
Pre-Feasibility Study

(Solar (PV) Power Back-up Solutions)



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Ministry of Industries & Production
Government of Pakistan
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1 DISCLAIMER

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2 EXECUTIVE SUMMARY

Solar Photovoltaic (PV) is a method of converting solar energy into direct current electricity using semiconducting materials that exhibit the photovoltaic effect. Power generation from solar PV has long been seen as a clean sustainable energy technology that draws upon the planet's most plentiful and widely distributed renewable energy source, which is the sun.

The proposed product is a Solar Home (PV) System, this system will be used as power saving feature in homes in the presence of electricity and also to be used as alternative power source in the absence of electricity hence eliminating the need for other alternative power sources such as generators and UPS. The Solar Home (PV) System will include Solar Panels, Hybrid Inverter, Charge Controller, Power Bank / Batteries and Frames.

The business can be established at any of the major cities across Pakistan such as Lahore, Rawalpindi-Islamabad, Faisalabad, Multan, Karachi, Quetta, Peshawar etc.

Distribution capacity **144 kW** (kilowatt) and initial utilization **90%**

Total Investment in the business is estimated to be **Rs.1,784,930** with fixed investment of **Rs. 595,000** and working capital requirement of **Rs.1,189,930**.

Given the cost assumptions IRR and Payback are **52%** and **3.34 years** respectively.

The most critical considerations or factors for success of the project are:

- Most significant consideration(s)
 - Owner and key employees must have technical expertise & experience.
 - Financial position and credit standing of the distributor.
 - After Sales Services is also crucial in creating good personal relationships with customers.
 - Linkages development with the local market & households.
- Equally important factors:
 - Effective marketing plan for the business so that the potential customers could be reached.
 - Good customer care is vital for creating positive image for business growth.
 - Selection of a central location based on the target market.

3 INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectoral research' to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives.

Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need based capacity building programs of different types in addition to business guidance through help desk services.

4 PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to facilitate potential investors in **Solar (PV) Power Back-up Solutions** by providing them with a general understanding of the business with the intention of supporting potential investors in crucial investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business set-up and it's successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form basis of any Investment Decision.

5 BRIEF DESCRIPTION OF PROJECT & PRODUCT

A photovoltaic system employs solar panels composed of a number of solar cells to supply usable solar power. The direct conversion of sunlight to electricity occurs without any moving parts or environmental emissions during operation.

Pakistan has always been in the grip of sustainable energy scarcity. There is an ever increase in energy demand that cannot be fulfilled using the current resources. “It is estimated that around 144 million Pakistanis out of 197 million face electricity load shedding. They can be grouped into (a) Off-grid, unserved: About 69 million rural Pakistanis who are not connected to the national grid, and (b) On-grid, underserved: About 75 million urban and rural Pakistanis who are connected to the national grid but experience daily load-shedding in excess of 12 hours on average. This amounts to almost 22 million households facing a serious energy crisis.”¹

Around the world, solar energy particularly, is positioned to become a new source of sustainable energy. The increased awareness towards environmental issues has prompted a new shift towards low-carbon energy alternatives that has enabled new investment in the alternate energy. “Pakistani households spend \$ 2.3 billion per annum on alternative lighting products.”² Commercial manufacturing of the PV Systems has served to decrease the cost of its components with the passage of time due to advancements in manufacturing technology, techniques and process.

Pakistan predominantly requires alternate sources of energy to both deal with the environmental challenges and the energy shortage. This feasibility study explores the opportunity that exists in the Home (PV) Distribution Business, in Pakistan. Hybrid Systems are more appealing because of the flexibility to connect along with the national grid electricity connection. So will enable the consumers to utilize the solar energy as an energy saving option in the presence of the electricity as well as to provide as a backup power in the absence of electricity in the day times with the ability to charge the batteries that will provide backup in the nights.

