The View From The Outer

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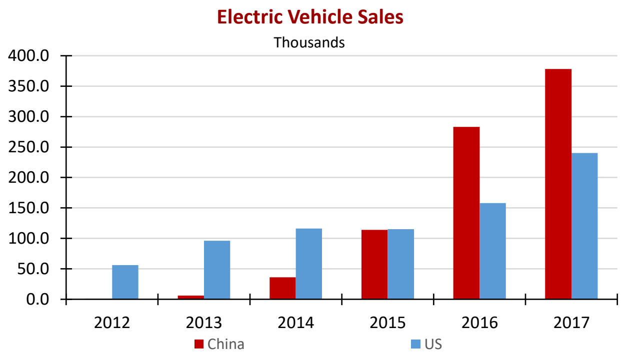
EVANS & PARTNERS

China driving the clean energy revolution

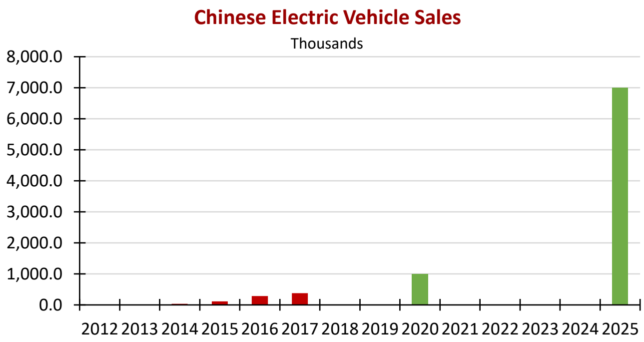
Despite Australia abandoning its clean energy target, recent global developments suggest to us that the clean energy revolution is accelerating and is increasingly being led by China.

China has announced a system of mandated quotas for all foreign and domestic car companies. Under the new scheme, electric vehicle (EV) sales must represent 10% of sales by 2019 and 12% by 2020 and companies that cannot reach this target can purchase *credits* from companies that exceed the target. This will ensure 1 million in EV sales by China in 2020 and potentially 7 million by 2025.

Several countries have already announced bans on the sale of non-electric vehicles by as early as 2025 including India, France, UK, Norway and Netherlands. China has announced it will do the same but has not yet confirmed a date.



Source: Thomson Reuters Datastream, Evans & Partners



Source: Bloomberg, Evans & Partners

The switch to EVs has implications for the solar industry. A range of sources suggest that demand for grid power may rise around 25%. Around half of new additions to the grid now come from solar, according to Bloomberg, and China recently announced new targets for substantial rises in solar capacity by 2020. These factors as well as ongoing falls in installation and panel costs will support a continuation of the recent 30% growth rate in solar installations.

Implications

We expect the interconnected advances in battery, solar and electric vehicle technology will have major social, economic, political and market implications over the next decade. This is one area of growth in a low growth world and investors should be alert to the opportunities.

In our view the industries under threat from disruption are clearer than the winners at this stage. The industries most at risk from disruption are in conventional energy and existing car companies. Identifying beneficiaries is harder as the industries are evolving quickly but are likely to appear in battery materials, solar generation, storage solutions, engineering and the auto sector.

Going forward, Evans and Partners will seek exposure in two ways:

- The E&P Global Disruption Portfolio. There are not currently any direct exposures to batteries, solar or electric vehicles but this is one disruption theme that the fund is monitoring.
- E&P is exploring some direct ways to play this theme in areas that are growing rapidly.

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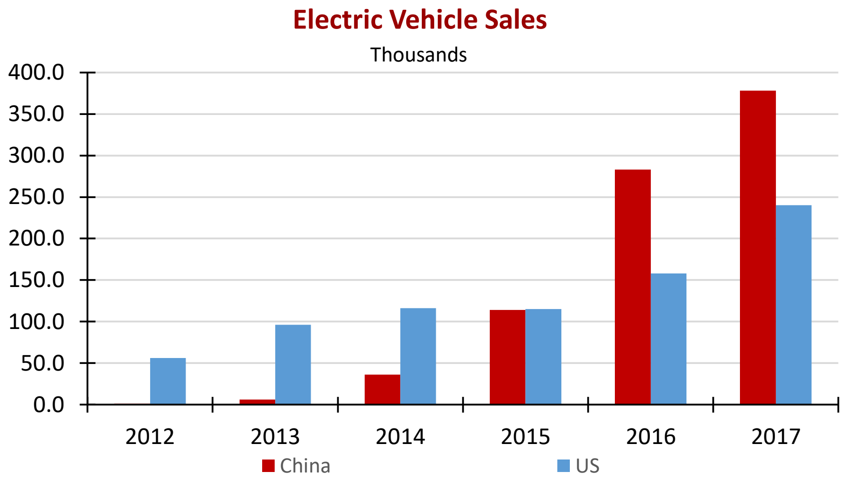
China driving the clean energy revolution

There have been some recent developments that indicate that the clean energy push is happening faster than expected and is increasingly being led by China.

