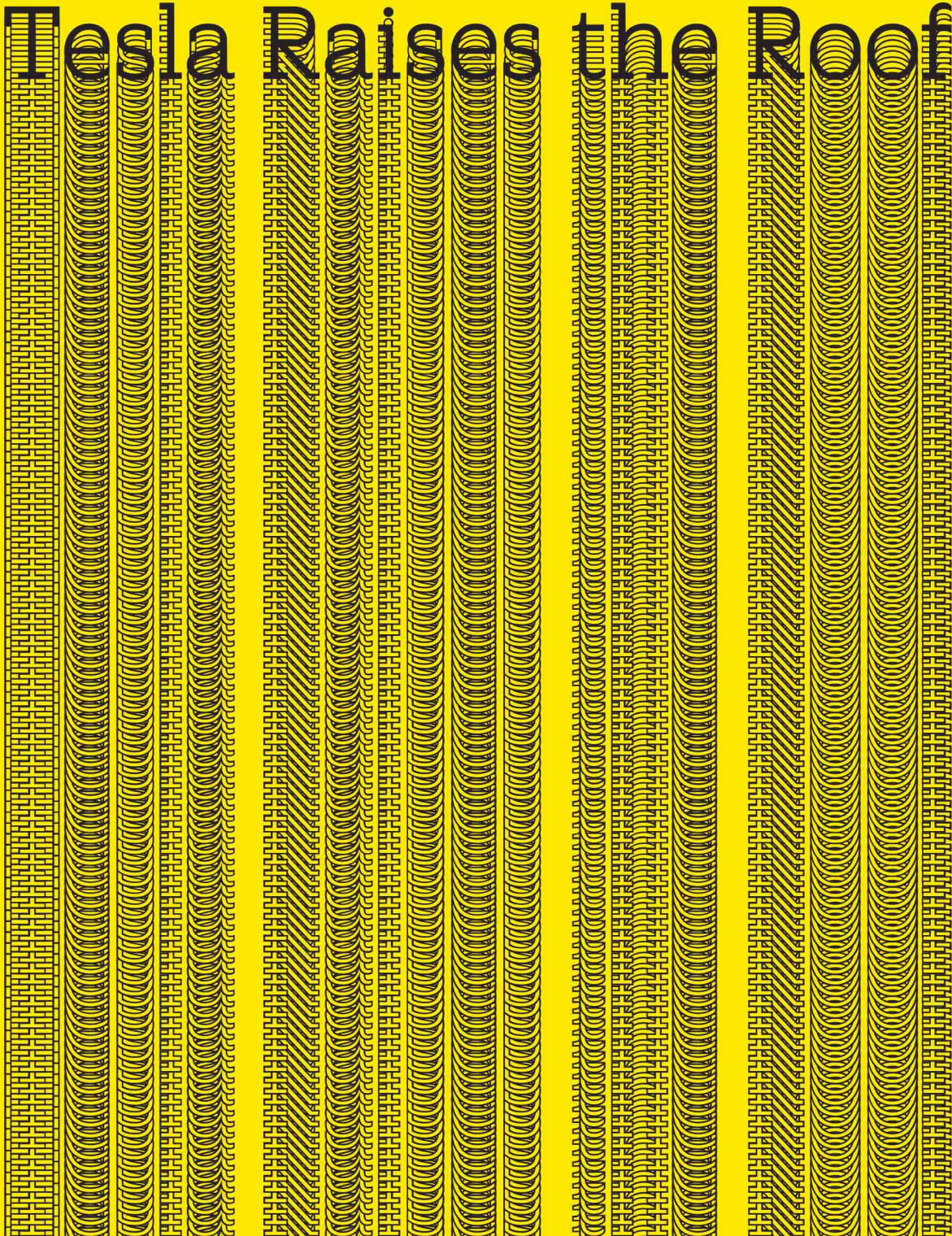


TESLA CEO ELON MUSK'S MULTIBILLION-DOLLAR ACQUISITION OF HIS COUSINS' SUSTAINABLE-ENERGY COMPANY, SOLARCITY, IS TOTALLY LOGICAL—AND HUGEY RISKY. WILL MUSK PULL OFF ANOTHER MIRACLE?

