FROM CELLS TO FARMS

Websol Energy Systems Limited | Annual report 2010-11

Forward-looking statement

In this annual report we have disclosed forward-looking information to enable investors to comprehend our prospects and take informed investment decisions. This report and other statements - written and oral - that we periodically make contain forward-looking statements that set out anticipated results based on the management's plans and assumptions. We have tried wherever possible to identify such statements by using words such as 'anticipates', 'estimates', 'expects', 'projects', 'intends', 'plans', 'believes', and words of similar substance in connection with any discussion of future performance.

We cannot guarantee that these forward-looking statements will be realised, although we believe we have been prudent in our assumptions. The achievement of results is subject to risks, uncertainties and even inaccurate assumptions. Should known or unknown risks or uncertainties materialise, or should underlying assumptions prove inaccurate, actual results could vary materially from those anticipated, estimated or projected. Readers should bear this in mind.

We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise.

Content

For a decade-and-a-half, we manufactured solar photovoltaic cells that were used by our customers to commission solar farms.

The time has come for us to graduate our make-and-sell business model to a make-and-use as well as a make-and-sell model.

Enhancing our margins. Increasing revenue visibility. Strengthening business sustainability.

Websol Energy Systems Ltd was a 1 MW solar cell manufacturing company in 1995. The Company is likely to emerge as a 120 MW company in 2011-12.

Websol was a company that used the reclaimed wafer technology to manufacture cells. The Company graduated to the monocrystalline solar grade technology today.

Websol exported to about five countries at one time.

The Company's products are marketed to more than 17 countries today.

Websol manufactured solar cells and modules upto 175 watts at one time. The Company widened its range to 245 watts today.

Websol only manufactured solar cells and modules at one time. The Company embarked on the process to integrate forwards and commission solar farms today.

“The only way to predict the future is to have power to shape the future.”

– Eric Hoffer

Profile

- Websol Energy Systems Ltd was created to address global energy through a renewable source like solar power.
- The Company was incorporated in 1990 and began production in 1995 with an installed capacity of 1 MW.
- The Company is one of India's leading manufacturers of solar photovoltaic monocrystalline cells and modules.
- The Company has its integrated production facility in Falta SEZ, Kolkata.

Vision

To provide clean and dependable solar energy that will sustain the environment and improve global living standards.

