

# Goodyear introduces tire concepts at Geneva motor show

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A key motivator to attend motor shows is to see what engineers are cooking up, even at the vision stage, as cars of the future. At this year's Geneva International Motor Show, which wrapped up on March 15, Goodyear was there to offer its glimpse of the tires of the future, and the tires would do far more than ever before. The Goodyear Tire & Rubber Company announced its "concept tires." They have tires playing additional roles; the tires are integrated components with the rest of the

car.

The first concept, BHO3, transforms the heat generated by a rolling [tire](#) into electrical energy, charging electric cars' batteries. BHO3 could possibly help reduce range anxiety associated with operating [electric cars](#).

Katherine Tweed, in *IEEE Spectrum*, described how this would work. She said, "while the car is sitting idle, the BHO3 tires would start to warm as sunlight hits the tires and the [ground](#) beneath. (The tire will be given an ultra black coat for maximum absorption of light and heat.) The heat would be transferred to the car through thermoelectric materials just under the tire's surface that can generate voltage as the material flexes in response to temperature changes. As the car moves, the thermoelectric materials in the tire can also capture the energy from the heat and friction as it rolls over the pavement during normal driving conditions. Additionally, as the tire rolls over different surfaces, it will deform in different ways, and these changes can also be turned into electrical energy by piezoelectric materials."

The press release said materials used would optimize its capabilities for generating electricity. Kyle Maxey, in *ENGINEERING.com*, said, "To realize these spectacular properties the BH03 would have a wrap of thermos-reactive, piezoelectric material underneath its outer shell. As heat penetrates the first layer of the tire the thermos-reactive material beneath would begin producing [electricity](#)."

Alex Davies in *Wired* also wrote about the materials: "Whether they're sitting in the sun or spinning on the road, tires generate heat. Goodyear is looking to use [thermoelectric materials](#) (like bismuth telluride and tin selenide), to generate electricity from the difference between the hottest and coolest parts of the [rubber](#). Again, the challenge is incorporating those materials without sacrificing elasticity and durability."

The second concept from Goodyear is Triple Tube, which adjusts tire inflation pressure in response to changes in road conditions. Three internal tubes in the tire are under the tread, near inboard and outboard shoulders of the tire and center. An internal pump moves air from the main air chamber to the three tubes. The tire automatically adjusts to the three different positions based on road conditions. Simply put, as Mark Maynard in *U-T San Diego* wrote, the concept "offers variable performance levels, automatically."

The tubes would adjust your tire inflation pressure based on road conditions. The Eco/Safety position offers reduced rolling resistance. This is with maximum inflation in all three tubes. The Sporty position gives drivers "dry handling" through an optimized contact patch. This is with reduced inflation in the inboard shoulder tube. The Wet Traction position provides high aquaplaning resistance through a raised tread in the center of the tire. This is with maximized inflation in the center tube.

In the bigger picture, Davies made the point that this is all concept, not a curtain-raiser of products to ship soon. "All of this is still in many ways theoretical, as engineers need to determine what the best materials are, how efficiently they'd generate power, how they might be added to a tire and how much weight they might add."

Stephen Edelstein in *Green Car Reports* similarly noted that, in Geneva, "Goodyear showed off the BHO3 and Triple Tube to demonstrate its engineering capabilities, and ways [tires](#) could potentially become more integrated with overall vehicle designs." Maynard, automotive editor at the San Diego Union-Tribune, said in *UT-San Diego* that the concepts posed "some critical thinking of when the 'smart' tire is integrated with the (so-called) 'smart' car and how that will change not just tire buying but also suspension engineering, whether complicating or simplifying it. Either way, these concepts make us rethink the role of those once-uncomplicated circular black contact patches that link car to [road](#)."

**More information:** [www.goodyear.com/cfmx/web/corp.../story.cfm?a\\_id=1058](http://www.goodyear.com/cfmx/web/corp.../story.cfm?a_id=1058)

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