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VAZIRANI SHUL: INDIA’S FIRST ELECTRIC HYPERCAR[[1]](#endnote-1)

Arpita Agnihotri and Saurabh Bhattacharya wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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Vazirani Automotive Pvt. Ltd.’s debut electric hypercar,[[2]](#endnote-2) the Vazirani Shul (pronounced “shool”), was launched in July 2018 at the Goodwood Festival of Speed in West Sussex, England. Chunky Vazirani, the founder and chief designer of Vazirani Automotive, created the Shul as a counter to the traditional, aggressively designed supercars of the world.[[3]](#endnote-3) The concept car was appreciated for being futuristic in its design and use of technology.[[4]](#endnote-4) According to Vazirani, the Shul was the perfect blend of art and science,[[5]](#endnote-5) which, along with power, depicted a lesser-known side of Indian culture and mythology. If successful, the Shul would become the world’s first electric car with a jet turbine-electric powertrain.[[6]](#endnote-6) Other automotive companies, including the American giant automakers General Motors Company and (then) Chrysler Corporation, had tinkered with the technology in the early 1960s, but had not been able to successfully implement the technology in reproducible cars.[[7]](#endnote-7) With the Shul, Vazirani Automotive ushered India into an elite, exclusive club of hypercar manufacturers, dominated by manufacturers from the United States and Europe.

Although the Shul’s national origin was India, the design centre and the manufacturing hub were located in the U.S. state of California.[[8]](#endnote-8) Indian hypercar enthusiasts would have to import the Shul after it was commercially launched. The Indian market had witnessed an increase in the sales of high-performance cars in recent years. However, with the high cost of such cars, purchases were far fewer than in developed countries like the United States (see Exhibit 1). The heavy import duty imposed by the Indian government on luxury cars, supercars, and hypercars made the cost of such imported cars almost double the actual price in the Indian market.[[9]](#endnote-9)

Supercars, sportscars, and hypercars, were typically priced above US$1 million,[[10]](#endnote-10) with at least 12 out of 50 supercars in 2016 priced above $ 2 million.[[11]](#endnote-11) Consequently, high net worth individuals or millionaires were the major customers. In 2017, India had only 263,000 millionaires, a number that was expected to increase to 1 million by 2020 (see Exhibit 2). Nevertheless, automobile enthusiasts were skeptical about whether a market like India was ready for a hypercar like the Shul. Reckless driving accidents and traffic snarls were frequent occurrences in India, as was the lack of space to drive such high-performance cars.[[12]](#endnote-12) Vazirani himself admitted that the Shul resulted more from passion than practicality.[[13]](#endnote-13)

To skeptics, the Shul had been likened to vapourware—something much promised but never delivered.[[14]](#endnote-14) However, skeptics were somewhat reassured by Vazirani Automotive’s engineering partnership with the Sahara Force India Team (Force India) and design partnership with Kazunori Yamauchi. Force India was India’s first and only Formula 1 racing team, and Yamauchi was the designer of the extremely popular PlayStation Gran Turismo video game series. Yamauchi was also credited with providing key inputs and design guidance for the Shul, which increased the car’s feasibility.[[15]](#endnote-15)

By the end of September 2018, Vazirani was quickly progressing toward the manufacture of the Shul. Could he succeed in making the Shul successful in India and in global markets? With its design and manufacturing centres located in the United States, was Vazirani right to position the Shul as an Indian car?

COMPANY BACKGROUND

Hypercars were characterized by appealing aesthetics, exorbitant price tags, state-of-the-art technology, and unimaginable speed and performance. Many hypercars were associated with developed countries, with many hypercars coming from European and American luxury car manufacturers, such as Ferrari N.V., Bugatti Automobiles S.A.S., and Automobil Lamborghini S.p.A. On a global level, very few Indian automotive designers were successful. The few designers that were popular included Dilip Chhabria and Chetan Shedjale. Pratap Bose of Tata Motors was also credited with new-age Tata designs. Among these popular names, Vazirani was unheard of.