China is driving electric vehicles

China has ambitious goals for the electric vehicle (EV) market. It sees EVs as a solution to its pollution problem and sees an opportunity to become the global leader in a new industry. The chart shows what has already occurred in EV sales. From 2012, when newly appointed President Xi Jinping led the charge into EVs, China has rapidly become the world's largest market.

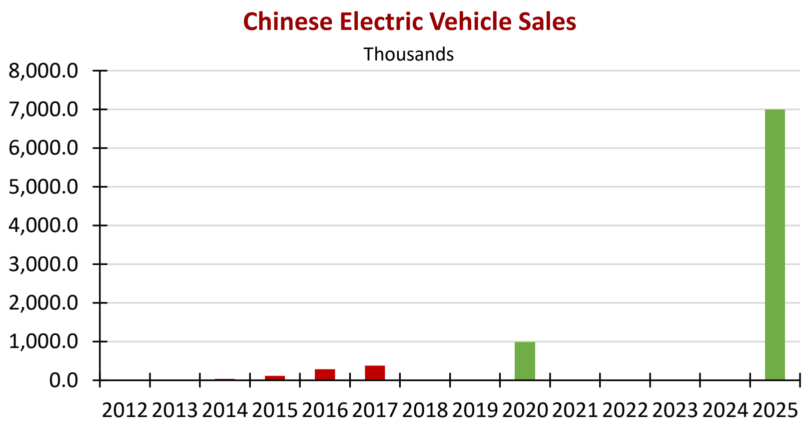


Source: Thomson Reuters Datastream, Evans & Partners

The initial impetus to this growth came from substantial subsidies and exemptions from licence plate restrictions in the major cities. The subsidies are significant ($US10,000 to 15,000 per vehicle) but were never going to be sustainable.

The important recent announcement signalled a shift from subsidies to a system of mandated quotas for all foreign and domestic car companies. These quotas will guarantee future growth in the industry through to 2021 by which time the costs of electric vehicles should have fallen enough that future schemes will not be needed.

The new rules, announced in September, require that EVs must represent 10% of sales for all domestic and foreign automakers by 2019 then increasing to 12% in 2020. To make the scheme workable for all producers, companies that cannot reach this target can purchase *credits* from companies that exceed the target. The 12% target will deliver 1 million in sales in 2020 compared with around 400,000 now. However, this is only one step in a broader plan towards 7 million in sales by 2025.



Source: Bloomberg, Evans & Partners

To further support the switch to electric vehicles, China is building a network of charging poles and stations. As many as 5 million charging points could be available by 2020. It currently has 150,000 – around 10 times the number in the US.

Global developments

China, along with Norway and the Netherlands, is leading the global charge into EVs. Importantly the scale it will deliver to the market will ensure further rapid falls in battery and EV prices that will accelerate the global penetration of EVs. The release of the Tesla Model 3 and the 2017 Chevy Bolt are significant events this year because for the first time mid-sized EVs are widely available at comparable prices to petrol vehicles (around $US 35,000). By 2021 EVs are likely to be cheaper than petrol vehicles even without subsidies.

Other countries are also rushing to announce incentive schemes and several countries have announced intentions to ban the sale of non-electric vehicles by as early as 2025 as shown in the table below. Norway and Netherlands have the most ambitious plans. China has signalled that it will also impose such a ban but it has not yet committed to a date; this might be announced as part of the National People's Congress that is now underway.

