

## SPOTLIGHT REPORT

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## Tesla's Master Plan: Separating Fantasy From Reality

**What's Happening:** Tesla CEO Elon Musk released [a new master plan](#) for the growth of the company last Wednesday. Musk's vision includes integrating SolarCity's rooftop generation with the Tesla Powerwall; expanding the lineup of Tesla vehicles to include heavy duty trucks, busses, and pickups; and developing a full fleet of autonomous vehicles that can participate in the sharing economy.

**Why It Matters:** Musk's new master plan, [like his 2006 original master plan](#), is bold and scant on details. It also envisions pushing both the technological and regulatory envelopes, and will depend on assistance from state and federal policy makers. In particular, most states' current renewable policies make the combined distributed generation-battery technology Musk envisions economically infeasible. And while Musk may envision a future filled with electric vehicle ownership, charging infrastructure is a low-margin industry and stations remain relatively scarce on US highways, making a fleet of semi-trailers crisscrossing the country difficult to imagine without more policy incentives from the federal government.

**What's Next:** Musk's most difficult policy interaction will be dealing with uncertainty as federal regulators slowly develop a framework for autonomous vehicle technology. Notably, Musk avoided mention of his company's current regulatory difficulties in the wake of a deadly crash involving one of its vehicles that was set to autopilot at the time of the accident. Earlier today, the National Transportation Safety Board (NTSB) released the preliminary results of an investigation into the accident, which found that the Tesla involved in the incident was going 74 mph in a 65 mph zone and using automatic steering technology at the time of the collision. Meanwhile, the Securities and Exchange Commission (SEC) is investigating Tesla's disclosure of the incident. There are currently no federal regulations related specifically to autonomous vehicles. The Department of Transportation (DOT) released a [Preliminary Statement of Policy Concerning Automated Vehicles](#) in 2013 and at an event last week, DOT official Mark Rosekind guaranteed that the DOT will unveil guidance for automated vehicles "very soon." Rosekind acknowledged that the DOT's approach will need to be "nimble and flexible, able to keep pace with technological innovation." Additionally, several states, including Nevada, California, Florida, Michigan, and Tennessee, have enacted legislation that permits the operation of self-driving vehicles under

certain conditions. However, as Musk acknowledges in his plan, it will take billions of miles of autonomous driving before a fully realized regulatory system is likely to be adopted, and uncertainty will continue until that is realized.

## Master Plan Part 1: “Integrate Energy Generation and Storage”

In the first plank of his plan, Musk declares that Tesla will develop a single product that will integrate SolarCity’s rooftop solar with the Tesla Powerwall battery. This aspect of the plan is dependent on Tesla finalizing its deal to buy SolarCity that was announced at the end of June. [Reuters has reported](#) that the two companies are finalizing their due diligence of each other and an agreement could be announced this week, although there is still ample opportunity for the proposed acquisition to fall apart.

As we explained in detail in our [June 22nd Spotlight Report](#), this proposed deal would create a vertically integrated, clean energy company that would be able to turn its current partnerships into synergies. But although the companies appear to be pursuing a common purpose by making and selling products across the clean energy spectrum, their interests don’t necessarily always align. Under the existing regulatory regimes, there is an inherent tension between SolarCity’s current model and Tesla’s home battery systems.

Net metering policies, which exist in more than 40 states, allow the entire grid to act as a battery for residential solar companies, meaning SolarCity has been unable to find a financially feasible way to sell a combined solar panel-battery system outside of Hawaii, where the cost of electricity is often three times the cost in mainland states. Consequently, a combined company is a long-term bet that net metering largely will disappear in many US states and that policy models that favor direct connections between storage and solar will take its place.

This bet is not necessarily a bad one to make. Most states that have net metering programs have already hit, or soon will, reach legislated caps on the number of residential solar installations that can qualify for the benefit, forcing those states to find new models to incentivize distributed generation.

Nevada famously rolled back many of its incentives, but other states are also considering alternative models that could be a boon for a combined SolarCity-Tesla. For example, Hawaii and California (often considered “cutting edge” in the solar market) are both in the process of implementing time-of-use rates that would charge customers more for using electricity during peak times. Importantly, these programs also incentivize customers with solar panels to purchase electric storage, since prices at night are typically higher than the day-time prices when solar is produced. If policies continue to move in this direction, then the combined rooftop solar-battery package Musk envisions could become an economically feasible reality.

## Master Plan Part 2: “Expand to Cover the Major Forms of Terrestrial Transport”

In his second plank, Musk envisions Tesla ramping up its production technology to create factories that can make its affordable Model 3 more quickly and efficiently, with a goal of rapid improvements in manufacturing technology every two years. Additionally, Musk declares that Tesla will unveil heavy-duty trucks and busses in 2017, and will make an electric pickup truck. These new vehicles will require larger and more powerful batteries than Tesla makes now, and currently no company makes an all-electric semi-truck.

Additionally, if Musk intends for the Model 3 to become a common household car, and for the Tesla heavy-duty truck to be able to travel across America, he will need a more widespread charging network than currently exists. Developing a national system will be difficult for a single company to undertake and is most feasible with the support of federal programs. The Obama administration has provided steady support toward the goal of a national charging infrastructure, albeit more often providing research than money.

