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Renewables: Does Maturity Imply Lower Returning Expectations?

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ENGAGE

Bill Nussey is a partner at the Engage and Tech Square Venture firms. He has spent most of his career as a tech CEO, helping lead several startups to successful exits, including an IPO. He is also the author of Freeing Energy, a book that includes 50 highly investible ideas, super growth, and multibillion-dollar emerging segments.

Summary

As wind and solar technologies mature, what innovation is left for VC to foster? Will returns evolve from the VC world to project finance/green debt? Are VC returns achievable?
Watch the full session here.

Key takeaways

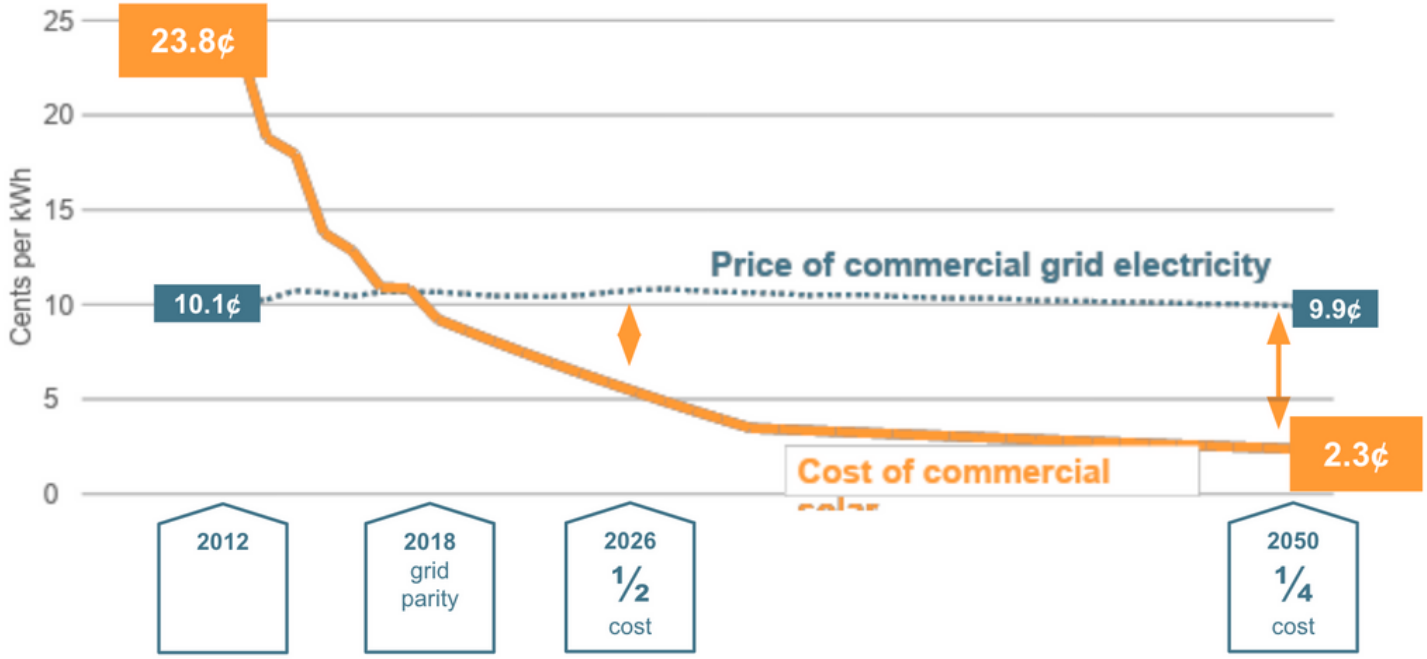
- Power transmission is the most significant limiting factor for the clean energy transition. The decentralization of power generation and transmission will be essential in the years ahead to achieve net zero.
- We need more transmission, more utilities, and big solar and wind, but they are no longer where innovation and investment can thrive. Local energy is the big investible opportunity, meaning any project that generates electricity near where it will be consumed and typically owned by the people who will benefit from the consumption.
- In the US, building a large-scale solar farm takes 1-2.5 years, but the entire process can achieve a domestic solar installation in 3-4 weeks. In Australia, installation can take a couple of days.
- We are fast approaching a time when buying solar panels and batteries will be much cheaper than purchasing electricity from the grid. Many investors have yet to recognize the importance of that moment. This will become ever more poignant for regulators and how they handle the competition.
- Electricity monopolies face an existential challenge. The leaders of the oil and gas industries are now aiming to take control of the electricity industry, which has been complacent for about 100 years with no competition and innovation. As a result, we'll see some old monopolies survive and thrive while market competitors will mop up others. As a result, the electricity market will look entirely different in 10 years.