Following are the key parameters for the proposed distribution unit:

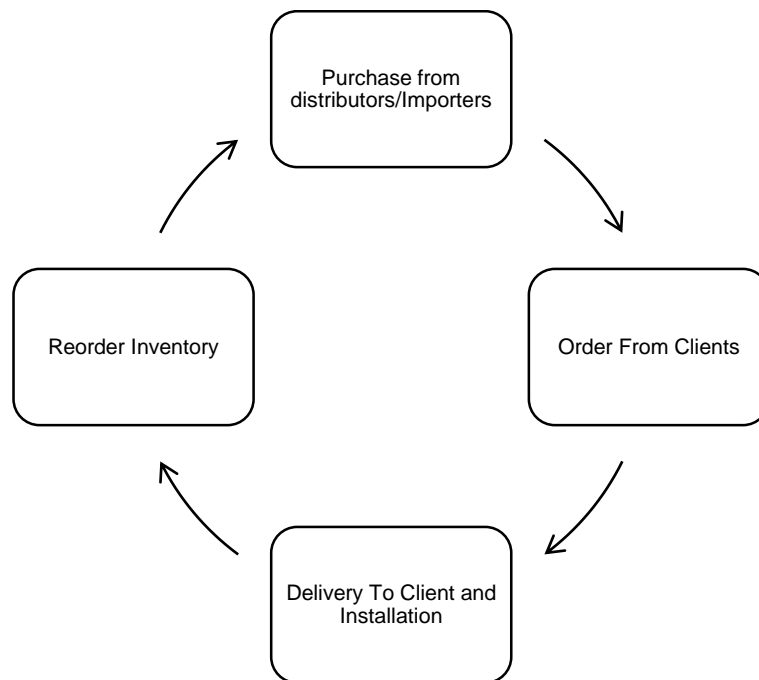
- **Technology:** There are three types of Solar (PV) Systems widely available:
 - The first type is the Grid Tied Systems that are connected to the utility power grids, which is an alternative power generation method like the hydel or fuel or gas generators used by power companies to meet the needs of the area or city or country and they will only work in the presence of sunlight.

¹ Pakistan Off-Grid Lighting Consumer Perceptions Study 2015, (IFC) World Bank Group

² Pakistan Off-Grid Lighting Consumer Perceptions Study 2015, (IFC) World Bank Group

- The second type is the Off-Grid PV System that are also known as stand-alone Systems. This type of Systems are not connected to the grid and it requires batteries. The batteries ensure the availability of electricity even in the absence of sunlight. These types of systems are mainly used in the remote areas, which are not in the reach of national power distribution.
- The third type is the Hybrid PV Systems, it is best suited for households because of the flexibility to connect along with the national grid electricity connection.
- **Location:** This solar back-up power business can be located anywhere in Pakistan, especially in urban cities like Karachi, Hyderabad, Sukkur, Larkana, Multan, Lahore, Faisalabad, Gujranwala, Sialkot, Rawalpindi, Quetta, Peshawer, Mirpur and Islamabad.
- **Product:** This distribution business would buy the Hybrid PV Systems from the importers or distributors which would be sold to and installed at premises of the end consumers.
- **Target Market:** The target market for the proposed business consists of three segments. The proposed segments are household consumers, small sized businesses and organizations, and educational institutions located in major cities of the country.
- **Employment Generation:** The distribution unit would generate both direct and indirect employment. Direct employment would be provided to 6 people. One person who would look after the accounts and general administration activities, one person would handle marketing and procurements and three people with technical skills are proposed to be engaged to manage system installation and after sales services.

5.1 Distribution Process Flow



- **Stage 1:** Bare minimum inventory is maintained to fulfil the demand on time
- **Stage 2:** Demand from clients analyzed
- **Stage 3:** Delivery and Installation at the premises of clients takes place
- **Stage 4:** Reorder of inventory according to demand

5.2 Installed and Operational Capacities

The operational capacity of this pre-feasibility is 12 kW per month. The assumed operational capacity during the first year of operations is 90%.

6 CRITICAL FACTORS

The key success factors are as follows:

- Quality of components
- Effective marketing plan for the business so that the potential customers could be reached.
- After sale services is also crucial in creating good personal relationships with customers.
- Owner or key employees must have technical expertise & experience.
- Selection of a central location based on the target market.
- Linkages development with the local market & households.

7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT

Pakistan's geography is most favorable to exploitation of solar energy as it is sixth most fortunate country in the world in terms of solar irradiance and where sunshine availability is 8-10 hours per day over much of the plains of Sindh, Baluchistan and Southern Punjab.

