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## **Electricity Grid Risk Management**

*In Response to the Essential Energy Community Energy Webinar Series*

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## **Executive Summary**

The transition to renewable energy in New South Wales (NSW) presents both significant opportunities and substantial risks. Ensuring a sustainable energy supply is essential, as any failure to meet this challenge will have profound community consequences.

This paper focuses on the most critical risk factor: household and commercial rooftop solar combined with battery storage. These systems are integral to the future of the grid, but they also introduce unique challenges that must be accounted for in any transition plan.

The key element of this risk is the timeline for the adoption of off-grid, stand-alone rooftop solar and battery systems. As adoption rates increase, it creates a race between grid preparedness and the shift toward off-grid energy independence. Managing this risk requires a thorough understanding of how rapidly off-grid solutions are being adopted and what that means for grid stability.

Additionally, the suite of technology disruptions across the five foundational sectors, Energy, Transport, Information, Food Production and Materials presents not only risks but also potential opportunities—unexpected positive developments that could assist progress.

Only by conducting a comprehensive risk analysis, which includes the pace of off-grid adoption, can we develop solutions that will ensure a smooth and equitable transition to renewables in NSW.

## The Energy Timeline

A critical factor in understanding the transition to renewables is the timeline for grid preparedness. My hypothesis is that this timeline is deeply connected to the broader goal of achieving Net Zero emissions by 2050. The targets set for 2035 are conservative in this context, providing a buffer that instils confidence in the ability to meet these milestones.

However, this very confidence poses a risk. By adopting a seemingly conservative 2035 target, there is the potential to overlook the rapid advancements being made by competitors. The energy landscape is shifting quickly, particularly with the acceleration of off-grid adoption and technology disruptions. If we become too focused on these distant targets, we may miss what's happening on the ground—where innovation often moves faster than established goals.

Therefore, while the 2035 target may seem prudent, it also runs the risk of fostering complacency. A more dynamic approach that continuously assesses real-time technological developments and off-grid adoption rates is essential to remain competitive and ensure a truly sustainable transition.

## What is the Competitor's Timeline?

There are two key ways to examine the competitor's timeline: by looking at credible predictions and by analysing accumulating real time data.

But are there credible predictions? The answer is yes. Since 2010, Tony Seba<sup>1</sup> has been at the forefront of this discussion. Through his books, global presentations, and advisory work with governments, Seba has provided a clear framework for understanding technology disruption. In 2016, he co-founded RethinkX<sup>2</sup>, a think tank that continues to expand on the Seba Technology Disruption Framework. Seba's S-curve predictions for technology adoption have proven accurate time and again, while many mainstream analysts continue to rely on outdated straight-line forecasts.

As we compare these insights to current data, the trajectory becomes even clearer. Statistics on rooftop solar adoption—both globally and in Australia give insight into the rapid pace of change. When we extend our view to global leaders like China, the largest manufacturer and consumer of solar technology, it becomes evident that the tipping point is approaching faster than conservative estimates suggest. Even Tony Seba's estimates are being proven to be conservative.

NSW and wider Australia must take these developments into account to remain competitive and avoid becoming reliant on an outdated grid that could soon become a stranded asset.

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<sup>1</sup> <https://tonyseba.com/>

<sup>2</sup> <https://www.rethinkx.com/>

## Why a Stranded Asset?

At the outset of the webinar series, the CEO of Essential Energy emphasised that rooftop solar is an integral part of their future grid plan. But what happens if the grid cannot maintain stability as more households and businesses move off-grid? This critical question must be addressed.

Let me illustrate the current situation with a personal story. At my business and adjoining house, we have installed a 'Superpower' solar system. Once our battery is fully operational, we will be independent of the grid. I made this decision for this compelling reason:

A superior product at a much lower price.

a. I no longer want to rely on the grid, especially as supply risks becoming intermittent during the transition to renewables.

b. Over an 18-month period from July 2022, our electricity prices increased by 40%. With higher price hikes on the horizon, the reality is clear: owning our own 'superpower' system will provide us with marginal-cost energy—energy that can be used to expand business ventures, including opportunities like bitcoin mining.

Rooftop solar generators across the board will continue to seek these opportunities, which makes going off-grid a financial no-brainer. It is more cost-effective to borrow money for installation, as the interest is likely to be far lower than the rising costs of grid-based energy.

