

# CleanTech – State of the Nation

*Here's an article by Todd Greenhalgh, who's uniquely positioned to give an overview of the current dynamics of the CleanTech sector – he leads this sector for our Silicon Valley based partner firm, SPMB in San Francisco.*

Emerging from the Paris climate change agreement, there is now a global recognition that climate change is real and a global commitment to making changes in how we generate, manage and store energy. This was a landmark moment – at least a framework has now been established so we can drill down to get accountabilities and actions agreed. So this is a validation for CleanTech and Sustainability - there are things we can and should be doing now to make a material impact.

Solar has become the fastest way to deploy Clean Power Generation and is rapidly scaling across Utility, Commercial and the Residential deployments. Part of the challenge is the associated high level of volatility – oil and natural gas prices, plus other commodities that influence the cost of generating energy. In the last few months, we've seen SolarCity's market cap shrink by two thirds, with Sun Edison on life support as its investors get into legal dispute. The overall market impetus though hasn't changed though – Utility scale solar farms deliver solid returns and the residential solar market is growing and here to stay. With developments in storage, the consumer has increasing control over how they generate and store the energy.

Utilities continue to be challenged on how to manage these multiple points of generation, storage and utilization. Their technology infrastructure, software and data tools are just not up to managing the complexity. There are a number of companies providing great technology to address this problem but the utilities are slow to adopt so the grid management is far from cutting edge.

Another interesting sector is Industrial IoT (Internet of Things). The Consumer IoT with connected homes is interesting but I can't see who is going to pay for it. However there is major opportunity on the Industrial side, in manufacturing, supply chain and operation optimisation. Also in commercial building space – energy management solutions, optimisation, reconfiguration, new builds that are “cleaner and leaner” - all areas that are already substantial and in growth.

While the Paris climate change agreement will affect the overall investment landscape, individual investments are largely independent of this. Extension of the Solar and Wind tax credits in the US to 2020, gives us more runway and less uncertainty from the end of 2016. We've weeded out the VCs which are not committed for the long haul. Those that are still active in the sector now have a better understanding about the length of time for the ROI, the volatility and how to best influence outcomes. I think corporates will be much more involved and more private equity money will come into the sector. Longer term, less risky capital will come into the marketplace. You can see this with GE branding and launching Current and Edison Energy's launch of their own Critical National Infrastructure (CNI) energy services company. These are companies with capital on their balance sheets and customers deploying in areas they can influence and disrupt. So it's not that traditional, high-value unicorn style investment which is the more typical VC aspiration.

Sustainability is about efficiency and optimization, a cleaner, more streamlined way of doing things. If we are successful, it won't be called sustainability anymore, it will just be the way we generate and manage our energy utilization, power our buildings and the way our vehicles are made. Tesla has

done a great job producing an emission-free vehicle, that's sexy, fast and fun to drive! They are a car with a better overall cost profile, so the consumer will have a choice, say, of similarly priced cars from Tesla and Volkswagen but with lower running costs for the Tesla. The same with buildings – there will come a point at which it will be significantly more efficient to run a building using Clean Technologies than traditional ones. It's about deploying your capital, as an individual consumer or a company, for optimum return. The initial obstacles about technology validation are in the rear view mirror. The technologies work, they are available, deployable and scalable so now it's about driving mass adoption into the mainstream commercial, industrial and consumer markets. That will generate the next wave of innovation, as the broad mass of the population begins to use these Clean Technologies.

Which are the benchmark best practice companies in CleanTech ?

Tesla's first model on the Lotus platform was a validation of the battery and drivetrain technology and that an electric vehicle could be fun to drive. Then the Model S is a high-end model, as a genuine challenger to a Porsche or top-of-the-range Audi purchase. Now comes a model for the SUV market. And then with sufficient manufacturing experience and scale you can build a mass-market vehicle.

In Utility scale Solar, First Solar is another benchmark business. They have the best products, best cost profile, best margins and a great platform to own and finance some of these assets, operating on a utility scale. In Residential Solar I think there is still uncertainty about how vertically integrated companies can go and what that means for investors, so there's no clear view of which model/models are best.

In Wind GE, Vestas and Siemens continues to innovate in terms of wind turbine technology.

Energy efficiency continues to see emerging technologies but nobody has gotten mass adoption yet in the commercial building space. There are multiple approaches, lighting, in-built sensors, dynamic glass but all face critical hurdles in penetrating the channel, specification and mass deployment.

Since we started the dialogue for this article, Tesla have launched the Model 3 vehicle, aimed at the mass market. Things are moving fast !