

Why Tesla batteries will fast-track switch to renewables

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Tesla battery storage product may be a cooler and cheaper option for residential customers, but it is at the commercial and grid level where the technology could make its biggest impact.

That, at least, is the estimate of Tesla founder and CEO Elon Musk. Last week he told analysts that the amount of energy storage deployed at grid level may be 10 times the amount installed in homes and businesses.

That makes sense for several reasons. Firstly, the grid is of a much grander scale than individual homes and businesses. Secondly, the grid-scale battery storage offering is much cheaper than that for homes and businesses. And thirdly, because of the way tariffs in the US are structured, it doesn't make a lot of sense to install storage right now in homes in the US, but does at bigger scale because of the different ways it can be deployed, the expenditure it can avoid, and the charges that can be ducked.



In a major new report, *Storage Business Models: More Approaches Than You May Think*, investment bank Morgan Stanley says the Tesla battery storage products prove that storage is cost competitive.

It was expecting a price reduction, but not to the extent that Tesla delivered. Morgan Stanley notes that the price of the utility-scale, 100kWh Powerpack product of \$US250/kWh (including inverters but not installation) compares with all-in costs of \$US800-\$US1,000/kWh from rivals.

The analysts make the crucial point that storage will not replace the grid, but it may alter the way it is used, and who uses it. Mostly, it is going to boost the penetration of renewable energy – the ultimate goal of Musk who says he wants the world to be powered 100 per cent by renewable energy.

“When considering the impacts to the power sector from energy storage, the most common response we hear is the ability of storage to replace the utility grid,” the Morgan Stanley analysts note.

“While in some geographies at some point in the future this may be a tangible risk/opportunity (depending on your perspective), for many years we believe other business models will be prevalent, all of which do not displace the utility grid but instead enable the utility grid to continue to support the increased growth of renewables.”

Morgan Stanley says that because of this, the biggest impact – particularly in the US where residential solar consumers are favoured by net metering policies – will be in utilities and merchant storage market.

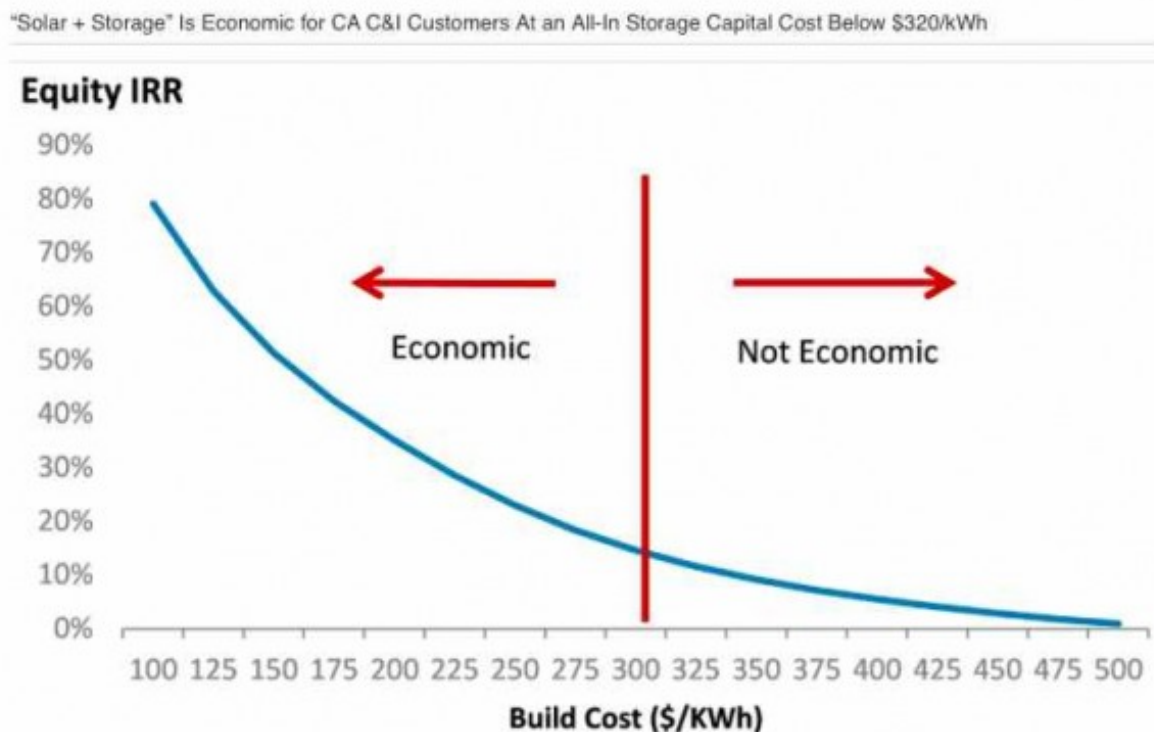
This assessment was borne out by subsequent news from SolarCity that battery storage does not make sense to be paired with solar in most of the US right now, not because it doesn't work with solar, as some suggested, but because of the tariff set-up, with most states providing net tariffs that provide little incentive for having storage.