Mission

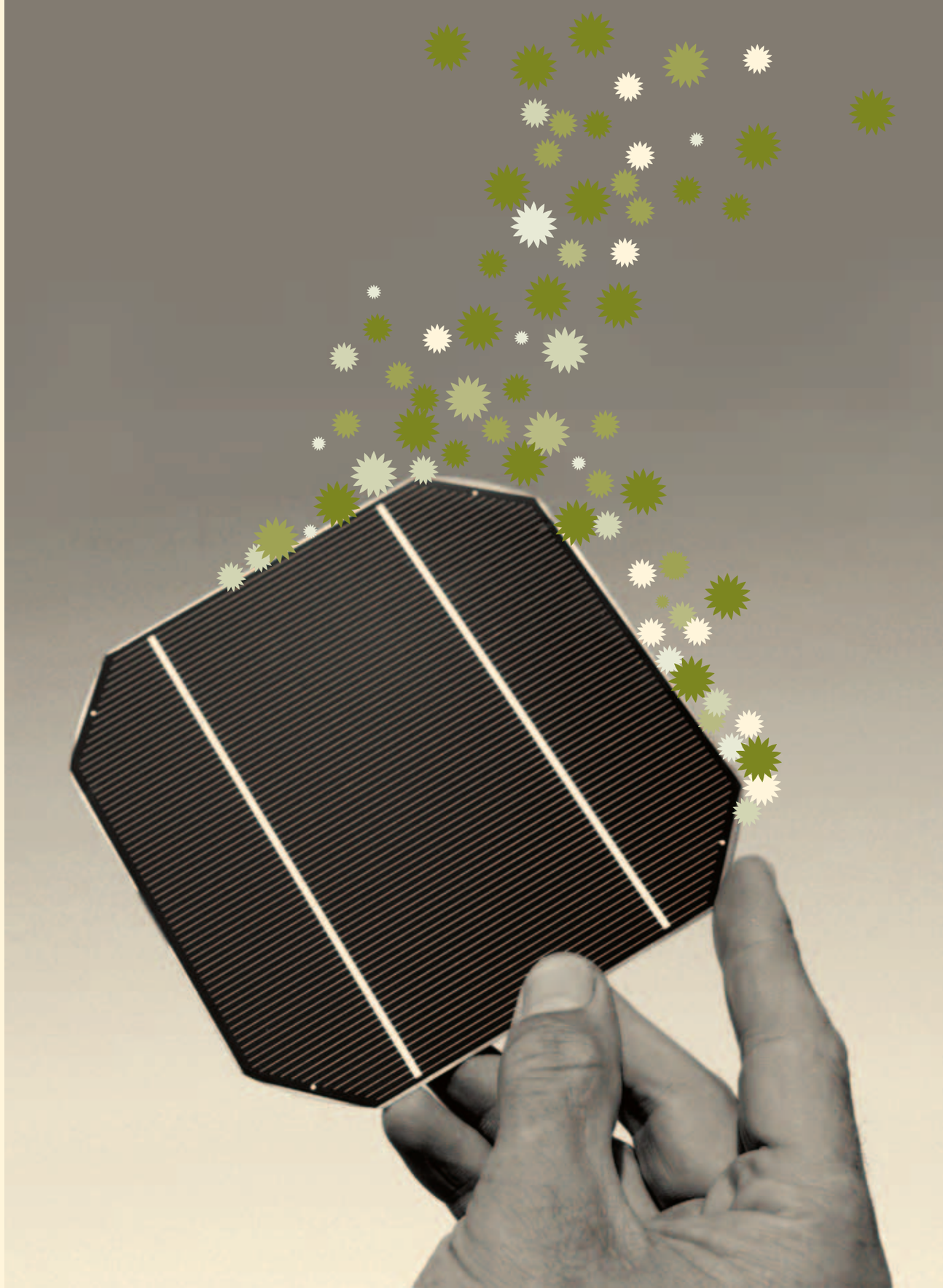
To provide solar energy solutions as per international standards and develop advanced and cost-effective products through cutting-edge technology that will create value customers and stakeholders while improving the environment and caring for our employees.

Core values

- Customer focus: All our actions and resources are focused on the customer, ensuring that the services they receive represent value for money. We treat our customers with dignity and respect while optimising their choice and giving them a stronger voice in designing our products and services. We feel that only a satisfied customer is the key to long-term success.
- Employee engagement: Being customer-focused begins with employee engagement. Our employees are our biggest asset and we believe in boosting their morale leading to our success. We encourage best practices among our employees as they grow with us. We like them to be mentally and physically present at the work place, and conduct their business enthusiastically and energetically.
- Innovation: We believe in being innovative to address the ever-changing needs of our customers with speed and agility. Innovation allows us to present better products along with unmatched service to enhance overall customer satisfaction.
- Transparency: For us, transparency implies openness, communication and accountability towards our suppliers, employees, customers and stakeholders. Clear and precise communication forms the footboard of our openness to remove all barriers and facilitate free and easy access to all our actions, products and services.
- Environment-friendly: We are an environment-conscious company with continuous improvement methodologies and efficient production and business processes. Our vendor selection and manufacturing processes are based on environment protection, workplace safety and employee health. We work towards a cleaner, greener and healthier future.

