

# EV battery swaps intended for long hauls

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Ever driven through a car wash? Going through a Better Place battery-switching station is like that - minus the soap suds, of course.

Better Place (BP) is a California-based company, founded by Israeli-born Shai Agassi in 2007, whose mission is not only to wire the world for [electric vehicles](#), but also to do it with a unique twist: battery swapping. The concept is simple enough: Instead of relying solely on charging stations that take six hours or so to juice up an EV, drivers have the option of swapping the batteries in an [automated process](#) that takes about five minutes.

Instead of buying a battery-powered car and then figuring out how to charge it - public stations, home unit? - customers have a one-stop transportation solution with BP. In Israel, customers buy "electric miles," paying BP roughly \$32,000 (the Israeli price) each for the cars, leasing the batteries and buy charging plan that gives them access to the company's public network and the swap stations. The general rule of thumb is that you'd use home or public charging for commuting and errands, battery swapping for longer trips.

Agassi, a former software executive, is one of the world's great talkers, and taking his message around the globe has helped the company raise \$750 million, with early support from such heavyweights as former President Bill Clinton and Israeli President Shimon Peres. Talking will only get you so far, but in Israel recently, , BP was not only showing off its network of about 40 swap stations, but also giving rides in the Renault Fluence Z.E., a version of a popular car here that was custom-made for

BP with swappable batteries. It's on sale now, though BP hasn't yet started its major marketing push in Israel.

Agassi stopped by on his way to a business meeting in New York, and admitted straight off that he'd forgotten to plug in his Fluence Z.E. the night before. "But it was no problem, because I drove to Jerusalem and swapped the battery at the station there. We've made an electric car more convenient than a gas car."

Agassi is a bit hard to quote since words come out of him in a torrent - he's a bit like clean-energy pioneer Amory Lovins that way. But one thing he said that makes a lot of sense is that Israel is a transportation island. "You can drive from Jerusalem to Tel Aviv in the space of one battery charge," he said. "If your car goes outside Israel, that's because it's been stolen." That's largely because Israel's neighbors aren't so friendly, but it creates an ideal scenario for limited-range electric cars, one that BP is set to enable (along with a concurrent rollout in environmentally friendly Denmark.)

We tested Agassi's theory in a ride through the wooded hills around Jerusalem, taking a leisurely route to Tel Aviv via the BP switching station in Modiin. Along for the ride was Barak Hershkovitz, an ophthalmologist who is also BP's chief technical officer.

The BP customer gets a range of options that include real-time range estimates, and the ability to plug in multiple destinations and come up with a pretty accurate guess (based on your previous driving performance) at what remaining range you'll have at each point in your journey. "We looked at 1,600 possible driving scenarios, because it comes down to the fact that technology has to serve its users," Hershkovitz said

The swap station was fascinating, reminding me of the heavily robotized

BMW factory I recently visited in Leipzig, Germany. The driver enters the business end of the station and hears various whirrs and clicks, including some compressor whine as the car is lifted a few inches for optimal replacement angle. What the consumer doesn't see is the extensive underground battery condo, capable of holding 16 packs (and, with expansion capability, 32). Two robot trolleys move the packs, the first one sliding out a new pack and moving it to a standby zone, and the second swooping in to drop off the depleted pack and slot the new one in place. The process takes about five minutes.

This was my first encounter with a Renault Fluence, and I found it a delight to drive, not dissimilar to the Leaf itself. Others in our party complained of the high-mounted battery pack making the car feel top-heavy, but I thought it handled well. It's a well-appointed and finished five-passenger sedan, and the only option for Israeli electric consumers now (though at least two other models are planned, BP says).

The Fluence isn't a stand-alone design like the Leaf or the Chevy Volt, but it's a comfortable and nicely built sedan that should prove attractive on the world market. The purchase price may not seem cheap, but it's in line with similarly equipped gas cars in Israel, which fulfills Agassi's mission of not forcing consumers to pay more to go electric.

BP has some challenges, as Agassi is the first to admit. Battery swapping is a destructive technology, with great potential but also some pitfalls. Company officials say the stations will be ready when there are a range of swappable battery packs on the market - the machinery is adaptable, they say. But multiple car models mean a more complicated battery inventory and the need to standardize connections. To succeed, BP will also have to convince large numbers of consumers to give up gas cars and go electric. The company says it would be happy to have 5,000 to 10,000 customers in Israel and Denmark over the next year.

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