In 2015, at the age of 25, Vazirani founded Vazirani Automotive as an automobile design and manufacturing company in Mumbai, India, where Vazirani was born and raised. To the general public, motor shows were nothing more than a demonstration of automobiles, but for Vazirani, they were a source of inspiration. In 2005, while attending the Geneva motor show, he was struck by the design of the Enzo Ferrari, and decided that his future was in designing cars.[[16]](#endnote-16)

Vazirani graduated from the ArtCenter College of Design in California, which was also the alma mater of popular Indian automobile designer Chhabria. Vazirani stated, “Dilip Chhabria has been the only Indian car designer around who has done good work. He is responsible for letting people know that car design exists on the planet. It is crucial to have someone like him.”[[17]](#endnote-17)

After working as a product designer for Rolls-Royce Holdings plc, Jaguar Land Rover Automotive PLC, and the Volvo Group, Vazirani decided to return to India with a mission to build “India’s first hypercar.”[[18]](#endnote-18) By early 2018, he created the Shul hypercar concept vehicle. The car gave Vazirani global recognition and was expected to catapult him to global prominence. Vazirani stated that the principles that guided him in the car’s development were motivated by Indian culture and mythology.[[19]](#endnote-19)

Vazirani considered his automotive company not just a hypercar company, but also a design and technology company. He intended to work with other original equipment manufacturers on a consultancy basis to support them in designing and advancing future cars. He stated, “We’re working on the technology of the next generation, so that’s something that we can capitalize on by offering consultancy services to other companies.”[[20]](#endnote-20)

Despite being an automobile company, Vazirani maintained a lean structure, with only 10 employees. The company hired various consultants and partnered with several designers across different countries, such as the United States and the United Kingdom.[[21]](#endnote-21) In 2017, Vazirani Automotive had $30,996 in fixed assets and $26,555 in current assets. The two figures represented growth for the company of 2,479 per cent in fixed assets and 1,778 per cent in current assets over 2014 (see Exhibit 3).

SHUL’S DESIGN and APPEARANCE

Vazirani wanted the Shul to look both modern and international, to ‘strike the correct equilibrium concerning art and science, He wanted his car to be unlike other contemporary hypercars, which Vazirani described as being “built by engineering.””[[22]](#endnote-22) Vazirani also wanted to depict a less familiar side of India to the world, the side that involved getting closer to one’s soul.[[23]](#endnote-23) Thus, he drew upon his Indian heritage and beliefs while designing the car. Commenting on challenges associated with embedding Indian culture and mythology in the car, Vazirani stated, “The Indian influence is very tricky, as you tend to go overboard and be too decorative with colour.” He cautioned, “On a sports car, you need to be subtle.”[[24]](#endnote-24)

The Shul was not about aggression, but about reconnection. Its design was inspired by the Indian god, Lord Shiva, and his trident weapon, known as the trishula. The Shul’s sides and hood had trishula-like lines. Its headlamps featured three vertical lines that resembled the three lines on Lord Shiva’s forehead, known as the tripundra,[[25]](#endnote-25) which personified life.[[26]](#endnote-26) In Indian mythology, the symbol of the trishula could remove negative qualities human beings suffered from, such as ego. It thus helped transform an individual from physical existence to the spiritual plane,[[27]](#endnote-27) thus conveying a message of getting closer to one’s own soul.[[28]](#endnote-28) Shul drivers would be able to approach their own selves through the experience of totality.[[29]](#endnote-29)

Despite the inspiration from Indian mythology, the design of the Shul, like other supercars in the market, was also partly aggressive, with several cuts and curves to enhance its aerodynamic capabilities. The body panels were designed to increase downforce, as were those of most hypercars. With a plunging roof, slanted front end, and a graceful rear end, the Shul was aesthetically comparable to Ferraris, Aston Martins, and Jaguars.[[30]](#endnote-30) It had light emitting diode (LED) lamps in both the front and back. The side of the car had vents, and the exhaust system was centrally mounted. Because the Shul was designed with input and guidance from Yamauchi, the Gran Turismo logo was mounted at the centre exit exhaust of the car. Vazirani intended to manufacture an electric car that gave the driver equivalent handling to that of a traditional sportscar.[[31]](#endnote-31)