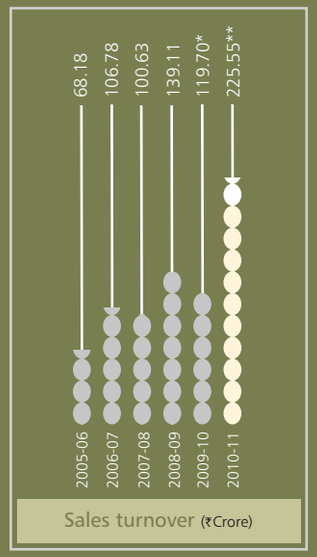
Certifications

- UL 1703 Standards for its entire product range. (specifically required for the USA and Canada)
- CSA mark for W1750 and W2100.
- IEC certification for its modules W2100 and W1750.
- ISO 9000:2000 from the UL Registered Firm.
- PV GAP certification.

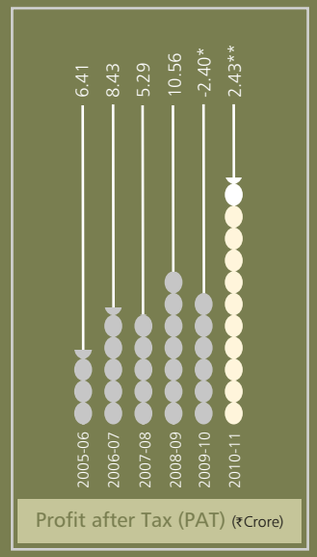


Numbers that made a big difference

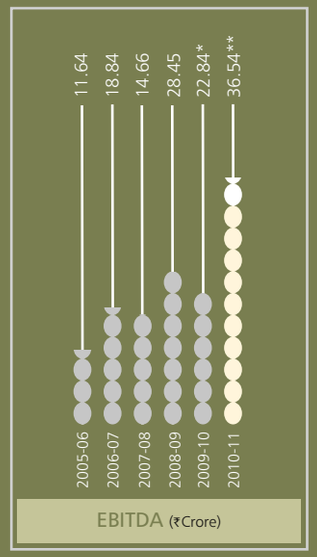
Rapid escalation in the installed capacity of the Company from 30 MW to 60 MW +	In merely nine months, increased production from 17.23 MW to 24.55 MW	Improved and enhanced cell efficiency from 17.8 % to 18.3%
Capital cost per MW decreased from ₹6.48 cr to ₹5.41 cr	Average realisations declined from ₹9.30 cr per MW to ₹6.78 cr per MW	Gross block investment size increased from ₹259 cr to ₹324 cr



Sales turnover (₹Crore)



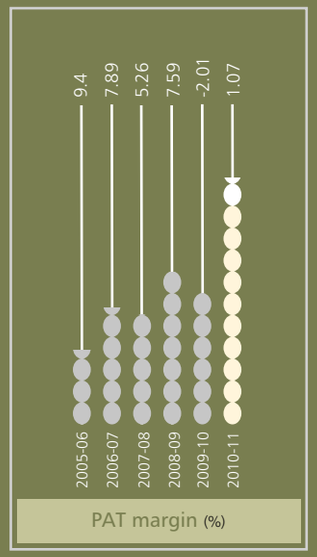
Profit after Tax (PAT) (₹Crore)



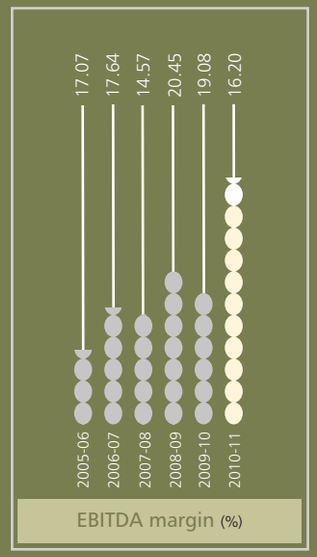
EBITDA (₹Crore)

