Siemens decarbonization efforts and impact

Siemens Global Position on Decarbonization

The Paris Agreement, which entered into force in November 2016, underlines the global consensus to keep global warming below 2°C above pre-industrial levels. Its goal: To protect societies and economies against serious impact from climate change. The most important means to achieve this end is the decarbonization of the global economy by the end of this century – meaning the total elimination of emissions of greenhouse gas (GHG), most of all of CO_2.

Siemens supports the Paris Agreement. By providing innovative technologies, we consider ourselves a leading partner for decarbonization for our customers and society. With respect to climate change mitigation measures, we take the entire value chain into account – from sustainable supply chain initiatives and our CO_2 neutral operations to Siemens' products and solutions. Siemens' research and innovation focuses among others on enabling the transition towards a low carbon economy.

Decarbonization on the supply and demand side

The decarbonization transformation will transform the entire energy value chain within the next decades, covering the exploration and transformation of energy resources, electricity generation and transmission as well as end-user applications:

- **On the supply side**, the necessary rise of renewable energy – with times of electricity generation being partly decoupled from consumption – will demand a highly flexible

system in terms of grid integration, stability, demand-response, available storage solutions and Power-to-X technologies. Conventional electricity generation in turn require a transformation towards flexible, low carbon power plants that are needed to provide flexibility, system stability and backup electricity production when renewable sources are not available.

- **On the demand side**, efficient use of energy along the entire value chain such as in buildings, industrial processes and transportation is essential as it often comes along with a positive business case, enabling energy cost savings.

Siemens takes leadership in driving decarbonization externally as well as internally

At Siemens, with our Environmental Portfolio, we support customers both on the supply and demand side to reduce their carbon footprint and enhance their business success through greater productivity. In fiscal 2019, carbon emission reductions at our customers were 637 million metric tons.

We as technology partners to our customers, we provide products, solutions and services which help our customers to achieve their decarbonization goals. Some of these examples are shared below:

- **H2FUTURE:** A European flagship project for generation and use of **green hydrogen for decarbonization of Steel Sector**. This pilot at Linz, Austria has brought "breakthrough" steelmaking technologies which replace carbon with green hydrogen as basis for further upscaling to industrial dimensions. We can learn from these global experiences and implement such technologies in India to decarbonize our steel sector.
- **World's first Power-to-Methane project:** Green methane is produced by biological methanation of sewage gas with hydrogen and fed into the natural gas grid in Switzerland. The project is under the premises of the Swiss "Energy Strategy 2050". Hydrogen generated using such technologies could also be used for green mobility in the future.

  In India, we have also initiated similar activity by signing an **MoU with NTPC** for developing two **hydrogen-based pilot** projects. One of the projects aims to utilize hydrogen in **fuel cell buses** and the other is to produce **green methanol** by capturing carbon from thermal plants blended with green hydrogen.
- **Modernizing steam turbines:** Siemens upgraded six industrial steam turbines for Hindustan Zinc Limited (HZL) with state-of-the-art design and digital technologies. As a result, HZL will be able to operate these turbines at **higher efficiencies** as well as reduce their **CO_2 footprint by one million tons** per annum.
- **Convertor for locomotives:** Siemens developed a convertor that can replace the existing diesel generators for locomotives which **saves up to 1 million liters of diesel** per train per annum. This reduces **0.5 million tons of CO_2** equivalent per annum.
- **Demand Flow:** Siemens' unique patented chiller plant automation technology enables the entire chiller plant to run on variable speed based upon the load requirements. At

Hyatt Regency Delhi, this solution has **reduced energy consumption of the chiller plant by ~30%** leading to reduced CO_2 footprint**.**

- **High efficiency motors:** By encouraging installation of premium (IE3) and super premium (IE4) efficiency motors, we enabled consumers in **saving ~39,000 MWh electric energy,** leading to a **reduction of ~33,000 tons of CO2 annually**.

In addition, we walk the talk when it comes to climate change. All our internal operations globally will be CO_2-neutral by 2030. In fiscal 2019, we already achieved a 40% reduction globally vs. our fiscal 2014 baseline.

At Siemens India, we started our decarbonization drive in 2014 in line with the global initiative. Several **energy efficiency initiatives** undertaken in 2019 across our manufacturing and office locations have culminated in a total savings of **2,400 MWh of electric energy** which has **reduced ~2,000 tons of CO_2** equivalent in fiscal 2019.