Paul's observations

Bill makes a compelling argument for the rise of microgrids, or more specifically, the decline of electricity monopolies. While I do take issue with some of his cost curve analysis for battery storage, the cost-effectiveness of solar panels is undeniable, and the rise of microgrids across Europe in response to energy insecurity driven by the Ukraine war is an indication of how quickly consumer preferences can change if the regulatory environment is favorable. It is currently not that favorable in the United States. The state and federal lobbying power of electricity utilities is powerful, and while this will hold back the tide that is micro-grid development, the trend toward decentralization will be relentless. Exposure to energy efficiency as a service will be compelling.

> ***"We need more transmission, more utilities, and big solar and wind, but they are no longer where innovation and investment can thrive."***

Price of commercial-scale electricity
(U.S. cents per kilowatt hour, 2012 - 2050)



Source: Taken from Bill Nussey's presentation at the Sustainable Finance forum.

Presentation: The investment opportunities in renewable technology are just beginning to get exciting

Utility-scale investment returns are declining, but this only marks the end of the first phase of a multi-decade investment opportunity that is nothing short of extraordinary. Companies building commercial solar and wind projects are signing power purchase agreements (PPAs) spanning 25 years, hoping that they can then sell the energy they produce beyond that to generate the rest of their return on investment. This is a bold move with limitations on the possible uplit. The days of realizing 20-30% returns on a large-scale system project are now long gone.

Challenges in clean energy transition

Bill Gates proposes that power transmission is the most significant limiting factor for the clean energy transition. The largest grid operator in the US announced last year a 2-year pause before reviewing further applications to connect large solar to their network. The speed of large-scale systems change is slow. Another example is that small nuclear pilots are heralded in 2028 as a great success, yet the Intergovernmental Panel on Climate Change (IPCC) has set targets to slash emissions by 2030. The pace is far too slow to achieve the necessary carbon reductions. Additionally, the cost of building power transmissions is increasing, and utilities in the US are expected to spend $140 billion on building transmission infrastructure, which is driving up the cost of energy for everyone.

Electric monopolies have a strange economic reality. Only three industries in the US are intensely regulated per custom for the price: gambling, alcohol, and electricity. In the US, electrical utilities are the lowest if you rank all industries, including pharmaceuticals, car insurance, etc., by the amount of R&D as a percentage of its revenue.

Sam Insull, Thomas Edison's secretary, persuaded the US government that electricity should remain a monopoly. The result today is low R&D and high lobbying costs. The electrical industry also has the largest lobbying budgets as a percentage of its revenue. On the other hand, microgrids exist outside the energy monopolies, so they have a very different economic model. In 2011, $5 billion of venture capital went into clean tech. In 2021, that was $165 billion, 30 times more.

The energy system is efficient and working relatively well, but it is stuck in time. The fathers of electrical science would still recognize what we have in place today—conductors, substations, insulators, and coal power plants—although they may be 3-4% more efficient now.

We need more transmission, more utilities, and big solar and wind, but they are no longer where innovation and investment can thrive. Local energy is a big investible opportunity, meaning any project that generates electricity near where it will be consumed and typically owned by the people who will benefit from the consumption. In the US, building a large-scale solar farm takes 1-2.5 years, but the entire process can achieve a domestic solar installation in 3-4 weeks. In Australia, installation can only take a couple of days.

The US Inflation Reduction Act (IRA) is exciting, but it fails to highlight that smaller projects generate 10

"The energy market will look entirely different in 10 years." – Bill Nussey

times more jobs per megawatt installed than larger projects. For example, a rooftop installation on a community building can see around 15% of the cost flow back into the community as earnings for local people who install it.