(This is different to Australia, which does not have net metering, but does have high grid and therefore residential prices, and plenty of good solar resources).

Morgan Stanley says at the commercial level and the grid level, businesses – such as WalMart and Amazon – and

utilities – such as Southern California Electric and Texas-based OnCor – might find an immediate economic benefit with battery storage.

“The power industry (both utilities & merchant storage developers, mostly the former) will in our view work to rapidly deploy Tesla’s technology onto the grid to integrate renewables and address solar power’s intermittency and lack of complete overlap with peak demand periods,” the analysts write.



Source: Morgan Stanley Research

They will do this for three reasons.

The first is to “dampen” variability from renewables and other causes, and to delay the need for incremental investments in grid upgrades, like Queensland’s Ergon Energy is already doing in its remote network.

The second is adoption by demand response providers, who will use storage and solar to help customers reduce peak demand and duck punitive demand charges. (This is also applicable in Australian markets). Morgan Stanley says this model works with battery storage at less than \$US320/kWh – see graph above.

And the third is by developers of renewable energy power plants, who will use storage to provide grid reliability, target peak demand and arbitrage power prices. Morgan Stanley says that model works at less than \$US275/kWh.

In the US, Edison International has already announced that it is going to use Tesla batteries as a demand response mechanism with customers, and will also install 2,000kWh of storage at two theatres, where battery will be charged with cheap power at night and discharged during the day.

Morgan Stanley says there is growing evidence that network operators are looking to battery storage for an increasing number of reasons.

These include mitigating grid volatility, offsetting costs of grid upgrades and expansions, cutting system-wide power costs, and having greater means to respond or avoid power interruptions caused by unplanned outages of large wholesale power plants. California has mandated that 1,325MW of storage capacity be installed by 2020.

So where does the economics of grid based battery storage lie?

Morgan Stanley says the scope of economic benefits of storage are wider than any other business model or technology: (1) it mitigates grid volatility caused by greater renewables penetration, (2) it creates a lower need for incremental wholesale generation, transmission and distribution assets to keep pace with peak demand growth, (3) it cuts system-wide power costs, and (4) it has a greater ability to respond to/avoid power interruptions caused by unplanned outages of large wholesale power plants.

And who are the losers?

Mostly fossil fuel generators. The ability of renewables to store power means that they will likely be peaking at the peaks, so less returns for gas fired generators, and the coal (and nuclear) generators that priced in big surges in peak demand and prices into their business model.

Other utilities face risk from people deserting the grid. In the US, this risk is highest in Hawaii, where electricity prices are high, although less so now that the utility is accelerating its push to a 100 per cent renewable grid.

There is an off-grid risk in other states such as Connecticut, New Jersey and New York, especially among commercial/industrial customers, but while the grids in these state functions as a free or low cost battery, the incentive to move off-grid are minimal.

Of course, the opposite is true in Australia, where the grid is anything but low cost, and accounts for around half of all bills. And fixed charges are likely to rise as networks and retailers adjust their tariffs to protect their revenue streams as consumers use solar and storage to reduce the amount of electricity they source from the grid.

The product is not designed to take customers fully off-grid, at least not initially, but CEO Elon Musk's vision is to move the world to 100% renewables, which could lead in that direction.

Morgan Stanley notes that companies such as AES has the most extensive experience in deploying and operating storage systems, and it is possible that many utilities and other entities pursuing storage may seek to leverage AES' strengths.

AES first entered the storage business in 2008, and has around 86MW of storage already in operation, and another 260MW in late stage development or under construction. Its former chief operating officer is now CEO at AGL Energy, which may explain that company's sudden acceleration of its energy storage strategy, and his invitation to the head of new technologies to challenge the incumbent business model of the company, almost entirely based around large centralized generation.