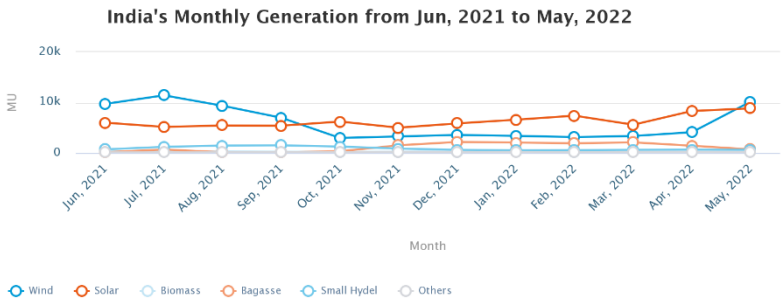
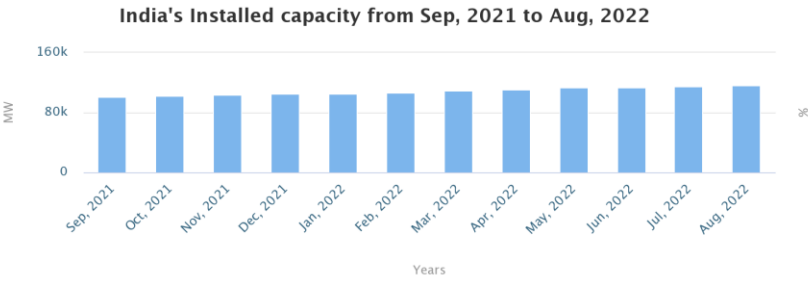
Growth in Renewable Energy Industry

According to the International Renewable Energy Agency (IRENA), the costs of renewable energy have fallen significantly in recent years, helping to advance the industry quickly. But apparently not quickly enough, as that same agency estimated in May of 2018 that renewable energy only represents about 15% of the total energy supply. Global sustainability goals, in contrast, have been set for it to represent 65% of the total supply by 2050.

Growth of Renewable Energy in India

India has low conventional energy resources compared to its required energy needs driven by a huge population and a rapidly increasing economy. However, India can harness the huge potential of solar energy as it receives sunshine for most of the year. It also has vast potential in the hydro power sector which is being explored across states, especially in the northeast. As of April 2022, India's installed renewable energy capacity (including hydro) stood at 158.12 GW, representing 39.43% of the overall installed power capacity and providing a great opportunity for the expansion of green data centres. India is the only country among the G20 countries who is on track to achieve its targets under the Paris Agreement. ICRA expects renewable energy capacity addition of 12.5 GW in FY22 and 16 GW in FY23.