Solar energy intensity in Sun Belt of Pakistan is approximately 1,800-2,200 Kwh per square meter per day which is most favorable for exploitation of solar energy. Potential capacity for installation of solar photovoltaic power by some estimates is 1,600 GW, which is 40 times greater than present consumption. Based on range of currently possible conversion efficiencies in area of one sq. km has potential to produce 40-55MW power and can generate revenue conservatively estimated at Rs. 1 billion per month at current average tariffs of Rs. 10 per Kw per hour.

Since solar power is available only during times of sunshine, it can at most meet up to 30% of daily consumption. Thar, lower Sindh & Baluchistan, Punjab and lower KPK are prime regions with potential to generate more than 250 Gigawatts electric power to meet energy shortfall over coming decades. Business of Solar (pv) based micro generation systems have a good demand owing to the geographical potential and energy shortfall in the country.

8 POTENTIAL TARGET CUSTOMERS

The solar (PV) system consumers are increasing in Pakistan as more people are shifting from fuel generators to solar power for power needs. The potential customers are segmented into following groups: Small Businesses and Organizations: Small businesses operating in areas with disrupted electricity supply opt for solar power systems for their electricity needs. Organizations including Health facilities, Government offices and NGOs operating in remote rural areas with no grid power access also install PV systems to meet their electricity needs. Such customers are found both in rural as well as urban areas of Pakistan. Households: Household consumers with adequate buying power prefer PV systems over power generators. People from urban centers of Punjab and Sindh are especial target with huge potential as these areas get maximum amount of sunlight. The affordability of such consumers is also high as the PV systems cost quite high. However, individual households may order PV systems from across the country. Educational Institutions: Schools and colleges operating in rural areas with no grid power supply install PV systems to meet their requirements.

9 PROJECT COST SUMMARY

A detailed financial model has been developed to analyze the commercial viability of this project. Various costs and revenue related assumptions along with results of the analysis are outlined in this section.

9.1 Project Economics

All the figures in this financial model have been calculated for estimated revenue of Rs.27.9 million in the year one. The capacity utilization is worked out at 90%.

The following table shows internal rate of return, payback period and net present value of the proposed venture:

Table 9.1: Project Economics

Description	Details
Internal Rate of Return (IRR)	52%
Payback Period	3.34 years
Net Present Value	Rs.8,711,708

9.2 Project Financing

Following table provides details of the equity required and variables related to bank loan:

Table 9.2: Project Financing

Description	Details
Total Equity (50%)	Rs. 892,465
Bank Loan (50%)	Rs. 892,465
Markup to the Borrower (annual)	14%
Tenure of the Loan	05 years

9.3 Project Cost

Following fixed and working capital requirements have been identified for operations of the proposed business. Working capital is estimated to be Rs. 1,189,930 to meet the initial requirements of operating the business

Table 9.3: Project Cost

Description	Cost (Rs.)
Capital Cost	
Furniture & Fixture	200,000
Office Equipment	136,000
Machinery and Equipment	81,000
Pre-operating costs	178,000
Total Capital Cost	595,000
Working Capital	
Raw Material Inventory	473,880
Up-front Building Rent	360,000
Up-front insurance payment	4,050
Cash	352,000
Total Working Capital	1,189,930
Total Project Cost	1,784,930

9.4 Space Requirement

The space requirement for the proposed PV Systems distribution business is estimated considering two facilities including a management office and a store. Details of space requirement and cost related to building are given below:

Table 9.4: Space Requirement

Description	Estimated Area (Sq ft)	Rent Cost (Rs./sqft)	Total Cost (Rs.)
Rented Space	750	40	30,000
Total			30,000

9.5 Furniture & Fixtures Requirement

Details of the furniture and fixture required for the project are given below:

Table 9.5: Furniture & Fixture

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Computer Table and Chair	02	25,000	50,000
Tables for store/workshop	02	20,000	40,000
Chairs	08	7,000	56,000
Air Conditioners	01	45,000	45,000
Electrical wiring & lighting	10	900	9,000
Total			200,000

9.6 Office Equipment Requirement

Following office equipment will be required for PV Systems distribution business:

Table 9.6: Office Equipment

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Computers	02	50,000	100,000
Printer	01	20,000	20,000
Tablet	01	15,000	15,000
Telephone Set	01	1000	1,000
Total			136,000