SHUL’S TECHNOLOGY

Vazirani used a revolutionary jet turbine-electric powertrain in the Shul, enveloped in a suit of carbon-fibre,[[32]](#endnote-32) which distinguished the Shul from competitors. Turbine-electric powertrains were generally used in warships, submarines, and railway locomotives. Despite repeated attempts, in the past, automobile companies such as Volkswagen AG, England-based MG Rover Group, and (then) Chrysler Corporation, had not been able to achieve much success using turbine engines in cars.[[33]](#endnote-33)

The Shul’s jet turbine-electric powertrain consisted of microturbines, which enabled its propellers to run on multiple fuels, including regular gasoline or petrol. This made it more efficient and less expensive to maintain than other electric hypercars. Microturbines also created less pollution than regular supercars and other electric supercars, although noise levels were still a concern.[[34]](#endnote-34) The microturbine acted as an instant generator, charging the batteries as the car ran. This feature allowed Vazirani Automotive to deploy a lightweight battery pack. The Shul battery pack weighed around 300 kilograms (kg), which was much lighter than batteries in other electric cars, such as the 540 kg battery in the Tesla S.[[35]](#endnote-35) The lightweight battery pack not only reduced the car’s weight, it also added a distinct sound and enhanced the car’s driving range. The signature “whoosh” sound from the turbine was expected to add to the unique driving experience for customers.[[36]](#endnote-36)

In the Shul, the battery pack was placed behind the passenger for equitable distribution of the car’s weight.[[37]](#endnote-37) The Shul was driven by four electric motors powered by the in-body 300 kg lithium battery pack. The four electric motors, located beside each wheel, acted as independent engines. Each engine provided its own independent torque,[[38]](#endnote-38) resulting in unprecedented acceleration. The car body was made of carbon-fibre, which made the Shul light and helped keep the car intact in a crash. Overall, the Shul weighed around 1,600 kg, compared to heavier competitors such as the Bugatti Veyron EB 16.4 at 1,888 kg [[39]](#endnote-39)or the Tesla Model S at 2,100 kg.[[40]](#endnote-40)

The smaller components of microturbine also helped create extra space, which was efficiently used to improve the aerodynamics of the car. Air was channelled through and around the car to reduce drag and improve downforce. The Shul had a smooth, flowing design with several air ducts, which were designed to create adequate downforce to keep the hypercar of 1,000-plus horsepower stationed at high speeds. The double diffuser of the Shul, a shaped section of the car’s underbody that influenced its aerodynamics, was also one of the biggest in the industry, and components around it were innovatively and creatively packaged. A massive radiator ran across the centre of the car. The front bumper featured a large intake that fed air to the batteries located on the central tunnel and behind the passenger’s seat. The intake also created a lot of downforce toward the anterior end. An air duct was built under the headlights with the objective of cooling the brakes.[[41]](#endnote-41)

Vazirani kept the design intact through the production stage, stating that design and packaging were ready. Further aerodynamic simulations had been successfully conducted with favourable results, as Vazirani reported: “A lot of interior ergonomics and the door-shut lines will stay on. The cooling requirements, such as ducts for the individual components, will also carry on unchanged.”[[42]](#endnote-42)

SHUL’s PARTNERS

For the Shul’s development, Vazirani worked with multiple companies globally, including Brembo SpA for the brakes and Michelin for customized tires.[[43]](#endnote-43) For design and branding, as noted earlier, Vazirani partnered with Yamauchi and the team that created the PlayStation Gran Turismo series of racing video games, which imitated the appearance and performance of real-world automobiles with licensed reproductions. Yamauchi himself awarded a final touch to the Shul’s design.[[44]](#endnote-44)

Vijay Mallya, the owner of Force India, on collaboration with Shul, stated, “It is only logical for us to collaborate with Vazirani Automotive to advise mainly with aerodynamic design and participate in this important milestone in Indian automotive engineering.”[[45]](#endnote-45) In August 2018, Force India was acquired by Racing Point UK and rebranded as Racing Point Force India. Vazirani looked forward to collaborating with the new owners to gain expertise in using a wind tunnel, which was required for developing the aerodynamics of the Shul.[[46]](#endnote-46) Vazirani also had teams based in the United Kingdom, Japan, Italy, and the United States who worked on the design and development of the Shul.