Table 1: Countries with proposed gasoline and diesel vehicles new sales bans

Country	Target date	Vehicle market size	2016 EV penetration rate in total car sales
China	Not disclosed	24.3 million	1.2%
India	2030	2.9 million	0.1%
U.K.	2040	2.7 million	1.5%
France	2040	2.0 million	1.7%
Netherlands	2025	0.4 million	6.0%
Norway	2025	0.15 million	29.2%

Source: Bloomberg New Energy Finance

In line with these government targets, auto companies have been announcing plans to switch their product ranges to electric. They increasingly fear being left behind by existing competitors or new entrants to the market. China has a stated intention of being a major exporter of electric vehicles and, given the scale of its domestic market, will have a significant head start. A range of technology companies such as Samsung, Foxconn and Dyson will also target the market. The table below shows some recent announcements by auto companies. Volvo has since announced that it will cease the production of petrol-only vehicles by 2019.

Table 2 • List of OEMs announcements on electric car ambitions, as of April 2017

OEM	Announcement	Source
BMW	0.1 million electric car sales in 2017 and 15-25% of the BMW group's sales by 2025	Lambert (2017b)
Chevrolet (GM)	30 thousand annual electric car sales by 2017	Loveday (2016)
Chinese OEMs	4.52 million annual electric car sales by 2020	CNEV(2017)
Daimler	0.1 million annual electric car sales by 2020	Daimler (2016a)
Ford	13 new EV models by 2020	Ford (2017)
Honda	Two-thirds of the 2030 sales to be electrified vehicles (including hybrids, PHEVs, BEVs and FCEVs)	Honda (2016)
Renault-Nissan	1.5 million cumulative sales of electric cars by 2020	Cobb (2015b)
Tesla	0.5 million annual electric car sales by 2018 1 million annual electric car sales by 2020	Goliya and Sage (2016), Tesla (2017a)
Volkswagen	2-3 million annual electric car sales by 2025	Volkswagen (2016)
Volvo	1 million cumulative electric car sales by 2025	Volvo (2016)

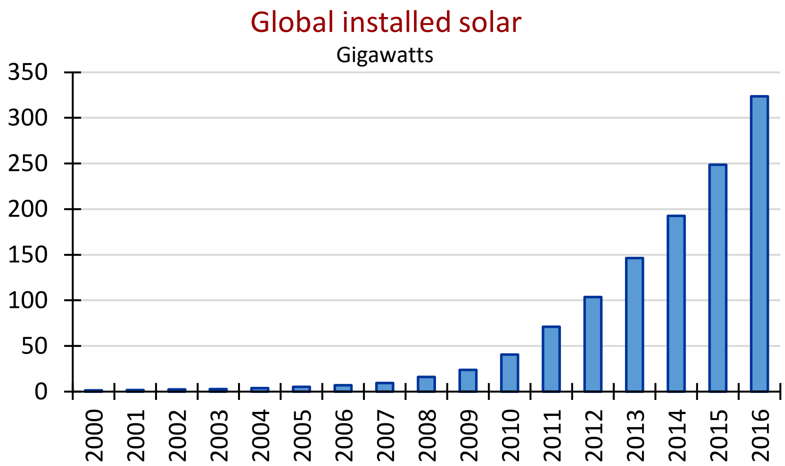
Note: Chinese OEMs include BYD, BJEV-BAIC Changzhou factory, BJEV-BAIC Qingdao factory, JAC Motors, SAIC Motor, Great Wall Motor, GEELY Auto Yiwu factory, GEELY Auto Hangzhou factory, GEELY Auto Nanchong factory, Chery New Energy, Changan Automobile, GAC Group, Jiangling Motors, Lifan Auto, MIN AN Auto, Wanxiang Group, YUDO Auto, Chongqing Sokon Industrial Group, ZTE, National Electric Vehicle, LeSEE, NextEV, Chehejia, SINGULATO Motors, Ai Chi Yi Wei and WM Motor.

Sources are indicated in the table.

The charge into solar

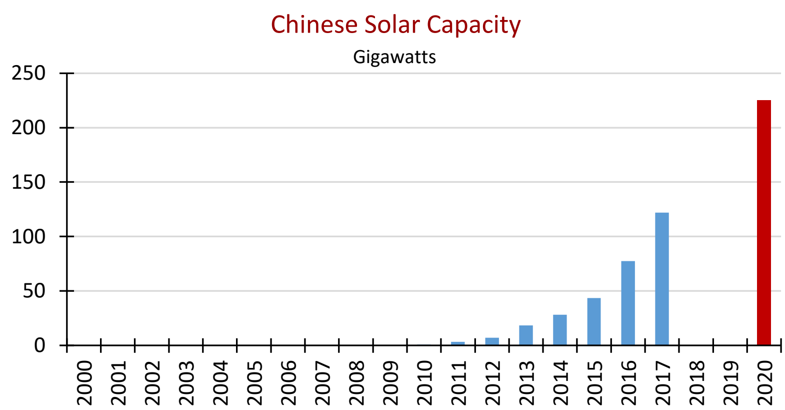
The switch to electric vehicles also has implications for the electrical grid, and the take up of solar in particular. The environmental benefits of EVs will be limited if the electricity to power them is generated from dirty sources. Most estimates suggest that the switch to electric vehicles in developed countries will lead to an increase in grid demand of around 25%. Estimates do vary however; the impact would be less if the batteries in electric vehicles are effectively integrated into the grid and vehicles are charged at times when there is excess power in the network.

