As a child growing up in San Diego, I never stopped to think that smog would spread from cities up in Los Angeles County to my home in Southern California. I thought it was just going to stay there and never hurt me. Even as I grew up and became heavily involved in racing, I still never stopped to consider the air quality because none of the laws impacted us. We were free to do as we wished, since we were a very small part of a much bigger problem.

I recently returned to Southern California after more than 20 years away and found that the smog haze has grown. It has spread from Los Angeles all the way to my old hometown. There is no clear definition of where the haze starts, or where it finishes, which prompted me to question whether it would ever stop.

In a huge effort to reduce the amount of smog, and slow the effects of the damage to the Ozone layer, government agencies all over the world have been imposing more and more strict emissions standards for motor vehicles to adhere to. As their standards become ever-so-strict, it is clear the vehicles running on petrol are struggling to operate in a manner acceptable to the users. Alternatives are being sought, and the latest idea is the electric vehicle. Powered by batteries alone, completely eliminating the need for a fuel-driven engine, these vehicles are starting to gain some popularity, boasting incredible torque figures, making them fun to drive. They are nearly silent and they have absolutely zero emissions. After debuting on cars, the attention now turns to bikes.

In the past, when someone said "electric motorcycle", I would think of the little toy motorcycles I had as a child, or recently bought for my daughter. I wouldn't have thought of them as a sport bike and definitely not a race bike. However, at least one man had a vision that electric motors could, and would be used to propel the next generation of racing motorcycles in the future.