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Illustration by Lola Dupré





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ELON MUSK STANDS IN THE MIDDLE OF A RESIDENTIAL STREET. IT'S SHORTLY BEFORE SUNSET AT A JOINT TESLA-SOLARCITY PRODUCT LAUNCH, HELD LAST OCTOBER AT UNIVERSAL STUDIOS' BACK LOT IN LOS ANGELES, AND MUSK, WEARING A GRAY SWEATER AND BLACK JEANS, IS PERCHED ON A PLATFORM ERECTED IN THE CENTER OF THE MANICURED SUBURBIA THAT SERVED AS THE SET FOR *DESPERATE HOUSEWIVES*. MUSK BEGINS HIS PRESENTATION WITH DOOM AND GLOOM—RISING CO<sub>2</sub> LEVELS, THE CRISIS OF GLOBAL WARMING—BUT THE AUDIENCE OF 200 OR SO IS BEAMING.



**Tesla is betting that its Powerwall battery, combined with its Solar Roof tiles, will entice the design-conscious set.**

They're excited to see what fantastical invention he will unveil as a solution. As he stresses the need to transition the world to sustainable energy, an overzealous attendee yells out, "Save us, Elon!"

Musk's big reveal: "The houses you see around you are all solar houses. Did you notice?" he says, gesturing toward the homes with a grin. They appear to have regular shingled rooftops, but Musk says they've actually been retrofitted with a new product called the Solar Roof, a potentially transformative system that's nearly indistinguishable from a traditional rooftop—and one, he promises, that lasts longer and costs less, all while generating electricity. "Why would you buy anything else?" he says. The crowd cheers.

These roof tiles are the latest component of Musk's larger plan to wean us off fossil fuels. Inside the garage of each of these homes, he points out, is a Tesla vehicle and next-generation Powerwall, the sleek rechargeable battery Tesla developed in 2015

to store energy for household use. During the day, the solar shingles can generate electricity and recharge the Powerwall. After the sun goes down, the battery takes over, providing power independent of the traditional utility grid. "This is the integrated future. You've got an electric car, a Powerwall, and a Solar Roof. It's pretty straightforward, really," he says with a big shrug and a smile. "[This] can solve the whole energy equation."

Musk's announcement is about saving the planet. But it's also about saving SolarCity, the company his cousins, Peter and Lyndon Rive—who are in the audience—launched with Musk's support in 2006 to bring solar power to the masses. The business, an industry-rallying success for nearly a decade, had recently run into challenges. Its stock, once unstoppable, had dropped roughly 77% since its February 2014 peak. Its debt had mushroomed to \$3.4 billion, sales growth had slowed, and it faced a cash crunch. Last June, Musk proposed that Tesla acquire SolarCity in a deal valued at \$2.8 billion. Today's event was staged largely to win over Tesla and SolarCity shareholders, who would be voting in three weeks on whether to approve the merger.

There was a lot for shareholders to think about—and even more for corporate governance experts and company analysts to scrutinize. Tesla's and SolarCity's boards and investors represent a weave of overlapping interests, both financial and familial. Six of Tesla's seven directors have clear ties to SolarCity. Tesla's board includes SolarCity's former CFO, a SolarCity director, and two VCs whose firms also have seats on SolarCity's board, along with Musk's brother, Kimbal. Musk chairs both companies and is SolarCity's largest shareholder. He has taken out \$475 million in personal credit lines to buy more shares in SolarCity and Tesla when advantageous. SpaceX, his aerospace company, has purchased \$165 million in bonds issued by SolarCity. Some analysts cautioned that Musk might be self-dealing, rescuing his own investments and his cousins' company through this purchase. Hedge-fund manager Jim Chanos, who had shorted Tesla and SolarCity, called the acquisition a "shameful example of corporate governance at its worst," a "bailout" of SolarCity that "strikes us as just the height of folly."

Musk's investors, though, have grown accustomed to naysayers. They know his actions are often fraught with risk, but they believe in his mission—and his products. Three weeks after Musk's presentation, 85% of shareholders approved the Tesla-SolarCity merger, an outcome even more impressive considering that



the first Solar Roof tiles wouldn't be installed on a real customer's home for at least another seven months. The ones atop the Universal Studios homes weren't functional.

But that's the magic of Musk. Few entrepreneurs in his stratosphere could make such a grandiose pitch land so solidly. His cousins, the Rives, had struggled to sell a fraction of this vision to Wall Street during their latter years running SolarCity as a public company; Musk did it in 14 minutes. To him, this future—in which his combined companies will save us from the destructive forces of climate change—is simply “logical” and “quite obvious,” phrases he repeats to me a few months after the deal closed. “It's totally logical that we'll have sustainable energy in the long term, because unsustainable energy, by definition, is unsustainable,” he says. “So how quickly do we get there? And to what degree do we negatively impact the environment by getting there slower?”

