



## TRENDS IN SUSTAINABLE POWER GENERATION

Globally, there is an increase in focus on replacement of existing coal-fired power plants with clean-fuel power plants with the aim of reducing the carbon footprint. This will further augment the demand for renewable power generation in the future. Overall, China is expected to remain the leader over the next five years, accounting for 43% of global renewable capacity growth, followed by Europe, the United States and India. These four markets alone account for 80% of renewable capacity expansion worldwide.

**The Renewable Energy** industry comprises non-thermal (such as Hydro, Solar Photovoltaic (PV) and Wind) and thermal energy (such as Bio-Power, Waste to Energy (WtE), Waste Heat Recovery (WHR) Concentrated Solar Thermal Power and Geothermal Power) sources.

In the case of thermal energy sources, the **Bio-Power** industry turns many potential feedstocks into solid fuels (biomass or wood pellets, sugarcane residues and palm oil residues etc.), liquid biofuels (ethanol etc.) and gaseous fuels (biogas, landfill gas), which are then used to produce electricity, heat and transport fuels. The drive to utilise locally available agricultural and forest residues has enabled generation of power closer to the point of consumption, which in turn has facilitated the setting up of biomass-based independent power plants.

The industrial use of biomass, particularly from sugar and palm oil mills, as well as wood waste from pulp and paper mills, is conducive to the production of power for captive consumption. About 70% of the biomass power globally is currently co-generated with process heat, as seen in the use of heat sources for district heating in European countries and for industrial process heating applications the world over.

**Waste-to-Energy (WtE)** refers to a variety of treatment technologies that convert waste to electricity, heat, fuel or other usable materials, as well as a range of residues. There are several primary waste streams in urban areas; with Municipal Solid Waste (MSW) is one among them. MSW streams are disposed of in municipal landfills, followed by Commercial and Industrial Waste (CIW). Thermal WtE utilises energy value in waste to generate electricity and/or heat. In Europe alone, WtE could prevent the production of up to 50 million tonnes of CO<sub>2</sub> emissions that would otherwise be generated by burning fossil fuels, according to an article on sustainability published in MDPI, an international open access journal.

Thermal treatment of waste is an environmentally acceptable alternative method. Thermal WtE, also known

**Triveni Turbines has installed its 1<sup>st</sup> Waste-to-Energy (WtE) steam turbine plant commissioned in Germany.**

as incineration with energy recovery, is a major waste treatment method in some developed countries, and by far the most widely adopted technology that dominates the global WtE market. The Refuse Derived Fuel (RDF) production involves separating, sorting, drying and compressing the combustible portion of the waste, resulting in a product which can be used as a feedstock for any of the three thermal processes, or combusted in an industrial application.

#### **ADVANTAGES OF COMBINED HEAT AND POWER (CHP)**

Triveni Turbines provides steam turbine solutions that use low pressure steam, generated through extraction turbine for heating application by producing both heat and electric power. The cost of power generated through this process is 14-15% lower as against that of power generated through IPPs.

While solar renewable energy is used as a utility power plant only during the day, power produced through CHP/ Cogeneration benefits the plant throughout the day by addressing its combined heat and power requirements. This gives the latter a strong edge. As a result, the ongoing rapid increase in electricity consumption, coupled with growing focus on electricity generation through biomass energy sources, thermal treatment of waste and recovery of waste heat, is expected to unleash sustainable power generation through the cost-effective approach of combining both heat and power.



Aftermarket is another area of huge potential growth for the Company and, as you will read in other sections of this report, we took major steps during the year to strengthen our offerings in this segment. /