

Industry Trends and Applications for a Greener and Renewable Environment: Use Cases

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From the outfall of the pandemic, a swift and significant headwind has been created to our markets leading to massive changes in raw material prices, utilization spikes, OEM backlogs, lack of maintenance availability and human resources as the themes that challenge us today. Further, world-wide developments are continuously changing our operational dynamics resulting in increased industry pressure on reduction in atmospheric carbon, which creates a huge market for high-efficiency technologies like tooling & fixturing, process and product improvements through waste elimination and striving for operational excellence through continuous improvement and innovation. We mostly hear of striving to be “carbon neutral”, however, there is a need to focus on being “carbon negative” to realize all of the potential benefits within our reach, as all processes and products must reduce more than they emit. It is about prevention to maximize the results by unleashing the innovation and creativity of our resources, while improving the quality of life.

Our success will be dependent upon our ability to collaborate on innovative solutions in all areas of industry, academia and the government. To accomplish this, a major building block for the foundation of our success will be in our ability to communicate and recognize the true root cause of the opportunities that are in front of us, and to look at things from a systems perspective. We must look at addressing the problem and not just the symptoms of the problem. There is no silver bullet, but there is the hard application of common sense. Let’s visualize ourselves in the end state and then look back in time to identify those steps that we took to achieve success. It is the tools, methodology and leadership by which we will cross the finish line first. We need to focus on a: (1) Sustainable community, (2) Affordable housing and workplace, (3) Realistic transition to renewable energy, viz., solar, wind, battery and water and (4) Universal transformation. We are a world that is data rich and knowledge poor. We need to take the time and work to convert that data to actionable items that we can resolve. We have to help others to understand. Very few understand how we got to the situation that we are in today, and it is not easily reversible. The failure of most organizations to achieve outstanding and innovative results is really not surprising. Innovation is a complex topic that is influenced by a plethora of interacting factors. Because of this complexity, it is very difficult for organizations to get all of the factors right, at the same time, to provide the results that everyone wants.

Throughout the history of product and equipment development, various fastener designs have been introduced to assist in the assembly of complex components during the development, production and sustainability phases. However, original equipment manufacturers have failed to look at the sustainability of a product to increase their useful life, as business strategies are primarily focused around selling new products, for which margins are higher. Moreover, traditional fastener removal techniques include the use of chemical lubricants, thermal energy and mechanical methods such as cutting. All of these are at the sacrifice of the environment, operator safety and prohibit the reuse of the existing part. In this article, we will discuss proven alternatives to improve all aspects of industrial excellence.

Further, an innovative approach called Surface Treatment System (STS) has been suggested in this article to have an integrated approach towards surface cleaning, surface preparation and coating. This systemic approach provides, not only cleaning the surface, but concomitantly, prepares the surface by tailoring desired surface roughness for subsequent coating, as an integral part of the cleaning process, by using laser ablation technology. Exotic use cases from various industries such as oil & gas, aerospace, automotive, semiconductor, defense, marine, etc. are being presented in this article, to understand Surface Treatment System, as an efficient and effective process.