Musk has always approached innovation this way: as a massive bet on the inevitability of tomorrow, rather than what he can deliver today. He designs the future and wills it into existence, despite the disbelievers. Tesla and SpaceX, which many viewed as the wild gambles of a stretched-thin entrepreneur keen to waste billions of his (and others') dollars, have proved more risky to bet *against*. This year, in fact, Tesla became the most perilous stock to short, costing speculators billions—more than the combined losses of those trading against Apple, Amazon, and Netflix. In that sense, Musk has become the face of salvation to some, and motivation to others. “BMW is using a picture of me to scare their executives into taking electric vehicles seriously. I'm not kidding,” Musk says. “It's sort of a backhanded compliment.” All of this makes him the—to use his word—obvious person to lead the solar-energy industry forward: Lyndon Rive, SolarCity's CEO, announced on May 15 that he'd be leaving the company.

Even so, within Tesla, there were serious doubts about the merger. “There was almost no understanding for what SolarCity was inside the broader company, and that includes Elon,” says a knowledgeable source. “They didn't understand the business.” Yet Musk is famous for mastering information quickly, and again, who's going to bet against him? If he's wrong, SolarCity could prove to be a serious strain on Tesla's resources. Solar power might be an undeniable part of our future—the industry created double the amount of jobs as coal did last year and accounts for nearly 40% of electric capacity added to the grid, more than wind or

even natural gas—but SolarCity itself isn't. In its last reported earnings quarter before the merger, SolarCity saw a 26% year-over-year decrease in its megawatts installed, a key growth metric of solar power. If he's right, however, he'll move a big step closer to realizing his vision for a cleaner planet.

Not surprisingly, Musk says he isn't worried. “Oh, it definitely will work,” he says. “It's just a question of when.”

**Since the acquisition, Musk has been regularly making the 2-mile drive from Tesla's factory in Fremont, California, to SolarCity's R&D center to look at Solar Roof prototypes. I glimpse a number of designs myself, during a visit to Fremont in April. They're installed on two model roofs sitting in the office's back parking lot, like parts of a prefab house waiting for pickup. “When we think something is ready, we'll bring Elon out here,” says Peter Rive, formerly SolarCity's CTO and now Tesla's VP of solar products, standing outside near the models on the cloudy afternoon. “He'll tell us if it's pass or fail.”**

When seen from below, the tiles appear to be opaque, like Tuscan or slate shingles. But from above, the glass covering the tiles is transparent, allowing the sun to reach the solar cell underneath. SolarCity's engineers have received feedback from Tesla designers to refine the products, spending weeks, for example, experimenting with different shades of black. Musk's reaction so far? “Not good enough,” Peter says Musk told the team earlier this year. “Make this look better.”

Musk stresses that such collaborative engineering couldn't have happened before the merger. Because they were previously separate public companies (with those many conflicts of interest), SolarCity and Tesla were required to operate at an “arm's length.” Whatever partnerships they pursued had to be audited to make sure they were in each company's interest. “Every time we wanted to do something, it had to go through two

org committees. It was incredibly slow,” Musk says. “Now we can make decisions immediately instead of it taking a month.”

Lyndon acknowledges that Musk, his and Peter's older cousin (their mothers are twins), instantly brought much-needed product skills to SolarCity. “There are often technical challenges ahead where people say, ‘No, that's impossible, a brick wall,’” says Lyndon. “Elon is smart enough to know how to go through that brick wall, to come up with solutions to address the problem. It's very rare to encounter someone with his all-of-the-above qualities.”

Musk feels that aesthetics, in particular, will be crucial for SolarCity, which hopes to win over the kinds of consumers who might balk at installing traditional solar panels on top of their houses. After all, Musk has explained that Tesla grew from his view that

electric vehicles were “ugly and slow and boring like a golf cart.” He created the Powerwall, he has said, because all existing batteries “sucked. . . . They're expensive, unreliable, stinky, ugly, bad in every way.” If there was one implied criticism of his cousins during the product event last fall, it was that they were never quite able to pull off this transformation, from the useful to the beautiful. “The key is to make solar something desirable,” Musk said onstage, so “you want to put it on the most prominent part of your house, call your neighbors over, and say, ‘Check out this sweet roof!’”