However, a new federal initiative, [announced by the White House last Thursday](#), will include \$4.5 billion in loan guarantees for new charging infrastructure, as well as provide support for a number of challenges and programs to develop new charging infrastructure and technology that can be deployed nationwide. A central aspect of the initiative is a public-private collaboration with nearly 50 industry signatories, including Tesla, whose goals include increasing consumer access to grid-connected infrastructure; supporting widespread access to charging infrastructure; creating a consistent user experience; enhancing American manufacturing; leveraging investment from the private, state, and federal level to increase deployment; and developing grid-based load management solutions to electric battery charging.

Tesla's Model 3 growth plan is also dependent on easy access to the public through direct-to-consumer sales. Unlike every other car manufacturer in the US, Tesla has refused to set up an independent dealer network to sell its cars, arguing that it needs a direct connection with its customers to provide an optimal experience and to address range anxiety and other issues particular to electric vehicles.

However, half of US states have refused to allow Tesla to sell cars directly to consumers, and many others have allowed Tesla only a limited number of dealerships. While this system has been an inconvenience for buyers of Tesla's high-end Model S, these customers typically have deep pockets and are comfortable taking extra steps to buy a luxury item. On the other hand, if the Model 3 is going to compete on the same scale as gasoline-powered cars, the automaker will need to be able to reach a wider customer base—something it will not be able to do without overcoming remaining state government barriers to expanding its direct-to-consumer sales model.

Tesla is considering challenging states where these sales are banned in a court case that could force the entire automotive industry to restructure and the litigation could eventually go all the way to the Supreme Court. The Federal Trade Commission (FTC),

meanwhile, has thrown its support behind direct-to-consumer sales in the automotive industry, although its position has not yet forced a change at the state level.

Finally, many analysts have pointed to electric vehicle tax credits as important for Tesla's continued growth, but Elon Musk is counting on the Model 3 remaining popular long after tax credits begin phasing out, which will occur after Tesla has sold its first 200,000 qualifying vehicles in the US.

## **Master Plan Part 3: "Autonomy" and "Sharing"**

In his third and fourth planks, Elon Musk announced that Tesla will continue to improve its "autopilot" hardware and software capability. Musk predicts that worldwide regulatory approval could require six billion miles of drive time, with the fleet currently learning at approximately three million miles per day. Eventually, Musk hopes to create a fleet of Teslas and a ridesharing program that will allow cars to drive and pick up passengers while they are not in use by their owners.

There are currently no federal regulations related specifically to autonomous vehicles (AVs) or self-driving cars, though both the National Highway Traffic Administration (NHTSA) and the Research and Innovative Technology Administration (RITA) are examining the issue. The DOT released a [Preliminary Statement of Policy Concerning Automated Vehicles](#) in 2013, which laid out NHTSA's plans for research on related safety issues and included recommendations for states related to the testing, licensing, and regulation of "autonomous" or "self-driving" vehicles.

The rapidly evolving nature of AV technology makes it difficult for federal regulators to prescribe appropriate rules, especially considering the traditionally slow federal rulemaking process which entails cycles of proposals, requests for comments, reviews, and lobbying that precede the final rule.

Transportation Secretary Anthony Foxx has said he plans to support the development of AV technology by reacting quickly to the new technology and ensuring that future DOT regulation does not prevent marketplace innovation. NHTSA Administrator Mark Rosekind echoed Foxx's enthusiasm for the industry in his [remarks](#) at the Automated Vehicles Symposium last week, where he assured tech giants and automakers that "no one incident," in reference to the recent controversy surrounding Tesla's semi-autonomous vehicle technology, will deter the DOT from the AV market. Rosekind specifically cited the positive impact self-driving cars will have on lowering the fatality rate among US drivers.

Rosekind went on to say that "the federal government is not here to pick the winners and losers of this technology," and NHTSA remains "neutral on the question of incremental technological development versus skipping to full automation." Rosekind guaranteed that the DOT will unveil highly automated vehicle guidance "very soon," while adding that those expecting "16,000 pages regulations in the coming weeks will be

disappointed." Rosekind said that the draft guidance is currently being "reviewed, tweaked, and perfected."

The pace of technological change in this industry creates some uncertainty as to how and when the DOT will promulgate a rule. Rosekind acknowledges that the DOT's approach will need to be "nimble and flexible, able to keep pace with technological innovation."

Several states, including Nevada, California, Florida, Michigan, and Tennessee, have already enacted legislation that permits the operation of self-driving vehicles under certain conditions. DOT officials have stated that future federal guidance on AV technology is meant to facilitate a harmonized approach across states and provide manufacturers and developers with a level of certainty about what to expect from the government.

As a recent fatal accident involving a Tesla Model S on autopilot demonstrates, there will be a harsh spotlight on any negative events related to this emerging technology. A regulatory framework would provide a clear process in the wake of an accident or issue and would make it easier for Tesla to address the issue without stumbling through the disclosure landmines it has faced thus far. Until it is developed, however, Tesla will need to operate with the understanding that its process could be halted or forced to change due to an evolving regulatory landscape.



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