This shift highlights the inevitable tipping point. At some stage, the exodus from the grid will be so widespread that it will be impossible to sustain. The Seba Disruption Framework clearly indicates that once this tipping point is reached, the demise of the grid will accelerate exponentially.

Without careful risk management and preparation, the grid risks becoming a stranded asset—an infrastructure relic that no longer serves its intended purpose as consumers find more efficient and affordable alternatives.

## So What Do We Do?

The technology disruption we're witnessing is already 'out of the bottle,' and it cannot be controlled by Essential Energy or other traditional energy providers. Much like our business, Essential Energy must adapt its business model to seize the opportunities created by this new paradigm.

This paradigm is defined by decentralisation, where control shifts from central authorities to individual users and communities with tailor made system designs<sup>3</sup>. The disruptions are happening across five foundational sectors:

- Energy – The rise of rooftop solar, battery storage, and off-grid solutions.
- Transport – Electric vehicles (EVs), autonomous EVs, rideshare systems, and electrification of all aspects of transport.
- Information – Web 3.0, crypto, decentralised finance (DeFi), smart contracts, and design innovation.
- Food Production – Precision fermentation and other breakthroughs in sustainable food technologies.
- Materials – Advances in smart devices, AI, robotics, and 3D manufacturing.

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<sup>3</sup> <https://www.highcalibreconsultancy.com.au/bourke-solar-battery-energy-system/>

All of the above requires further exploration in future papers to fully tease out the energy opportunities. However, there is one common thread: this transition is not a simple one-for-one exchange. For example, while we focus on electric vehicles (EVs) today, they will eventually be supplanted by autonomous EV rideshare services, such as Uber.

Currently, individual cars are utilised for only 4% of their lifespan. With autonomous rideshare, this figure could shift to nearly 100%, significantly reducing the need for personal EVs and, by extension, lowering the demand for resources like lithium that are essential for batteries.

The knock-on effects of this shift will be enormous. The way we think about energy supply must fit within this evolving framework, where resource efficiency and decentralised systems redefine how we power our transportation and broader society.

To thrive in this era, Essential Energy and other corporations need to pick the opportunities that align with their strengths and transform accordingly. We are no longer operating in a one-size-fits-all world—success will come from adaptability and strategic innovation.

## **Conclusion**

Is the grid a one-size-fits-all solution for energy distribution? Historically, the answer has been yes.

But is the grid the best way to distribute energy in the future?

That depends on whether you view renewable energy as simply swapping one form of generation for another, or as a phase-changing technology disruption.

Either way, the risk for Essential Energy—and for society—is very real.

The best starting point from here is to approach the renewable energy transition from a risk management perspective. This will broaden scope, enabling application of the lessons of technology disruption to your business model, while also fulfilling your essential community service role as a NSW Government Corporation.

Having immersed myself in your energy space these past few days, I can understand how overwhelming it must feel—like a mountain standing in front of you. Coming from a generational earthmoving family, I can tell you that the best and fastest way to move a seemingly impossible mountain of dirt is to use the corner of the blade, teasing it out bit by bit. Skilled operators make it look easy.

The timeline for this transition is short. Just think about how quickly the last four years have passed. If the global timeline for renewables is set at 2030, then 2028 is not too early for sunny Australia. Time is of the essence, and the rest of the world is watching NSW<sup>4</sup>. Don't fumble this opportunity.

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<sup>4</sup> [https://www.youtube.com/watch?v=RP\\_Hi1JycCA](https://www.youtube.com/watch?v=RP_Hi1JycCA)

With over sixty-four years of life experience and eight years of studying Tony Seba's work, I've been able to put this paper together in just a few days—while cooking a camp oven dinner for guests on Friday, spending Saturday at the Enngonia races, and taking care of a few weekend jobs. This level of practical application knowledge is vital, and we only have four years before the game changes completely.

The mindset has to shift from "making the grid work" to "transitioning to renewables"—period. The current grid is the starting point, and the solutions will come from there. The grid has to change shape but just what will that be? One of your trump cards is the "Your Future Network Vision" diagram on page 16 of the webinar #1 resource kit. You are on top of it, this simple diagram says it all. Just gotta put boxes against each connection and tease out the right numbers for each box. You are the professionals; all that's needed is a fresh perspective.

There are exciting possibilities ahead, and I look forward to continuing the conversation. I've only scratched the surface with this paper.

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