Our strengths

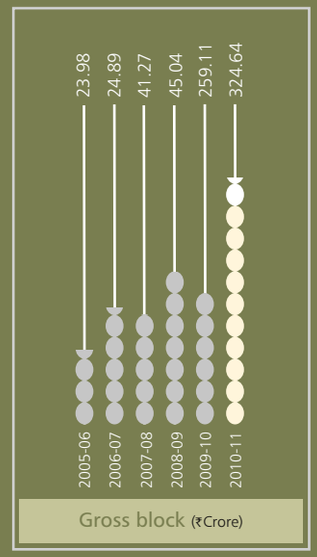
Rich experience An experience of 17 years in the dynamic global solar energy industry.	**Quality standards** Our manufacturing plant is accredited with the ISO 9000 quality and our products conform with the requirements of the PV GAP, TUV, IEC and UL international standards.	**Global presence** Our footprint covers 17 countries in the Europe, the Middle-East, the US, Africa and Australia.
Vast portfolio Our product portfolio comprises a range of solar wafers from five to eight inches, solar modules from 10W to 245W and from sub-200 microns to 400 microns.	**Brand** Our Webel Solar brand is respected for superior cell efficiency, timely delivery and overall price-value.	**Technology** We established expertise in the monocrystalline solar grade technology in our second year, resulting in an increase in yields, cell efficiency and capacity utilisation.



PAT margin (%)



EBITDA margin (%)



Gross block (₹Crore)

* Annualised figures for the 15 months ended from 01.04.2009 to 30.06.2010.

** Annualised figures for the 9 months ended from 01.07.2010 to 31.03.2011.

Chairman's overview

> “Websol is in the process of commissioning assets with an annual revenue potential of ₹700 cr”

Dear Shareholders,

ONE OF THE BEST THINGS THAT HAPPENED IN THE RENEWABLE SOLAR ENERGY INDUSTRY DURING THE LAST YEAR WAS A SHARP DECLINE IN REALISATIONS.

This decline was partly triggered by a drop in global poly-silicon costs from around US$ 90 to US$ 60 per kilo. This single industry phenomenon opens out interesting possibilities. A lower breakeven cost, a willingness to explore whether solar energy's viability in domestic and commercial applications (which previously was not even considered) and a greater focus on solar farms, coupled with encouraging power purchase agreements with the prevailing regulatory authorities.

Optimism

There are a number of reasons that enhance my industry optimism that achieving a grid parity of US$1 / W (as estimated by the US Department of Energy) by 2017 may not be impossible:

- One, there is a growing annual increment in solar photovoltaic cell production and off take, is creating the critical mass for the product that will facilitate a decline in costs.
- Two, it is our conviction that the cost of solar energy was the biggest impediment to solar energy capturing a large market share of the global renewable energy market, which we feel will correct, following a sharp decline in realisations in 2010-11.
- Three, there is a greater preference for the installation of solar cells in urban locations with no form of renewable energy coming close as a probable alternative.
- Four, the regulatory environment in a number of countries (including India) favour the feed-in of generated power at one point and its use in any other, enabling the commissioning of solar farms.
- Five, the liberalisation in India's power transmission sector makes it possible for solar farms to be commissioned just where they should be (areas with high sunshine and low land cost) as opposed to the conventional approach that they should only be commissioned close to consumption points
- Six, there is a growing shortage of thermal coal globally, resulting in an increase in per unit cost across the last year; inevitably, this will translate into an increase in thermal energy costs on the one hand, resulting in fresh commissioning capacities and environmental concerns
- Seven, the recent Japan nuclear plant disaster compelled the world to conduct a rethink of its energy sources, resulting, among others, of a leading Japanese investor seeking to invest extensively in 33 of Japan's 47 prefectures, resulting in an increase in renewable energy from 10 percent of Japan's total energy to 30 per cent as opposed to an erstwhile plan to increase the country's nuclear energy exposure from 30 per cent to 50 per cent.

Websol initiatives

At Websol, the initiatives that we embarked on in the last few years appear to be finally coming to fruition. These are expected to potentially transform the face of the organisation with speed and enable it to emerge as one of the fastest-growing solar photovoltaic companies in India

One, we grew from 1 MW in 1995 to 10 MW in SPV capacity across 10 years. We now expect to multiply this capacity 12-fold in only about five years and emerge as a 120 MW organisation by the end of 2011-12.