9.7 Human Resource Requirement

In order to run operations of PV Systems distribution business smoothly, details of human resources required along with number of employees and monthly salary are recommended as under:

Table 9.7: Human Resource Requirement

Description	No. of Employees	Salary per month per Person (Rs.)	Total Monthly Salary (Rs.)
CEO	01	40,000	40,000
Sales Rep./Procurement officer	01	25,000	25,000
Installer	03	25,000	75,000
Accounts and admin. officer	01	20,000	20,000
Security Guard	01	18,000	18,000
Total	07		178,000

9.8 Utilities and other costs

An essential cost to be borne by the project is the cost of electricity, telephone and internet. The electricity expenses are estimated to be around Rs.15,840 per month, telephone expenses are estimated to be around Rs.6,180 per month including internet expenses. Furthermore, promotional expense being essential for marketing of PV Systems distribution business is estimated as 03% of sales.

9.9 Revenue Generation

Based on the approx. capacity utilization of 90% for PV distribution, revenue during the first year of operations is estimated as under:

Table 9.9: Revenue Generation – Year 1

Description	No. of Units Procure (kW)	Remaining Inventory (kW)	Units available for Sale (kW)	Sale Price / kW (Rs.)	Sales Revenue (Rs.)
Solar (PV) Systems	130	0	130	216,040	27,921,010
Total					27,921,010

10 CONTACT DETAILS

10.1 Raw Material Suppliers

Raw Material Supplier -1

Name of Supplier	Nizam Energy Pvt LTD.		
Address	G-30/4 KDA Scheme No. 5, Block 8, Clifton, Karachi		
Phone	021-35360583	Fax	+92-21-3536-0584
E-mail	sales@nizamenergy.com		
Website	www.nizamsolar.com		

Raw Material Supplier -2

Name of Supplier	Reon Energy Solutions		
Address	3 rd Floor Dawood Center, MT Khan Road, Karachi		
Phone	021-3563220009	Fax	N/A
E-mail	info@reonenergy.com		
Website	www.reonenergy.com		

Raw Material Supplier -3

Name of Supplier	Tesla Solar		
Address	81-G, Street 6, I-10/3, Islamabad		
Phone	03218375278	Fax	N/A
Website	www.tesla-pv.com		

11 USEFUL WEB LINKS

Small & Medium Enterprises Development Authority (SMEDA)	www.smeda.org.pk
Government of Pakistan	www.pakistan.gov.pk
Ministry of Industries & Production	www.moip.gov.pk
Ministry of Education, Training & Standards in Higher Education	http://moptt.gov.pk
Government of Punjab	www.punjab.gov.pk
Government of Sindh	www.sindh.gov.pk
Government of Khyber Pakhtunkhwa	www.khyberpakhtunkhwa.gov.pk
Government of Balochistan	www.balochistan.gov.pk
Government of Gilgit Baltistan	www.gilgitbaltistan.gov.pk
Government of Azad Jamu Kashmir	www.ajk.gov.pk
Trade Development Authority of Pakistan (TDAP)	www.tdap.gov.pk
Security Commission of Pakistan (SECP)	www.secp.gov.pk
Federation of Pakistan Chambers of Commerce and Industry (FPCCI)	www.fpcci.com.pk
State Bank of Pakistan (SBP)	www.sbp.org.pk
Punjab Small Industries Corporation	www.psic.gop.pk
Sindh Small Industries Corporation	www.ssic.gos.pk
Pakistan Horticulture Development and Export Company (PHDEC)	www.phdec.org.pk
Punjab Vocational Training Council (PVTC)	www.pvtc.gop.pk
Technical Education and Vocational Training Authority (TEVTA)	www.tevta.org
Pakistan Readymade Garment Technical Training Institute	www.prgmea.org/prgtti/
Livestock & Dairy Development Department, Government of Punjab.	www.livestockpunjab.gov.pk
Punjab Industrial Estates (PIE)	www.pie.com.pk
Faisalabad Industrial Estate Development and Management Company (FIEDMC)	www.fiedmc.com.pk