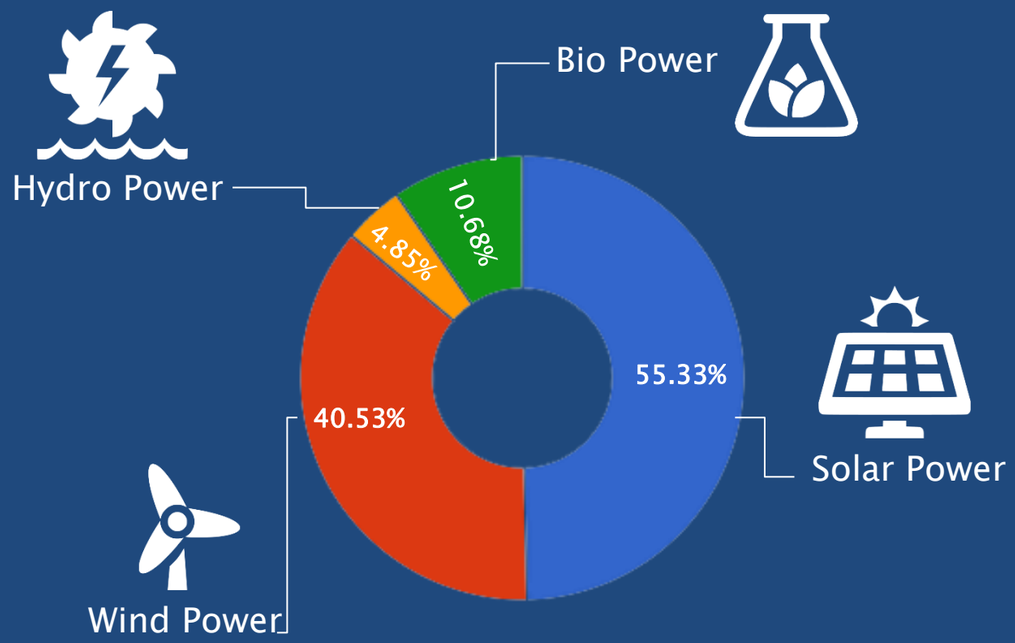




In November 2021, at the Cop-26 Summit in Glasgow, Prime Minister Mr. Narendra Modi made a promise to increase India's renewable energy generation capacity to 500 GW, and meet 50% of India's energy needs through renewable means by the year 2030. • The renewable energy capacity addition stood at 8.2 GW for the first eight months of FY22 against 3.4 GW for the first eight months of FY21.

FUTURE OF RENEWABLE ENERGY

This whitepaper explores the various emerging technologies and processes that have been positioned to help increase productivity and profitability, specifically in wind, solar, bio and hydro power plants, as well as the challenges that still face the industry as a whole.



WIND POWER

Major advances in wind energy over the past decade have resulted from a focus on technological advances that have made wind turbines more efficient and less costly. Between 2009 and 2016, installed project costs for new wind farms dropped 33%, while also generating more electricity per turbine..

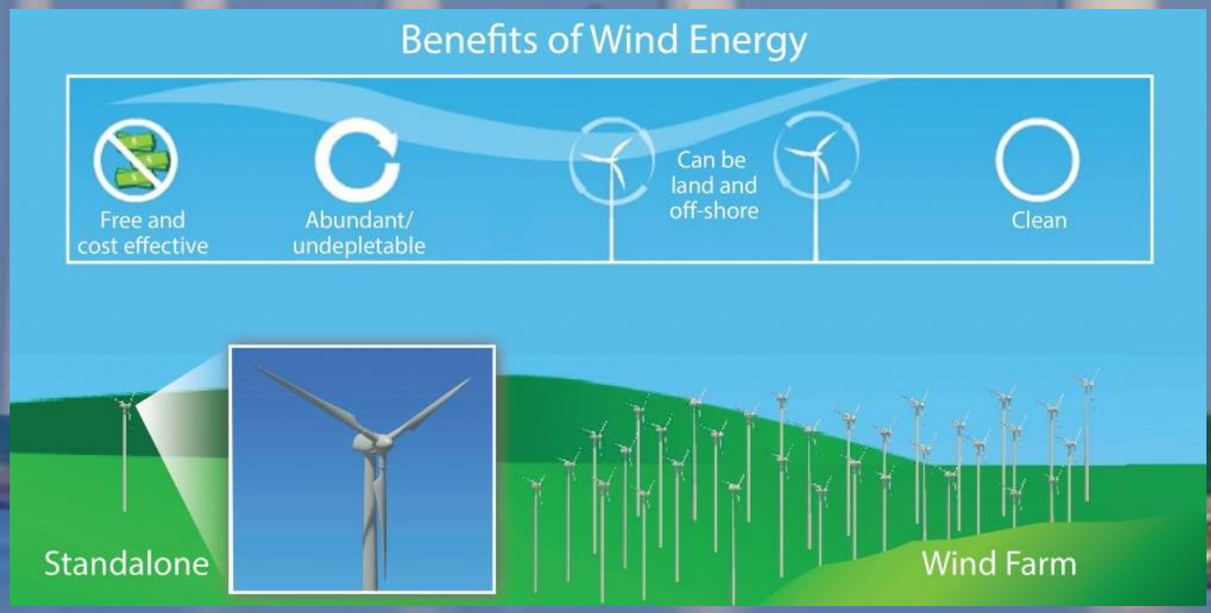
India's wind energy sector is led by indigenous wind power industry and has shown consistent progress. The expansion of the wind industry has resulted in a strong ecosystem, project operation capabilities and manufacturing base of about 10,000 MW per annum. The country currently has the fourth highest wind installed capacity in the world with total installed capacity of 39.25 GW (as on 31st March 2021) and has generated around 60.149 Billion Units

wind power projects in entire country through private sector investment by providing various fiscal and financial incentives such as Accelerated Depreciation benefit; concessional custom duty exemption on certain components of wind electric generators. Besides, Generation Based Incentive (GBI) Scheme was available for the wind projects commissioned before 31 March 2017.

