POWERTRAIN ECOSYSTEM — INEVITABLE CHANGE

DR ARUN JAURA
European Advisory Committee,
SAE International, USA

It is evident that fuel economy, lower carbon footprint and cleaner tailpipes will continue to evolve and be the focus of future powertrains. The triggers will be innovations, and norms and regulations. Most of the incremental innovations are seen in components and combustion barring few radical ones in materials and high pressure diffusion. The societal demands due to infrastructure and lifestyles, linked with fiscal policies for sustainability and cleaner environment will motivate the fraternity to develop radical innovative solutions. Big data, embedded systems, networking in the digital ecosystem will be major influencers in the newer world of powertrains.

Radical innovations though sometimes seemingly far-fetched are the demand of the hour and enable success in the digital economy with the support of multiple affordable energy storage systems. Surface Mobility for businesses is becoming discretionary since suburban living, hub-and-spoke business models, and efficiency in operations across industries through virtual offices is growing exponentially. Consumer focus is growing on quality of life, comfort and convenience.

ELECTRIC MOBILITY ECOSYSTEM

The growth in electric mobility ecosystem is obvious, especially energy storage devices and charging systems. Even today, weight of these systems, charging time and energy capacity continue to be the shortcomings. There is tremendous research still being done in these segments but not much of a radical breakthrough is obvious in the last 100 plus years. In the meantime, hybrids have established a niche for themselves in the last about two decades. Due to the development of hybrids, electric mobility subsystems have gotten a cost advantage and boost in terms of volumes, funding and performance. Focus on hybrids will be the trend for the foreseeable future.

The ease and speed of charging the battery coupled with vehicle range are other obstacles in electric mobility penetration. The cumbersome methods, regional protocols and slow charging are preventing mass scale customer acceptance. In conjunction, cost has been a major influencer due to these challenges. In conventional powertrains, innovative materials and combustion processes will boost powertrain energy density and weight reduction. This aids aerodynamic designs, and enhances safety for occupants and pedestrians. Hence, focus on smaller vehicles would grow resulting in reduced parking and infrastructure issues.

customer through remote transmission, it will balance the automotive ecosystem globally. The cyclical demand can be balanced with the consumption, de-stress manufacturing and enhance resource optimisation. The gas stations could deliver power by reading a bar coded or thumb imprint instead of selling diesel or petrol, thus reducing pollution in the already congested urban and non-urban centres. The flexibility and ease in the power transfer remotely is more important during V2V power handshake. Virtual augmentation or reduction of power could become a boon to the industry, consumer, regulators and the environment.

More work will be on shared power banks so that the cost of public and private transportation reduces significantly. Multiplicity of infrastructure will not be necessary as such will benefit the consumer and ecosystem.

Remote diagnostics and prognostics of powertrain systems will grow to bring in agility, flexibility and participation of domain experts, assessment of accidents or compliances by governmental and insurance agencies. It will become more important to leverage the communication speeds and data channels, and integrate them with vehicle architectures that will boost diagnostics.

Eventually, it is prudent to revisit and develop the powertrain ecosystem rather than an isolated vehicle system. This core of mobility can be the biggest game changer globally, if conglomerated holistically.

RADICAL CHANGE

The flexibility in catering and modulating powertrain demand in conventional or other vehicles will be the largest radical change possible. If a consumer can, by the push of a button, borrow torque or power from another willing