12 ANNEXSURES

12.1 Income Statement

Calculations										SMEDA
Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Revenue	27,921,010	34,211,230	37,642,810	41,407,091	45,547,800	50,102,580	55,112,838	60,624,121	66,686,533	73,355,187
<i>Cost of sales</i>										
Cost of goods sold 1	22,746,240	27,363,917	29,561,242	31,926,141	34,480,232	37,238,651	40,217,743	43,435,162	46,909,975	50,662,773
Cost of goods sold 2	-	-	-	-	-	-	-	-	-	-
Operation costs 1 (direct labor)	897,500	987,351	1,083,782	1,189,300	1,305,092	1,432,158	1,571,595	1,724,608	1,892,518	2,076,776
Total cost of sales	23,643,740	28,351,268	30,645,023	33,115,441	35,785,325	38,670,809	41,789,338	45,159,770	48,802,493	52,739,549
Gross Profit	4,277,270	5,859,963	6,997,786	8,291,649	9,762,475	11,431,771	13,323,500	15,464,351	17,884,040	20,615,637
<i>Gross Profit Margin</i>	15%	17%	19%	20%	21%	23%	24%	26%	27%	28%
<i>General administration & selling expenses</i>										
Administration expense	1,236,000	1,356,339	1,488,394	1,633,306	1,792,327	1,966,830	2,158,324	2,368,461	2,599,058	2,852,106
Administration benefits expense	61,800	67,817	74,420	81,665	89,616	98,342	107,916	118,423	129,953	142,605
Building rental expense	360,000	396,000	435,600	479,160	527,076	579,784	637,762	701,538	771,692	848,861
Electricity expense	190,080	209,088	229,997	252,996	278,296	306,126	336,738	370,412	407,453	448,199
Travelling expense	61,800	67,817	74,420	81,665	89,616	98,342	107,916	118,423	129,953	142,605
Communications expense (phone, fax, mail, internet, etc.)	74,160	81,380	89,304	97,998	107,540	118,010	129,499	142,108	155,943	171,126
Office expenses (stationary, entertainment, janitorial services, etc)	49,440	54,254	59,536	65,332	71,693	78,673	86,333	94,738	103,962	114,084
Promotional expense	837,630	1,026,337	1,129,284	1,242,213	1,366,434	1,503,077	1,653,385	1,818,724	2,000,596	2,200,656
Insurance expense	4,050	3,645	3,240	2,835	2,430	2,025	1,620	1,215	810	405
Professional fees (legal, audit, consultants, etc.)	139,605	171,056	188,214	207,035	227,739	250,513	275,564	303,121	333,433	366,776
Depreciation expense	41,700	41,700	41,700	41,700	41,700	41,700	41,700	41,700	41,700	41,700
Amortization of pre-operating costs	35,600	35,600	35,600	35,600	35,600	-	-	-	-	-
Bad debt expense	837,630	1,026,337	1,129,284	1,242,213	1,366,434	1,503,077	1,653,385	1,818,724	2,000,596	2,200,656
Miscellaneous expense 1	200,000	220,000	242,000	266,200	292,820	322,102	354,312	389,743	428,718	471,590
Subtotal	4,129,496	4,757,369	5,220,992	5,729,919	6,289,321	6,868,600	7,544,455	8,287,330	9,103,867	10,001,369
Operating Income	147,774	1,102,593	1,776,794	2,561,730	3,473,154	4,563,170	5,779,044	7,177,021	8,780,173	10,614,269
Earnings Before Interest & Taxes	147,774	1,102,593	1,776,794	2,561,730	3,473,154	4,563,170	5,779,044	7,177,021	8,780,173	10,614,269
Interest on short term debt	52,613	52,613	-	-	-	-	-	-	-	-
Interest expense on long term debt (Project Loan)	41,650	35,349	28,166	19,977	10,642	-	-	-	-	-
Interest expense on long term debt (Working Capital Loan)	46,077	-	-	-	-	-	-	-	-	-
Subtotal	140,340	87,962	28,166	19,977	10,642	-	-	-	-	-
Earnings Before Tax	7,434	1,014,631	1,748,628	2,541,753	3,462,512	4,563,170	5,779,044	7,177,021	8,780,173	10,614,269
Tax	1,487	202,926	349,726	508,351	692,502	912,634	1,155,809	1,435,404	1,756,035	2,122,854
NET PROFIT/(LOSS) AFTER TAX	5,947	811,705	1,398,903	2,033,402	2,770,009	3,650,536	4,623,236	5,741,617	7,024,138	8,491,415
	0%	2%	4%	5%	6%	7%	8%	9%	11%	12%
Balance brought forward		5,947	817,652	2,216,555	4,249,957	7,019,966	10,670,503	15,293,738	21,035,355	28,059,494
Total profit available for appropriation	5,947	817,652	2,216,555	4,249,957	7,019,966	10,670,503	15,293,738	21,035,355	28,059,494	36,550,909
Balance carried forward	5,947	817,652	2,216,555	4,249,957	7,019,966	10,670,503	15,293,738	21,035,355	28,059,494	36,550,909