In addition to fiscal and other incentives as stated above, following steps also have been taken to promote installation of wind capacity in the country:

Ø Technical support including wind resource assessment and identification of potential sites through the National Institute of Wind Energy, Chennai.

Ø In order to facilitate inter-state sale of wind power, the inter-state transmission charges and losses have been waived off for wind and solar projects to be commissioned by March, 2022.



SOLAR POWER

The solar photovoltaic (PV) market has been expanding exponentially in recent years largely as a result of the reduction in costs for silicon solar cells. The key to advancing solar power capacity to the next level is to increase the efficiency of the solar cells. Some researchers believe that the answer might not be with silicon, which is the most commonly used material today. The problem with silicon is its inefficiency as silicon cells typically only achieve 16-20% efficiency when it comes to converting energy.

Presently, solar tariff in India is very competitive and has achieved grid parity.

Compressed air for Solar Power

During the manufacturing of solar panels, there is always a requirement for clean and dry compressed air for operations of various manufacturing processes. Using fixed speed compressors, consumes more power. Fixed speed compressor consumes energy during unload condition also. Therefore, the amount of energy used by a fixed-speed compressor is a major concern.

Atlas Copco team has analyses the issue and found out that the actual problem was the demand for the compressed air. Atlas Copco does an energy audit and proposes the solution of Variable Speed Compressors (VSD), which are highly advanced compressors. VSD technology matches variable air demand by adjusting its motor speed.

Compressed air helps for Glass Manufacturing

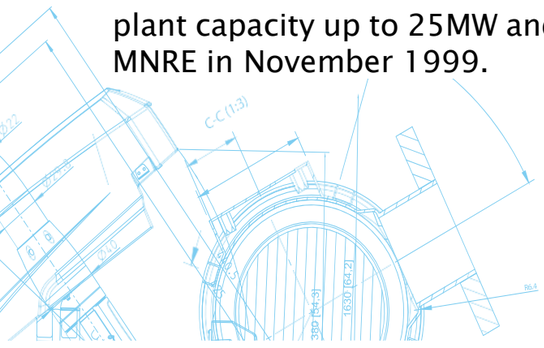
Many leading solar companies have started their production plants in the various states of India. Glass is a necessary component in the construction of solar panels because it protects photovoltaic cells from contaminants including water, dirt, and mist. Several top glass producers have increased their production in order to supply this glass to the solar industry.

In the manufacturing of glass, there is a requirement of compressed air for numerous applications, such as pneumatic operations of tools and transport of raw materials, cooling air, and autoclaves. Many leading glass manufacturers approaches Atlas Copco for compressed air requirements. After doing a comprehensive audit on the requirements of the customer, Atlas Copco's team proposes an energy-saving solution to the customer. The solution consists of an oil-free rotary screw compressor with a variable speed drive (VSD) and an oil-free centrifugal compressor.

HYDRO POWER

Even though hydro power is considered less variable than wind or solar energy, over the long-term, it remains dependent on the level of precipitation and/or water run-off. To realize the full potential of water power, innovative technologies are needed to harness resources from a wide array of water source, from streams to oceans.