Local energy is more resilient and cheaper

Local energy is cheaper for consumers. Large-scale installations are cheaper for utility companies to build, and they support their profits because consumer prices stay the same, whilst the utility enjoys a cheaper source of generation. However, there is some burden in terms of being more dynamic to manage intermittent generation. Moreover, the cost of installed solar per kilowatt varies massively between different countries. For example, in the US, a residential solar installation costs $3.8 per watt, whereas in Australia, it is $1.2 per watt. The difference is that Australia has a national policy to support the permitting and interconnection of these systems. We are fast approaching a time when buying solar panels and batteries will be much cheaper than purchasing electricity from the grid. Many investors have yet to recognize the importance of that moment. This will become ever more poignant for regulators and how they handle the competition.

How can investors digest the opportunities?

Personally, I focus on higher returns from the innovation growth side rather than longer-term project investment.
Integrations refer to taking available components and bringing them together in an innovative way to create a new product. Most of the value is created for investors at this integration stage, which is counter-intuitive to many investors. For example, the Tesla Model S is considered one of the best cars, using components also available to BMW, General Motors, and others. Tesla had nothing proprietary, yet by configuring those readily available components innovatively, they changed the history of automobiles. Furthermore, the clean-tech industry is asset-heavy, so you take those assets and turn them into a service stream. The most prominent example is the electric grid, with trillions of dollars worth of assets, delivering electricity 1 kilowatt at a time. Finally, platforms should be the most exciting area for venture capitalists because they don't have to own any assets but get a cut of sales. Disruptions are where a vertical value chain is so successful that it leaps over the industry that it is in and disrupts an associated industry that did not see it coming.

The electricity market in 10 years

The leaders of the oil and gas industries are now aiming to take control of the electricity industry, which has been complacent for about 100 years with no competition and innovation. As a result, we'll see some old monopolies survive and thrive whilst others will be mopped up by market competitors. As a result, the electricity market will look entirely different in 10 years.

Questions & Answers

How long does a domestic rooftop solar installation with a battery take to break even with a median electricity bill?

The externalities surrounding the system are the determining elements. For example, if you are in Hawaii, it has already been cheaper for a while to have your solar battery system than to buy electricity from the grid by a long way. In this case, the system would break even in 5-8 years.

Batteries are falling in price and are expected to continue to do so, which will improve the speed of that return. However, there is a larger question here: many people see small-scale systems as competition for large-scale systems, but they also thought that PCs were like toys in the early days of computers, yet now even large computers are composed of smaller computers linked, whilst mainframe computers still exist to serve limited functions where only they can.

We need to consider grid optimization. For example, at 5 p.m., there is peak demand and expensive electricity, so it is a perfect time for batteries to discharge to reduce the demand peak. At night in some places, the nuclear-generated baseload has spare capacity, which would be ideal for charging the batteries.

Measuring the small-scale systems in isolation without looking at the cost benefits to the grid they are part of will make them look more expensive. Still, even the most ardent centrally run utilities are looking at the cost benefits of using batteries to reduce peak demand and the savings this allows.

Could microgrids sell or trade electricity locally?

Selling and trading electricity locally is illegal in the US. The monopolies have guarded the right to generate and sell electricity. In Europe, there are energy communities, and Australia and Japan have peer-to-peer energy markets for electricity. Some of the Nordic countries have those markets also. As the economics of microgrids becomes more attractive, we will see some more liberal markets take off, and the US will be shamed or pushed by its citizens to follow suit. However, the costs will then go down even further.

A nuclear plant is under construction In Georgia that will take 30 or 40 years to pay off. Everything built on the grid takes decades to pay off, and it is all included in consumers' energy bills. A pertinent question is how the government or entrepreneurs can support low-income people to access domestic solar with batteries. Sunsave in the UK is bringing this model by paying for the asset and installation, with the homeowner paying the cheaper electricity unit cost.

As the grid operators add more cost to support large-scale transmission, electricity prices go up, which motivates more people to install their small-scale system so that large-scale cost is shared between fewer customers and the gap between grid prices and microgrid electricity prices becomes greater. This has been termed the death spiral.