12.2 Balance Sheet

Calculations											SMEDA
Balance Sheet											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Assets											
<i>Current assets</i>											
Cash & Bank	682,000	-	162,744	1,392,943	3,261,100	5,835,507	9,305,541	13,721,680	19,226,345	25,980,005	36,092,811
Accounts receivable		535,471	595,789	689,011	758,013	833,814	917,195	1,008,915	1,109,806	1,220,787	1,342,866
Finished goods inventory		65,860	78,775	85,125	91,987	99,404	107,419	116,081	125,444	135,562	146,499
Raw material inventory	473,880	598,586	678,985	769,969	873,145	990,146	1,122,825	1,273,284	1,443,904	1,637,387	-
Pre-paid building rent	30,000	33,000	36,300	39,930	43,923	48,315	53,147	58,462	64,308	70,738	-
Pre-paid insurance	4,050	3,645	3,240	2,835	2,430	2,025	1,620	1,215	810	405	-
Total Current Assets	1,189,930	1,236,562	1,555,833	2,979,814	5,030,598	7,809,210	11,507,748	16,179,637	21,970,617	29,044,885	37,582,176
<i>Fixed assets</i>											
Machinery & equipment	81,000	72,900	64,800	56,700	48,600	40,500	32,400	24,300	16,200	8,100	-
Furniture & fixtures	200,000	180,000	160,000	140,000	120,000	100,000	80,000	60,000	40,000	20,000	-
Office equipment	136,000	122,400	108,800	95,200	81,600	68,000	54,400	40,800	27,200	13,600	-
Total Fixed Assets	417,000	375,300	333,600	291,900	250,200	208,500	166,800	125,100	83,400	41,700	-
<i>Intangible assets</i>											
Pre-operation costs	178,000	142,400	106,800	71,200	35,600	-	-	-	-	-	-
Total Intangible Assets	178,000	142,400	106,800	71,200	35,600	-	-	-	-	-	-
TOTAL ASSETS	1,784,930	1,754,262	1,996,233	3,342,914	5,316,398	8,017,710	11,674,548	16,304,737	22,054,017	29,086,585	37,582,176
Liabilities & Shareholders' Equity											
<i>Current liabilities</i>											
Accounts payable		63,958	76,830	83,099	89,861	97,179	105,100	113,674	122,956	133,006	138,802
Short term debt	-	537,911	-	-	-	-	-	-	-	-	-
Total Current Liabilities	-	601,870	76,830	83,099	89,861	97,179	105,100	113,674	122,956	133,006	138,802
<i>Other liabilities</i>											
Deferred tax		1,487	8,100	8,100	8,100	8,100	6,480	4,860	3,240	1,620	-
Long term debt (Project Loan)	297,500	252,493	201,185	142,694	76,015	-	-	-	-	-	-
Long term debt (Working Capital Loan)	594,965	-	-	-	-	-	-	-	-	-	-
Total Long Term Liabilities	892,465	253,980	209,285	150,794	84,115	8,100	6,480	4,860	3,240	1,620	-
<i>Shareholders' equity</i>											
Paid-up capital	892,465	892,465	892,465	892,465	892,465	892,465	892,465	892,465	892,465	892,465	892,465
Retained earnings		5,947	817,652	2,216,555	4,249,957	7,019,966	10,670,503	15,293,738	21,035,355	28,059,494	36,550,909
Total Equity	892,465	898,412	1,710,117	3,109,020	5,142,422	7,912,431	11,562,968	16,186,203	21,927,820	28,951,959	37,443,374
TOTAL CAPITAL AND LIABILITIES	1,784,930	1,754,262	1,996,233	3,342,914	5,316,398	8,017,710	11,674,548	16,304,737	22,054,017	29,086,585	37,582,176