Plug and

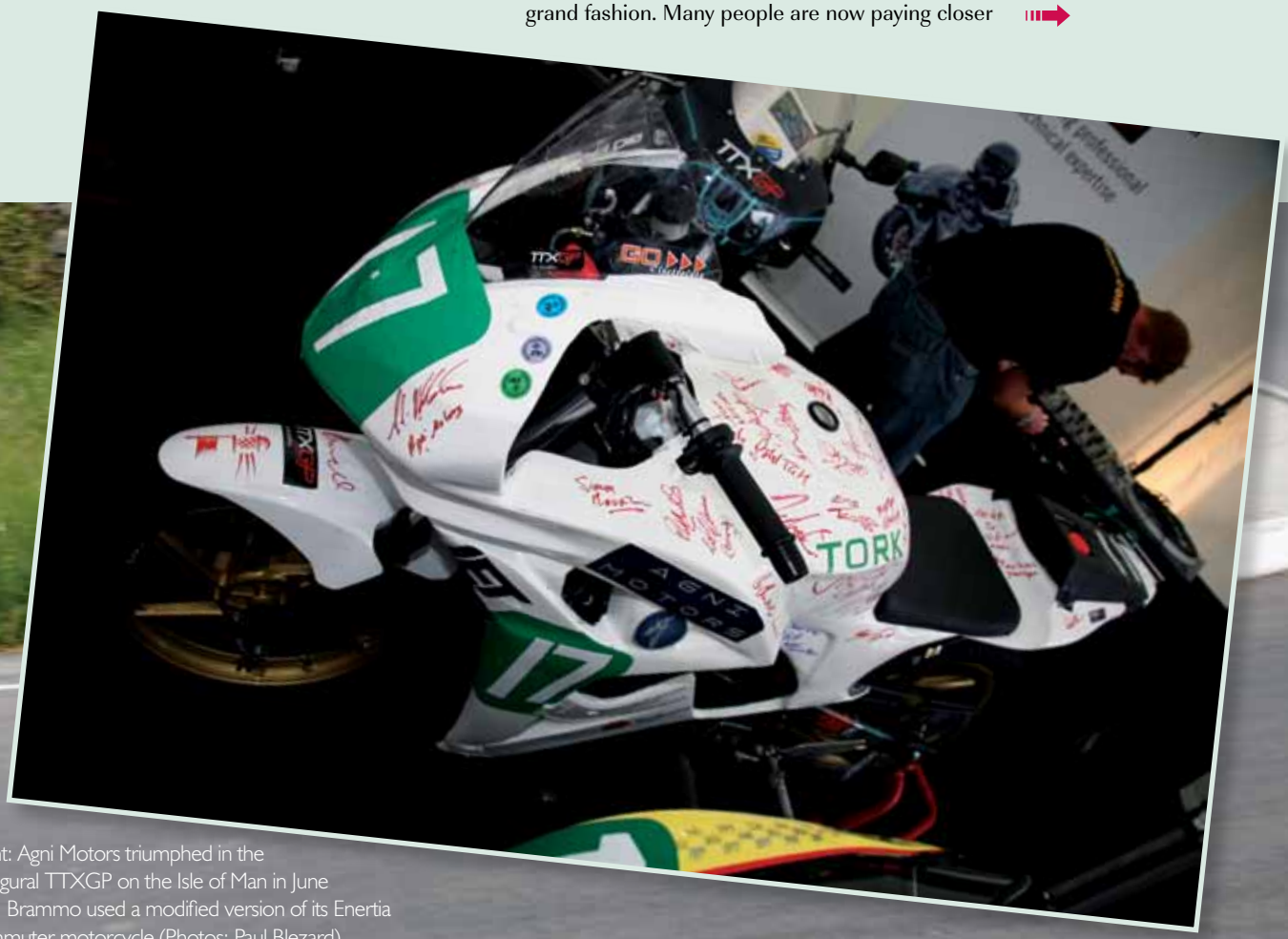
play

Mike Norman contemplates the growth of electrically-powered motorbikes

Before last month, I don't think many people shared the same vision as Azhar Hussain, the founder of TTXGP, which debuted at the 2009 Isle of Mann TT. The 14 teams that were on the same page as Hussain entered their personal creations in the new electric racing motorcycle movement. The race grew with such interest, that there was call for a second race to be run in the United States in conjunction with the Mid-Ohio AMA races in July. With that, the FIM also saw the potential in this new breed of racing and agreed to create a new series aimed at driving low-carbon technology.

The performance of the competing motorcycles astounded even veteran TT racers. In a normal fuel-driven engine, the power increases with rpm until the efficiency of the engine peaks. It was explained to me that, with the electric motor, the peak torque is at zero rpm. That means the peak of the engine is on tap immediately. Obviously, this wouldn't be usable immediately, or you would find yourself doing back-flips off the starting line. But, with the proper electronics and controls, the power of the electric motorcycle could be almost constant. This sort of power could bring a whole new excitement to riding a motorcycle.

So the electric racing motorcycle has caught on in grand fashion. Many people are now paying closer



Right: Agni Motors triumphed in the inaugural TTXGP on the Isle of Man in June
Left: Brammo used a modified version of its Enertia commuter motorcycle (Photos: Paul Blezard)

PHOTO: DINH BOWMAN

attention to Hussain and his vision, but, is the electric motorcycle, or the electric vehicle in general, the most practical solution to the zero-emission target? There are many hurdles still to be overcome with the use of electric vehicles: How to handle the increased electricity demand and emissions produced from the electric power plants themselves; the costs associated with use and repair, not to mention the extremely high prices of the vehicles. There is also an issue with the size and weight of the batteries and the time they take to recharge.

But there are alternatives, as battery operated vehicles are not the only path to zero-emissions. Several companies are conducting research on solar energy to power vehicles. The Society of Automotive Engineers (SAE) also holds an annual challenge for student-teams of cooperating Universities to design, fabricate and race solar powered vehicles. However, to propel a vehicle with solar power, a large surface area is required to expose the solar panels to light. This wouldn't work well for a motorcycle, in which the purpose of the design is to be as compact as possible.

Fuel cells, in which energy is converted from a fuel source (can be water, alcohol, hydrocarbons or many other alternatives) into electricity are also being experimented with in the automotive industry, but have little room to be effective in a motorcycle. These are very similar to batteries in many ways, including their large size and weight. Again, the objective of motorcycle design is to be as compact and light as possible.

Alternative fuels such as alcohol have been used in motorcycles and are still being explored. Many areas are now switching to higher and higher percentages of alcohol in their readily available pump fuels, and some forms of racing are mandating higher levels of alcohol, requiring engines and fuel management systems to be modified for the new mixtures. The largest downside is the larger capacity of fuel required as engines require much more alcohol compared to petrol. The alcohol also has a tendency to damage most plastics and rubbers that petrol does not. So, converting to a higher percentage of alcohol requires completely upgrading every component in the fuel system with newer materials that are specifically designed to work with alcohol.

I don't see the electric vehicle causing fossil-fuels to become extinct anytime soon. But I do see the need to continue the reduction in emissions as rapidly as we can. If I can see a huge difference in 20 years, what will it be like in 50 years? 100 years? 150 years? I believe the future of this world lies in the hands of today's scientists and engineers. There must be better alternatives.