Two, we expect to evolve from a solar cell manufacturing company to one that is a cell manufacturing-cum-solar farm-creating company. The extension in the Company's business model will result in some business advantages. A captive consumption of the Company's production on the one hand, resulting in a decline in the cost of production and the prospect of annuity incomes backed by attractive power purchase agreements with the government.

Websol possesses an attractive foundation to make this a reality: the Company's monocrystalline technology has stabilised, cell efficiency increased, the products were certified by the leading global quality agencies, exported to demanding countries (France, Germany, Czech, Portugal and Italy) and stocked in warehouses in Germany with proposed warehouses in Canada and the USA.

Overview

What I want to communicate to the shareholders is that Websol made extensive investments (projected at 120 MW by end 2011-12) with a revenue potential of ₹700 cr that should translate into attractive profits and value in the hands of all those who hold shares in the Company.

S. L. Agarwal,
Managing Director

“We achieved one of the highest cell efficiencies in only our second year of working with new technology”

Mrs S. Vasanthi, *Director - Technical & Marketing,* reviews the Company’s technology progress in 2010-11

Q. How would you review the Company’s performance during 2010-11?

A. We started the year under review with a production capacity of 30MW. We graduated to 60 MW in the first phase, starting in the last quarter of 2010-11, through further investment in capital equipment. Once the equipment came in, we climbed the learning curve with speed and achieved a capacity utilisation of more than 90 per cent within three months of commissioning. The result is that our performance in 2010-11 served as a foundation for what we expect to achieve in the current financial year.

Q. What production improvements did you report?

A. Fundamentally, we shifted our manufacturing facility from Salt Lake in Kolkata to a spacious dust-free Falta on the city’s outskirts, which is critical in the manufacture of solar photovoltaic cells. This made it possible for us to enhance our production scale from 10 MW to a projected 120 MW by the end of 2011-12.

We also reported improvements at every stage of our manufacturing process (texturing, diffusion, PECVD and screen printing). For instance, we added chemicals to improve our texturing process; we altered established process parameters and recipes to enhance diffusion efficiency; we did the same in PECVD and we substituted certain raw materials to improve pattern design. All of these contributed in improving our cell efficiency and yield.

Q. How did this enhance the efficiency of cells manufactured by the Company?

A. In the solar cell manufacturing business, the higher the cell efficiency, the higher the returns the customer can generate out of his asset purchase. We did well in this regard: even though it was only the second year that we were working with the new solar cell manufacturing technology, we succeeded in raising our cell efficiency from 17.20% to 18.20% towards the end of the year. To achieve a 100 bps increase in cell efficiency within as short a time from start-up represents an achievement; besides, when one considers that this is probably among the highest cell efficiency in India, it is something that makes us proud. We are raising the bar through a targeted 19-19.50% cell efficiency for 2011-12.

Further, we increased yield to a level of 97%, resulting in a better management of material costs. On the module front, we increased wattage from 212 W to 245 W.

Q. For years, the Company used the reclaimed wafer technology to manufacture solar photovoltaic cells. Why did the Company invest in a new technology? Is this technology cost-competitive?

A. The previous technology which we installed was costlier in terms of conversion costs and productivity. The Company is progressing to invest in cutting-edge technologies like Selective Emitters, Light Induced Plating Anti-Reflective Coated Glass and Light Trapping Ribbon to enhance cell efficiency, leading to effective marketing of our products in competitive international markets.

Q. What are the prevailing technology challenges faced by the Company?

A. The biggest challenge is how we can leverage technology and reduce our production cost in line with declining global prices and growing competition from countries like Taiwan and China. Websol was able to withstand competition for the following reasons: quality, service, relationships and adequate product availability.

The result is that in terms of cells and modules, we are globally competitive.

Q. What is your agenda for 2011-12?

A. We will need to commission 120 MW of solar cell production by the end of the year and stabilise production, followed by an infusion of cutting-edge technologies to enhance cell efficiency and material substitution with lower cost alternatives (multi-crystalline wafers). Most importantly, we intend to commission a solar farm by the end of 2012, resulting in captive material consumption at one end and assured revenues at the other.