SHUL’S COMPETITION

Although the Shul’s pricing was not revealed by Vazirani Automotive, industry experts believed that the Shul was expected to be priced similar to BMW’s i8 in India, which cost $293,000. The estimates were based on Shul’s size, which was similar to the BMW i8 in several aspects, such as design, size, and engine layout.[[47]](#endnote-47) Given their high pricing (see Exhibit 3), supercars and hypercars like the Shul needed average annual sales of approximately 400 units to break even.[[48]](#endnote-48)

The two most prominent electric hypercars in direct competition to the Shul were the Rimac Concept One and C Two by Croatia-based Rimac Automobili. The Rimac Concept One, delivered in early 2017, had a price of $1 million; the Rimac C Two, scheduled for release in 2019, was priced at $2 million.[[49]](#endnote-49) Rimac Automobili claimed that the C Two would have a longer driving range of approximately 600 kilometres (400 miles) with a single charge, compared to the Concept One at 340 kilometres (210 miles). The C Two also boasted an acceleration of 0 to 100 kilometres (60 miles) per hour in 1.85 seconds and a top speed of 415 kilometres (258 miles) per hour.[[50]](#endnote-50)

Another competitor to the Shul was Tesla’s 2020 generation of the tri-motor Roadster all-electric hypercar.[[51]](#endnote-51) Tesla was criticized for its claim to have a 200-kilowatt hour battery pack, which implied a weight of approximately 833 kg.[[52]](#endnote-52) Such a weight would substantially limit the hypercar’s range and acceleration. Tesla claimed that its Roadster could accelerate from 0 to 100 kilometres (60 miles) per hour in less than two seconds, compared to Vazirani’s Shul at 2.5 seconds.[[53]](#endnote-53) Experts opined that this range of acceleration speed would become the norm rather than the exception, once several electric hypercars were available in the market (see Exhibit 3).[[54]](#endnote-54)

In India’s automobile market for high-end luxury cars, sportscars, and supercars, most companies had received a mixed response. Well-known companies from developed markets, such as Rolls-Royce and Bentley Motors Ltd., had registered some sales success in the Indian luxury car market. However, less-known companies, such as Koenigsegg Automotive AB from Sweden and Apollo Automobil Ltd. (formerly Gumpert Sportwagenmanufaktur GmbH) from Germany, had been unable to generate any sales in India.[[55]](#endnote-55)

MARKETING

The Shul’s first teaser promotion was released on Vazirani Automotive’s YouTube channel. The channel described the Shul as “an aerodynamically enhanced elegant design paired with a Micro Jet Turbine Electric powertrain to deliver a *spiritual automotive experience* of restrained power, eternal beauty and quiet eminence.”[[56]](#endnote-56)

Vazirani advertised the Shul as a car of Indian origin and claimed it as being India’s first hypercar due to its headquarters in Mumbai, India. The company, however, had its design and style centre in California. Shul was also expected to be manufactured in California, considered the world capital of electric cars and companies.[[57]](#endnote-57) To explain why California was chosen as the foreign design location, Vazirani stated, “It’s the cash of the electric-powered auto environment, and we have connections there.”[[58]](#endnote-58) Venture capitalists funding the future growth of Vazirani Automotive were more likely to be found in California than in India. Also, the lack of suitable technologies for building hypercars in India was a roadblock.