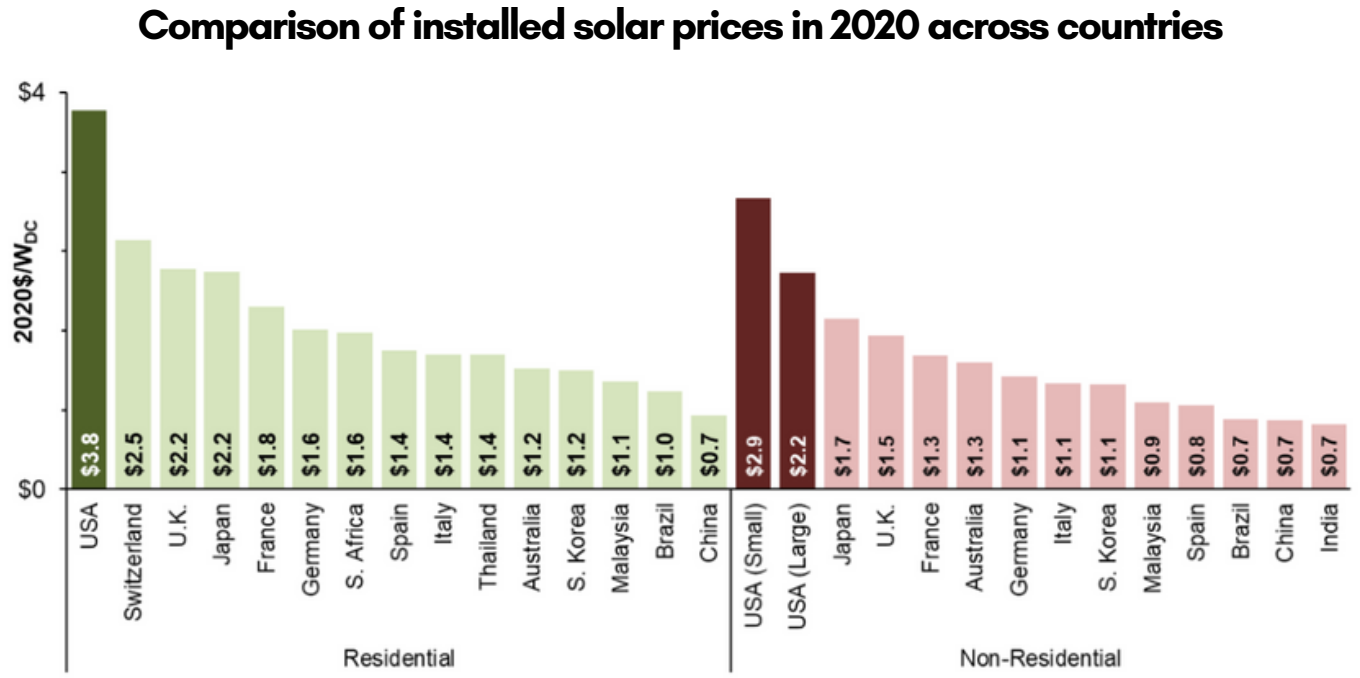
How will the IRA affect individual households or communities looking to install renewable energy

with battery storage?

Most of the benefit of the IRA is to the large-scale grid. One of the reasons the bill got passed is that it was incredibly friendly to the big utilities. It is arguably the most significant piece of climate legislation in the world and a fantastic piece of legislation, but utility monopolies support it.
However, some impressive side effects include lowering the cost of a small-scale energy system if it is built with union labor or in parts of the US that are deemed low-income regions. The bill perpetuates benefits that have been in place for the past 30 years during Republican and Democratic administrations, including the Solar Investment Tax Credit (ITC) and other subsidies.
I do not think the IRA will push local energy any faster, but its independent economics will make it successful regardless. From a climate point of view, the IRA is fantastic. From a local energy point of view, it is a break-even.

How can a monopolized U.S. electricity market reform in such a way that allows local energy to flourish?

It does not matter whether the big grid is a monopoly. It is legal to generate electricity for your own consumption, and this alternative to the big grid is getting cheaper. Microgrids are increasingly becoming a better option for more people.
Interestingly, both Republican and Democrat voters want local energy and the ability to access and produce their own energy.



US local-scale solar is far more expensive than the rest of the world.

Source: Taken from Bill Nussey's presentation at the Sustainable Finance forum.

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