Musk's tiles might prove as sexy to customers as his vehicles. Gavin Baker, who runs a \$13.8 billion portfolio at Fidelity, increased the firm's investment in SolarCity right before the acquisition, and he has said he's bullish on the product. But the residential solar industry is still Byzantine and fragmented, involving things like building permits, regulatory roadblocks, and individual roof assessments. And then there's the issue of price. The SolarCity roof requires a complete re-roofing job, unlike traditional solar

**“BMW IS USING A PICTURE OF ME TO SCARE THEIR EXECUTIVES INTO TAKING ELECTRIC VEHICLES SERIOUSLY. I'M NOT KIDDING,” MUSK SAYS. “IT'S SORT OF A BACKHANDED COMPLIMENT.”**





**"It is crazy to think that we needed any type of bailout," says Lyndon Rive, SolarCity's former CEO. "If we needed to raise capital, we could have."**

panels, which can be mounted on top of existing shingles. Apple sells its customers on a portfolio of products—iPhones, iPads, MacBooks—but that same kind of integration isn't as feasible when you're dealing with a \$70,000 Model S, a \$6,000 Powerwall, and a Solar Roof that can cost \$65,000 or more.

The combined companies aim to develop financing models that will make the technology affordable, streamline the rollout process (thanks to SolarCity's army of installers), and take advantage of Tesla's retail footprint to sell the vision. While the up-front price for its Solar Roof looks high, SolarCity asserts that tax credits and the estimated value of energy created over the product's 30-year power warranty will save customers money in the long run. Solar is a massive market, the company notes, with about 5 million new roofs built every year in the U.S. alone, and SolarCity hopes to capture 5% of that business, or 250,000 homes annually, an ambitious goal considering the company only made 325,000 solar installations in its decade of operation before the merger.

SolarCity isn't the first company ever to produce a solar tile, and most in that space have floundered (see "The Shingle Factor," page 70). But the merger with Tesla allows the company to offer vertical integration, potentially meeting all of its customers' energy needs. "If you just created a solar shingle, you're kind of fucked," Peter Rive says. "I don't think anybody but the combination of SolarCity and Tesla can pull this off."

**When it was founded, SolarCity wasn't concerned with product at all. The Rive brothers—who grew up with Musk in Pretoria, South Africa, and built (and later sold) an IT software company in the Bay Area—were looking to make a bigger impact with their next startup. Musk, Lyndon recalls, suggested they look into solar. They launched SolarCity in 2006 with a \$10 million investment from Musk.**

They came up with a plan to drive costs down by controlling the experience from sale to installation (while third-party manufacturers provided the panels). They hired 150 employees, the majority of them construction workers, and by the next year, the company was installing about 70 solar systems per month around Northern California. Having sold panels himself in the early days, Lyndon knew that the biggest barrier to adoption was price: Customers simply didn't have capital to purchase the system, which typically costs upwards of \$40,000. What if they could lease it instead? Other companies had explored similar financing models in the commercial space, but banks told them it was impossible to bring that to the residential market. "But we just kept hammering and hammering at it," recalls Lyndon. The company pioneered an arrangement that allowed it to offer systems to homeowners without any down payment. SolarCity would handle all the up-front costs—for the consultations, rooftop designs, panels, and installation—and worked with banks to help front the capital, giving SolarCity long-term recurring revenue. The customer would pay back SolarCity and its financial partners over the course of a 20-year lease, ideally at a monthly cost that would be lower than their traditional utility bill. (This financial model was feasible in part thanks to a 30% federal solar tax credit, which SolarCity could claim on the value of each installation.)

Business began to grow, and the company eventually expanded to more than a dozen states. Musk, who was at the time busy building Tesla and SpaceX, wasn't involved much beyond the board level. But the Rives—who share a passion for extreme sports such as mountain biking (Lyndon also plays underwater hockey, which involves holding your breath and shuttling a puck across a pool floor)—brought a Muskian intensity to their jobs.

**When SolarCity went public at the end of 2012, at \$8 a share, the stock surged 47% on its first day of trading, and the company effectively doubled its sales every year thereafter. In early 2014, it boasted more than 70,000 customers, and its stock hit \$86 per share, an all-time high. Lyndon set a Musk-size goal for his employees: 1 million installations by 2018.**

Of course, as with any booming startup, there was also chaos. Peter and Lyndon were successfully bringing residential solar mainstream, but the company culture began to shift, especially with the ascent of two particularly polarizing executives, Tanguy Serra and