INFRASTRUCTURE PROBLEMS IN INDIA

The Goodwood Festival of Speed was considered one of the best motor shows in the world.[[59]](#endnote-59) India received global visibility on the 25th anniversary of the festival, when the Shul was first presented. With the Shul, India was not only launching its first hypercar, but a battery-operated electric hypercar. According to a survey by Velocity MR, a market research firm in India, 90 per cent of Indians surveyed claimed that they would choose to drive an electric car.[[60]](#endnote-60) However, critics were skeptical about the future of electric cars in India because of the lack of electric car maintenance infrastructure, such as publicly available charging points (see Exhibit 4).[[61]](#endnote-61) But the Shul was a hybrid-electric car built on the concept of “charging on the go.” Fuels such as gasoline or petrol were used to charge the batteries while the car was being driven, so the lack of public charging points was less of a concern for Vazirani Automotive.[[62]](#endnote-62)

Nevertheless, hypercars like the Shul had a low ground clearance and were generally sensitive to road infrastructure problems. A modest blemish in the roads could result in a cost of thousands of dollars for maintenance and servicing.[[63]](#endnote-63) India’s road infrastructure was considered greatly inferior to developed countries. Poor road conditions such as potholes and bumpy roads had been known to cause accidents and even death.

Another challenge to hypercars in India was road traffic. Traffic jams in major Indian cities often caused cars to slow to a crawl, making walking much faster than driving.[[64]](#endnote-64) Further, speeding related accidents were a major concern in India. In 2016, 66.5 per cent of all road accidents and 61 per cent of deaths caused in road accidents were attributed to speeding. National and state highways, where traffic that was relatively smoother and speed limits were generally more relaxed, were the site of about 55 per cent of all road accidents in 2016.[[65]](#endnote-65)

Skeptics further raised concerns about whether hypercars or supercars could be effectively driven in the uncontrolled obstructions of Indian roads, including pedestrians disobeying street crossing regulations, potholes in roads, and roads blocked by the movement of stray animals, such as cows and dogs. Driving supercars could also be particularly hazardous due to the driver’s lack of attention, lack of knowledge of the vehicle’s high-end technology, and incapability to deal with high acceleration, speed limits, and the required maneuvering.[[66]](#endnote-66) However, with several start-ups in India posed to chase the electric hypercar dream, as Vazirani Automotive had already done, many experts believed that India would soon be recognized on the global platform as an influencer of the hypercar world.[[67]](#endnote-67)

THE ROAD AHEAD

The Shul was expected to hit the Indian market before being sold globally.[[68]](#endnote-68) Commenting on future plans, Vazirani stated, “We want to make things a lot more modular going forward in terms of not just the way we design the car. We see the powertrain evolving a lot faster in the future, so owners will get an option to swap. For instance, if in three years, there’s a better motor out there, we could offer this as an upgrade.”[[69]](#endnote-69)

Other Indian entrepreneurs racing toward the development of supercars included Sathak Paul, a 21-year-old entrepreneur. In 2015, Paul had intended to launch a supercar in the Indian market under his company’s name of Mean Metal Motors. However, he found fundraising to be a major roadblock. Given the financial and engineering support Vazirani Automotive received, automobile experts were far more positive about the possibility of the Shul running on roads.[[70]](#endnote-70) However, according to media sources, a similar project called the Techrules Ren RS was presented at the Geneva Motor Show in early 2018. The Techrules Ren RS was also a turbine-run car fuelled by diesel and powered by up to six electric motors. However, after its Geneva debut, no news about the company was heard.[[71]](#endnote-71)

Vazirani wondered if he should continue to position the Shul as an Indian car, despite its manufacturing in the United States. Would Vazirani succeed in creating turbine-powered hypercars, or would the company vanish, like the Techrules Ren RS? Could Vazirani succeed in the Indian market? Would the Shul design, inspired by Indian mythology, prove to be a distinct advantage?

EXHIBIT 1: UNIT SALES OF LUXURY CARS, INDIA VersuS United States (2015–2017)

Note: USA = United States

Source: Created by the authors with information from Sumant Banerjee, “Luxury Car Sales Grow Fastest in 5 Years in India,” *Business Today*, January 9, 2018, accessed December 19, 2018, www.businesstoday.in/sectors/auto/luxury-car-sales-grow-fastest-5-years--india/story/267578.html; and “Mid-Size Luxury Car Sales in the United States from 2015 to 2017, by Model (in units),” Statista, accessed October 19, 2018, www.statista.com/statistics/287751/midsize-luxury-vehicles-sales-by-make-in-the-united-states.