12.3 Cash Flow Statement

Calculations											SMEDA
Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Operating activities											
Net profit		5,947	811,705	1,398,903	2,033,402	2,770,009	3,650,536	4,623,236	5,741,617	7,024,138	8,491,415
Add: depreciation expense		41,700	41,700	41,700	41,700	41,700	41,700	41,700	41,700	41,700	41,700
amortization of pre-operating costs		35,600	35,600	35,600	35,600	35,600	-	-	-	-	-
Deferred income tax		1,487	6,613	-	-	-	(1,620)	(1,620)	(1,620)	(1,620)	(1,620)
Accounts receivable		(535,471)	(60,317)	(93,223)	(69,001)	(75,801)	(83,381)	(91,720)	(100,891)	(110,981)	(122,079)
Finished goods inventory		(65,860)	(12,915)	(6,350)	(6,862)	(7,416)	(8,015)	(8,663)	(9,362)	(10,119)	(10,936)
Raw material inventory	(473,880)	(124,706)	(80,399)	(90,984)	(103,176)	(117,001)	(132,680)	(150,459)	(170,620)	(193,483)	1,637,387
Pre-paid building rent	(30,000)	(3,000)	(3,300)	(3,630)	(3,993)	(4,392)	(4,832)	(5,315)	(5,846)	(6,431)	70,738
Advance insurance premium	(4,050)	405	405	405	405	405	405	405	405	405	405
Accounts payable		63,958	12,871	6,269	6,762	7,318	7,921	8,574	9,282	10,050	5,796
Cash provided by operations	(507,930)	(579,940)	751,963	1,288,691	1,934,836	2,650,421	3,470,034	4,416,139	5,504,664	6,753,660	10,112,806
Financing activities											
Project Loan - principal repayment		(45,007)	(51,308)	(58,491)	(66,680)	(76,015)	-	-	-	-	-
Working Capital Loan - principal repayment		(594,965)	-	-	-	-	-	-	-	-	-
Short term debt principal repayment		-	(537,911)	-	-	-	-	-	-	-	-
Additions to Project Loan	297,500	-	-	-	-	-	-	-	-	-	-
Additions to Working Capital Loan	594,965	-	-	-	-	-	-	-	-	-	-
Issuance of shares	892,465	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares											
Cash provided by / (used for) financing activities	1,784,930	(639,972)	(589,219)	(58,491)	(66,680)	(76,015)	-	-	-	-	-
Investing activities											
Capital expenditure	(595,000)	-	-	-	-	-	-	-	-	-	-
Cash (used for) / provided by investing activities	(595,000)	-	-	-	-	-	-	-	-	-	-
NET CASH	682,000	(1,219,911)	162,744	1,230,200	1,868,157	2,574,406	3,470,034	4,416,139	5,504,664	6,753,660	10,112,806
Cash balance brought forward		682,000	-	162,744	1,392,943	3,261,100	5,835,507	9,305,541	13,721,680	19,226,345	25,980,005
Cash available for appropriation	682,000	(537,911)	162,744	1,392,943	3,261,100	5,835,507	9,305,541	13,721,680	19,226,345	25,980,005	36,092,811
Cash balance	682,000	(537,911)	162,744	1,392,943	3,261,100	5,835,507	9,305,541	13,721,680	19,226,345	25,980,005	36,092,811
Cash carried forward	682,000	-	162,744	1,392,943	3,261,100	5,835,507	9,305,541	13,721,680	19,226,345	25,980,005	36,092,811

13 KEY ASSUMPTIONS

13.1 Operating Cost Assumptions

Description	Details
Office hours	08 hours
Number of shifts	1
Days operational per year	330 days

13.2 Product Cost Assumptions

Description	Details
Increase in cost of each component of PV System	08% per year
Promotional Expense	3% of sales
Duty rates and other charges on PV Panels, Inverters and Batteries	5.5%

13.3 Revenue Assumptions

Description	Details
Increase in price of PV System	10% per year
Number of kilowatts	130 kW per year
Increase in number of kilowatts	10% per year

13.4 Financial Assumptions

Description	Details
Project Life	10 years
Debt Equity Ratio	50 : 50
Interest Rate on Long Term Debt	14%
Long Term Debt Tenure	5 years
Numbers of Payment / Year	12