The good news for the solar industry is that a significant amount of this incremental capacity will come from solar. According to the International Energy Agency, solar capacity grew by more than 30 per cent globally last year, faster than any other source of electricity, with almost half the expansion coming in China. Almost two-thirds of net power capacity added around the world last year was from renewable sources.



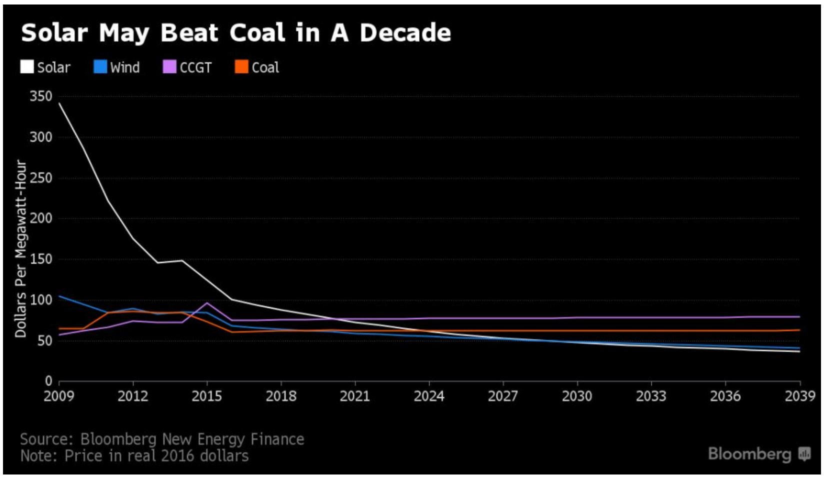
Source: EPIA, Evans and Partners

China's take up of solar has been particularly aggressive. In fact, China recently exceeded its previous 2020 target of 105 gigawatts (GW) of power from solar and has more than doubled the target to 230 GW. This means around one half of all new additions to the Chinese network will be solar. Solar currently represents around 7% of grid power in China (compared with 1-2% across the globe).



Source: Bloomberg, Evans & Partners

There is the prospect of this pace of growth accelerating even further given ongoing falls in the costs of solar panels and installation; Bloomberg estimates that the cost of fully-installed solar will fall by another 66% by 2040 and will be the cheapest form of grid power within a decade without subsidies. Much of the decline in costs from here will come from falling installation costs.



Implications

Our view is that the interconnected advances in battery, solar and electric vehicle technology will have major social, economic, political and market implications over the next decade. This is one area of growth in a low growth world and investors should be alert to the opportunities.

In our assessment the industries under threat from disruption are clearer than the winners at this stage. Segments that are vulnerable include:

- The oil industry since 60% of oil is currently used for land transportation. Rapid adoption of EVs will cut oil demand with this likely to be the dominant industry theme after around 2021.
- Coal demand may also be affected in the long term as most incremental electricity supply will come from solar although demand could increase in the short term as grid demands rise from more EVs.
- Existing car companies are under threat as they will not be able to move as quickly as Tesla and other technology companies that will move into the industry such as Foxconn and Samsung. Early moving Chinese companies such as BYD will also have a head start on the rest of the world.

Identifying beneficiaries is harder at this stage as the industries are evolving quickly. Some areas where opportunities are likely to arise are:

- Materials used in the manufacture of batteries and EVs. Lithium and graphite companies have been early winners.
- Energy distributors and utilities. Large scale solar has significant implications for the grid as power generation will be more decentralised.
- Companies providing solar generation and storage solutions to businesses and the grid. For example, many existing buildings will be retrofitted with solar panels and batteries.
- Engineering companies involved in building new solar generation and storage plants.
- Auto companies that seize the opportunity and become the new global leaders.

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