EXHIBIT 2: RANK AND NUMBER OF MILLIONAIRES by COUNTRY (2016, 2017, and 2020)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Countries** | **2016 Rank** | **Number of Millionaires in 2016** | **2017 Rank** | **Number of Millionaires in 2017** | **2020 Rank (Estimated)** | **Number of Millionaires in 2020 (Estimated)** |
| United States | 1 | 4,795 | 1 | 5,285 | 1 | 7,318 |
| Japan | 2 | 2,891 | 2 | 3,162 | 2 | 2,202 |
| Germany | 3 | 1,280 | 3 | 1,365 | 4 | 1,746 |
| China | 4 | 1,129 | 4 | 1,256 | 3 | 3,327 |
| France | 5 | 579 | 5 | 629 | 7 | 676 |
| United Kingdom | 6 | 568 | 6 | 575 | 6 | 929 |
| Switzerland | 7 | 364 | 7 | 389 | 10 | 396 |
| Canada | 8 | 357 | 8 | 377 | 8 | 611 |
| Australia | 9 | 255 | 9 | 278 | 9 | 415 |
| Italy | 10 | 252 | 10 | 274 | N/A | N/A |
| India | 11 | 219 | 11 | 263 | 5 | 1,002 |

Source: Created by the authors with information from “Growth Continues as Global HNWI Wealth Breaks the US$70 Trillion Mark,” Capgemini, accessed October 18, 2018, www.worldwealthreport.com/hnwi-market-expands; and “Countries with the Most Millionaires in 2020 (in 1,000),” Statista, accessed October 19, 2018, www.statista.com/statistics/260622/coutries-with-the-most-millionaires.

EXHIBIT 3: VAZIRANI AUTOMOTIVE FINANCIALS, 2014–2017 (in US$)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **2014** | **2015** | **2016** | **2017** |
| Income | N/A | –37 | –617 | –456 |
| Fixed assets | 1,202 | 9,136 | 16,261 | 30,996 |
| Current assets | 1,414 | 1,574 | 26,065 | 26,555 |
| Total expenditure | N/A | N/A | 617 | 456 |
| Share capital | N/A | 1,414 | 1,414 | 1,414 |

Source: “Vazirani Automotive Private Limited,” Zauba Corp, September 13, 2018, accessed February 13, 2019, www.zaubacorp.com/company/VAZIRANI-AUTOMOTIVE-PRIVATE-LIMITED/U34100MH2011PTC223444.

EXHIBIT 4: ELECTRIC LUXURY CARS, SUPERCARS, AND HYPERCARS

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | **Range**  **(in Miles)** | **Acceleration** | **Maximum Speed (mph)** | **Horsepower** | **Price (US$)** |
| Jaguar I-Pace | 292 | 4.50 sec (0–60 mph) | 155 | 394 | $69,500 |
| Tesla Model S P100D | 381 | 2.40 sec (0–60 mph) | 155 | 588 | $135,000 |
| Tesla Roadster (2020) | 620 | 1.90 sec (0–60 mph) | 250 | > 600 | $200,000 |
| Elextra | 373 | < 2.30 sec (0–62 mph) | 155 | 680 | $58,000 |
| LVCHI Auto Venere | 403 | 2.70 sec (0–62 mph) | 155 | 1,000 | n/a |
| Rimac Concept One | 210 | 2.60 sec (0–62 mph) | 221 | 1,224 | $1,000,000 |
| Rimac C Two | 400 | 1.85 sec (0–60 mph) | 258 | 1,914 | $2,000,000 |
| BMW i Vision Dynamics | 373 | 4.00 sec (0–62 mph) | 120 | n/a | n/a |

Note: 1.0 mile = 1.6 kilometres; mph = miles per hour; sec = seconds; < = less than; > = more than; n/a = not available.