Strengthening our competitiveness

Manufacturing

In the business of solar cell manufacture, it is imperative to scale production to the highest capacity possible at the lowest cost, strengthening competitiveness.

The Company reported a fair year in this regard. It enhanced installed capacity from 30 MW to 60 MW towards the close of the financial year under review; thereafter, it projected an increase in capacity to 120 MW by the end of 2011-12. The new production facility in Falta SEZ (West Bengal) is equipped with the latest technology.

In line with this increased capacity and improved technology, the Company reported an increase in production from 17.23 MW in 2009-10 (15 months) to 24.55 MW in 2010-11 (9 months),

Cost management

The Company invested in the following initiatives to reduce costs:

- Economies of scale: The increased economies of scale strengthened its ability to cover fixed costs more effectively and reduce capital cost per megawatt.
- Low transportation cost: The Company generated more than 95% of its revenues from exports supported by warehouses in Europe to reduce logistics cost and accelerate product delivery.
- Optimum resource utilisation: The Company set output targets, resulting in an optimum utilisation of manpower, raw materials and energy.

Production costs (₹in Lacs)

	2008-09	2009-10*	2010-11*
Manpower cost per MW	22.38	21.70	17.82
Energy cost per MW	15.40	25.54	26.19

* Annualised.

The plant capacity is 120 MW i.e., the infrastructure (facilities and utilities) has been designed in line with the mentioned capacity. The actual production in 2010-11 was 32.73 MW (annualised) and the energy consumption was higher than the standards. On completion of the expansion and full utilisation of capacities, this value will be in line with the industry standards.

The Company also derived the benefits of being located in a SEZ, strengthening its position as one of the leading solar photovoltaic manufacturers.

The Company optimised its processes to manufacture products with high efficiency. The result is a ISO 9001:2008 certification that endorses process standards and IEC 61215 & IEC 61730 that endorses product standards.

Over the years, the Company protected its product quality through a standardisation of parameters, product monitoring, statistical analysis and procurement of quality raw materials.

Safety, health and environment

In an environmentally-sensitive world, it is imperative to produce products using the highest standards of personal and environmental safety. The Company was certified for ISO 14001:2004 (environment protection) and ISO 18001:2007 (healthy and safe working conditions).

Marketing

In the solar photovoltaic industry, it is imperative to price oneself appropriately in a volatile pricing environment on the one hand and deliver materials to emerging global demand pockets on the other.

One of the biggest industry challenges during the year under review was the price decline across the product range, inspired by larger capacities, lower pricing to capture a larger market share and an industry initiative to strengthen the price-value and expand the market. The result was a near 30% decline in prices in only six months: from US$90 to US$60.

Besides, subsidies offered by developed countries were not attractive enough to catalyse offtake. High inventory in various countries also affected realisations. As a result, the Company's average realisations declined from ₹9.30 cr per MW in 2009-10 to ₹6.78 cr per MW in 2010-11.

The factors that strengthened the Company's marketing during the year under review comprised the following:

- Superior products from the new plant comprising cell efficiency and reflected in the Company's brand-enhancing certifications
- A reputation for service reliability
- Higher product availability (following the capacity increase from 30 MW to 60 MW), making it possible for large customers to buy a larger proportion of their requirements from a single-stop
- The Company's longstanding relationships with existing customers in Germany, South Africa and Italy, which now needs to be scaled
- The Company's wide product mix comprises diverse modules (3Wp to 245Wp), providing adequate flexibility to cater to demand from various grid and off-grid applications. The Company is enhancing its design to develop modules with high output (280 Wp and above).

The Company widened and deepened its presence in about 17 countries; it enlarged its presence in four countries that were accessed for the very first time during the year under review. Going ahead, the Company intends to enter Eastern Europe, the USA, Canada and Australia.

During 2011-12, the Company intends to strengthen its competitive edge through an increase in product availability, following a corresponding increase in production capacity (120 MW by the end of the financial year under progress).