Hydro power projects are classified as large and small hydro projects based on their sizes. Different countries have different size criteria to classify small hydro power project capacity ranging from 10MW to 50 MW. In India, hydro power plants of 25MW or below capacity are classified as small hydro, which have further been classified into micro (100kW or below), mini (101kW-2MW) and small hydro (2-25MW) segments. Hydro Power was being looked after by Ministry of Power prior to 1989 mainly with the help of State Electricity Boards. In 1989, plant capacity up to 3MW and below was transferred to the Ministry of New and Renewable Energy (MNRE) and as such 63 MW aggregate installed capacity of 3MW and below hydro projects came within the jurisdiction of MNRE. Many initiatives were taken by the Ministry since then for the promotion of small hydro which included implementation of a UNDP-GEF assisted Technical Assistance project entitled “Optimizing Development of Small Hydro Resources in Hilly Regions of India” and India-Renewable Resources Development Project with IDA credit line having interalia small hydro development component with target of 100MW canal based small hydro power projects through private sector participation. Subsequently plant capacity up to 25MW and below was entrusted with the MNRE in November 1999.



VSD Compressor

The Variable Speed Drive (VSD) air compressor is the ideal solution for the fluctuating demand with almost 50% energy saving over fixed-speed air compressors.

Variable Speed Drive reduces the overall load on the power grid and minimizes sudden spikes in demand that can overload the grid and cause an outage. As a result, governments and power companies may provide incentives for manufacturers to upgrade to energy-saving systems such as a VSD air compressor. These incentives can significantly offset the costs of upgrading to a new VSD air compressor and accelerate the payback period.

The optimal design of a compressed air system will reflect the specific needs of your processes, your facility and your approach to capital projects. To learn more about how Variable Speed Drive can address your needs, talk to an air system professional.

BIO POWER

The Ministry has been implementing biomass power/co-generation programme since mid-nineties. Over 800 biomass power and bagasse/Non-bagasse cogeneration projects aggregating to 10170 MW capacity have been installed in the country for feeding power to the grid.

Biomass has always been an important energy source for the country considering the benefits it offers. It is renewable, widely available, carbon-neutral and has the potential to provide significant employment in the rural areas. Biomass is also capable of providing firm energy. About 32% of the total primary energy use in the country is still derived from biomass and more than 70% of the country's population depends upon it for its energy needs. Ministry of New and Renewable Energy has realised the potential and role of biomass energy in the Indian context and hence has initiated a number of programmes for promotion of efficient technologies for its use in various sectors of the economy to ensure derivation of maximum benefits. For efficient utilization of biomass, bagasse based cogeneration in sugar mills and biomass power generation have been taken up under biomass power and cogeneration programme.

Biomass power & cogeneration programme is implemented with the main objective of promoting technologies for optimum use of country's biomass resources for grid power generation. Biomass materials used for power generation include bagasse, rice husk, straw, cotton stalk, coconut shells, soya husk, de-oiled cakes, coffee waste, jute wastes, groundnut shells, saw dust etc.

As per a recent study sponsored by MNRE, the current availability of biomass in India is estimated at about 750 million metric tonnes per year. The Study indicated estimated surplus biomass availability at about 230 million metric tonnes per annum covering agricultural residues corresponding to a potential of about 28 GW. This apart, about 14 GW additional power could be generated through bagasse based cogeneration in the country's 550 Sugar mills, if these sugar mills were to adopt technically and economically optimal levels of cogeneration for extracting power from the bagasse produced by them.

ZR/ZT: Energy efficient oil free rotary screw compressors

The VSD technology of the oil-free rotary screw compressor is fully advanced, which matches variable air demand by adjusting its motor speed, giving energy savings of up to 50% and reliable performance in the harshest conditions. The components of the ZR/ZT oil-free rotary screw air compressor range have been carefully designed in-house. This reduces losses and pressure drop to a minimum, resulting in the highest compressor package efficiency.

Specifications

Motor Power	90 kW – 160 kW
Working Pressure	7.5 bar(e) – 10 bar(e)
Capacity FAD	762 m³/h – 1542 m³/h

H2Y: Tested hydrogen plug and play compressors

Any application requiring hydrogen needs a continuous reliable and safe operation. All our H2 compression equipment meets major international and local safety codes. Our H2 hydraulic compressor packages for daughter stations help you

- To decrease unloading time and
- Increase the amount of gas unloaded
- To significantly reduce energy consumption as it automatically adjusts to the inlet pressure, preventing pressure losses through regulators..