Source: Created by the authors with information from “New All-Electric Jaguar I-Pace,” Jaguar, accessed October 19, 2018, www.jaguar.co.uk/jaguar-range/i-pace/index.html; Richard Ingram, “Tesla Model S P100D 2017 Review,” Auto Express, January 19, 2017, accessed October 16, 2018, www.autoexpress.co.uk/tesla/model-s/98337/tesla-model-s-p100d-2017-review; Jeff Perez, “The New Tesla Roadster Will Absolutely Crush the Original,” Motor 1, November 17, 2017, accessed October 16, 2018, www.motor1.com/news/216269/2020-tesla-roadster-original-comparison; and James Brodie, “Elextra EV Four-Seat Supercar Revealed,” Auto Express, February 27, 2018, accessed October 18, 2018, www.autoexpress.co.uk/car-news/98682/elextra-ev-four-seat-supercar-revealed.

EXHIBIT 5: PUBLICLY AVAILABLE CHARGERS AND ELECTRIC CAR STOCK by COUNTRY (2017)

|  |  |  |  |
| --- | --- | --- | --- |
| **Country** | **Total Publicly Available Chargers** | **Battery Electric Car Stock** | **Density (Number of Cars ÷ Publicly Available Chargers)** |
| China | 213,903 | 951,190 | 4.45 |
| India | 222 | 6,800 | 30.63 |
| Japan | 28,834 | 104,490 | 3.62 |
| United Kingdom | 13,534 | 45,010 | 3.33 |
| United States | 45,868 | 401,550 | 8.75 |

Source: Created by the authors with information from “Global EV Outlook 2018: Towards Cross-Modal Electrification,” Organisation for Economic Co-operation and Development, June 9, 2018, accessed December 14, 2018, www.oecd.org/publications/global-ev-outlook-2018-9789264302365-en.htm.

endnote

1. This case has been written on the basis of published sources only. Consequently, the interpretation and perspectives presented in this case are not necessarily those of Vazirani Automotive Pvt. Ltd. or any of its employees. [↑](#endnote-ref-1)
2. A hypercar was an ultra high performance car that was designed first for performance and secondly for exceptional aesthetics. Hypercars were meant to push the boundaries of what was possible in a vehicle’s performance. Production volume was minimal and prices extraordinarily high. Sean Evans, “What’s the Difference Between a Supercar, a Hypercar, and a Megacar?,” *New York Magazine*, December 14, 2016, accessed May 31, 2019, http://nymag.com/speed/2016/12/the-difference-between-a-supercar-a-hypercar-and-a-megacar.html. [↑](#endnote-ref-2)
3. “India’s First Hypercar,” Silicon India News, July 17, 2018, accessed October 12, 2018, www.siliconindia.com/news/life/Indias-First-Hypercar-nid-204917-cid-51.html. [↑](#endnote-ref-3)
4. Tarun Kochar, “Be Proud: The Vazirani Shul Is India’s First Electric Hypercar,” Car Blog India, July 16, 2018, accessed October 12, 2018, www.carblogindia.com/vazirani-shul-indias-first-hypercar. [↑](#endnote-ref-4)
5. “India-Built Vazirani Shul Electric Hypercar to Get Reveal at 2018 Goodwood Competition of Pace,” TrendsIndia.Net, July 11, 2018, accessed October 12, 2018, https://trendsindia.net/2018/07/11/india-built-vazirani-shul-electric-hypercar-to-get-reveal-at-2018-goodwood-competition-of-pace. [↑](#endnote-ref-5)
6. Stephen Neil, “Vazirani Shul Turbine-Electric Hypercar to Debut in India Soon,” Drive Spark, September 24, 2018, accessed October 12, 2018, www.drivespark.com/four-wheelers/2018/first-indian-electric-hypercar-unveil-details-revealed-026520.html. [↑](#endnote-ref-6)
7. Richard Truett, “Chrysler Turbine Car Shows the Future Is Always Changing,” Automotive News, May 17, 2016, accessed October 12, 2018, www.autonews.com/article/20160517/BLOG06/160519904/chrysler-turbine-car-shows-the-future-is-always-changing. [↑](#endnote-ref-7)
8. Sam Sheehan, “Vazirani Automotive Shul Turbine-Electric Hypercar Unveiled,” Autocar, July 12, 2018, accessed October 13, 2018, www.autocar.co.uk/car-news/motor-shows-goodwood-festival-speed/vazirani-automotive-shul-turbine-electric-hypercar. [↑](#endnote-ref-8)
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