Average realisation per MW (in ₹ crore)

Jan-March 2010	April- June 2010	July-Sept 2010	October-Dec 2010	Jan-March 2011
8.38	6.65	6.84	7.26	6.65

Management discussion and analysis

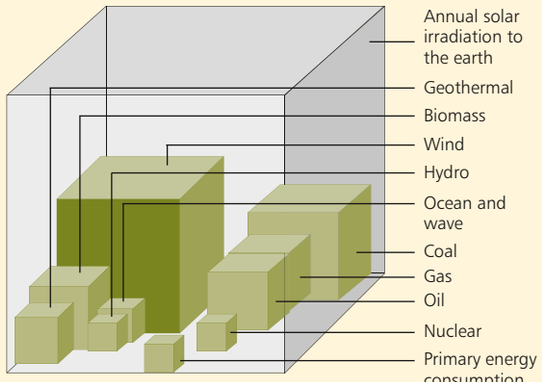
Product overview

Photovoltaic (PV) is a renewable energy technology that converts solar radiation into electricity. Photovoltaic systems use cells which comprise one or two layers of a semi-conducting material. When light shines on the cell, an electric field is created across the layers, causing electricity to flow; the greater the light intensity, the greater the electricity flow.

The most common semi-conductor material in photovoltaic cells is silicon, the second-most abundant element in the Earth's crust after oxygen. On the other hand, the earth receives enough solar energy every hour to meet the world's annual energy needs. In the last few years, global solar technology strengthened to generate electricity even on cloudy days; in fact, slightly cloudy days can result in higher energy yields than completely cloudless ones.

On an average, each square metre of land on earth is exposed to enough sunlight to generate 1,700 kWh of energy every year using available technologies. The total solar energy that reaches the Earth's surface could meet existing global energy needs 10,000 times over.

Solar irradiation versus established global energy resources



(Source- DLR, IEA WEO, EPIA's own calculations.)

Photovoltaic technology

Solar photovoltaic cells

The photovoltaic (PV) technology converts sunlight into electricity. This is also known as solar electricity. The most common solar cell material is crystalline silicon, but newer materials for making solar cells include thin-film materials such as cadmium telluride, copper indium diselenide and amorphous silicon. These layers of semiconductor material absorb sunlight and then knock the electrons loose from their atoms, allowing them to flow through the material and produce electricity.

More recently, certain companies declared their plans to produce solar cells using polymer plastics and solar-absorbing inks printed on aluminum foil. Solar cells power everything from small calculators and remote highway signs to commercial buildings and large power plants. They also power satellites, making them responsible for the world's communications products.

Concentrated photovoltaic systems

Concentrated photovoltaic (CPV) systems concentrate sunlight on solar cells, greatly increasing the cell efficiency. The PV cells in a CPV system are built into concentrating collectors that use lens or mirrors to focus sunlight on the cells. CPV systems must track the sun to keep the light focused on the PV cells. The primary advantages of CPV systems are high efficiency, low system cost, and low capital investment to facilitate rapid scale-up; these systems use less expensive semi-conducting PV material to achieve a specified electrical output.

Solar arrays

Solar cells are generally very small, and each one may be capable of generating only a few watts of electricity. They are typically combined into modules of about 40 cells; the modules are, in turn, assembled into PV arrays up to several metres on one side. These flat-plate PV arrays can be mounted at a fixed angle facing south or they can be mounted on a tracking device that follows the sun, allowing them to capture more sunlight.

Production process

The following steps are involved in the production of crystalline silicon:

1. Convert the metallurgical silicon into high purity polysilicon (known as solar grade silicon)
2. Form the ingots (Ingots are the long solid blocks which are cooled after polysilicon is melted in large quartz crucibles)
3. Slice the ingot or block into wafers
4. Transform the wafer into a solar cell
5. Connect and coat the cells to form a module

Why solar PV?

- Clean power from domestic renewable energy
- Reliable source of power
- Easier to build than conventional power plants
- Boosts national economy by creating many new solar companies and jobs.

(Source: EPIA and SOLAREIS)