for notice at any time, by giving notice to the other party pursuant to the provisions of this agreement.

### **Interpretation of Agreement**

The validity, interpretation, construction and performance of this agreement shall be governed by the Laws of the Province / Territory of **Pune**. This agreement shall be interpreted with all necessary



changes in gender and in number as the context may require and shall convey to the benefit of and be binding upon the respective successors and assigns of the parties hereto.

IN WITNESS WHEREOF the parties hereto have caused this agreement to be executed as of the 20\_\_\_\_.

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(EMPLYOEE Name)

Signature & Date

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**SunCool Energy LTD  
LTD**

Signature & Date

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**WITNESS SunCool Energy**

Signature & Date