Specifications

Mini inlet **5 bar**, max discharge **1000 bar (g)**
Up to **500 Nm3/H**
Up to **110 KW** and more in different configurations
Water Cooled Global installations in mobility & grid injection applications

ZH: Energy efficient oil free centrifugal compressors

Engineered using innovative in-house technology, the ZH centrifugal air compressor is the result of years of experience in the design of oil-free air compressors Centrifugal oil free compressors are used in:

- Food and beverage Industry
- Chemical and petrochemical Industry
- Textile Industry
- Electric car battery production

Specifications

Motor Power	1250 kW
Working Pressure	10.4 bar(g)
Capacity FAD	3578 m³/h

Elektronikon®: intelligent control and monitoring

The blowers are integrated with Elektronikon® controller system, using "Internet of Things" technology to enable remote monitoring and energy conservation. To ensure maximum machine safety and easy networking, the Elektronikon® system controls both the blower and the integrated converter. The advanced control system maximizes the reliability of your blower installation. Monitors overall system performance with service indications, malfunction alarms and safety shutdowns.

Smart AIR solutions that suit all your need

To guarantee the quality of your cement products, you keep a check on every aspect of your production process. So why would you leave the performance of your compressor room to chance?

Optimizer 4.0 central controller

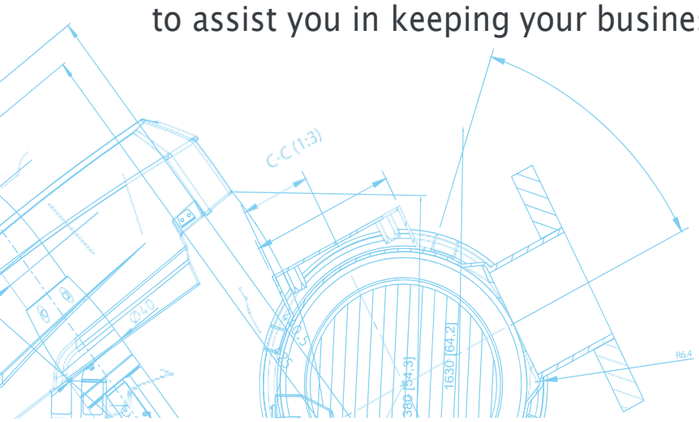
Operating multiple compressed air equipment calls for the best management in order to reduce the energy consumption and the best utilization of all the equipment. Optimizer 4.0 provides the continuous connectivity and control for multiple compressors and blowers supported by the latest connectivity standard “Internet of Things 4.0“ that can provide full performance monitoring from the plant central control room.

SMARTLINK

SMARTLINK is our 24/7 remote monitoring system that connects your compressor & blower Room. room to Atlas Copco service experts, to give you complete insight into your compressed air network. SMARTLINK warns you of potential problems upfront to avoid production interruptions, and helps you to save energy and prevent unexpected costs. Additionally, SMARTLINK can provide you with data allowing you to benchmark the compressed air usage of multiple plants in relation to their productivity.

Service

Total customer care is our ultimate goal. From spares to proactive monitoring and control, to auditing and optimization, we have the aftermarket service that suits your needs. Our dedicated service experts are available to assist you in keeping your businesss up and running in the most efficient way.



Conclusion

Atlas Copco is investing heavily in solar panels to provide the power for our most energy-demanding manufacturing and logistics sites. The investments have brought both financial and environmental benefits. Renewables still face major obstacles. The industry is depending on new technologies to increase the profitability and reliability of renewable power plants in order to make them a truly viable long-term alternative.

Atlas Copco have all the product offerings such as oil-free screw air compressor, oil-injected air compressor, refrigerant & desiccants type dryers with required line filters suitable to achieve air quality and support this emerging industry. To maximize efficiency and reduce your carbon footprint, Atlas Copco offers not only energy recovery units, which use the waste heat generated by the compression process offered on both technologies, but also energy audits of existing equipment as well as control solutions for central plant and remote systems.

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