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"Gradually, the suddenly" Suddenly is here for energy.

October 2021

By Rod Snodgrass and Duane Fernandes
www.theexponential.agency



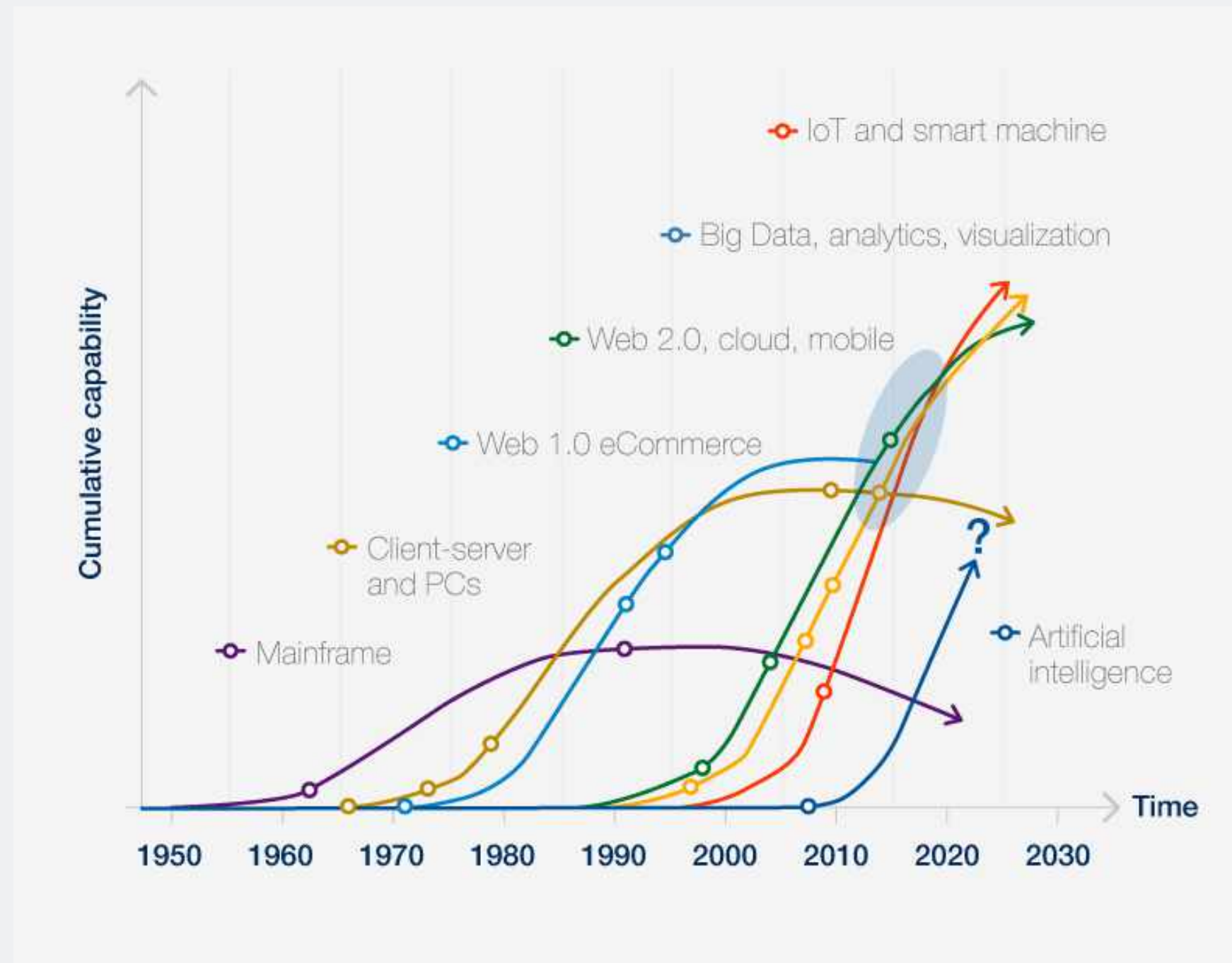
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**THE BATTLE BETWEEN EVERY
STARTUP AND INCUMBENT COMES
DOWN TO WHETHER THE STARTUP
GETS DISTRIBUTION BEFORE THE
INCUMBENT GETS INNOVATION.**

- Alex Rampell, a16z Partner

Multiple accelerating exponential technologies have emerged all together...

1. Internet of Things
2. Robotics
3. 3D Printing
4. Autonomous Vehicles
5. Blockchain
6. Artificial Intelligence
7. Digital Biology
8. Immersive Reality
9. Nanotechnology
10. Quantum Computing
11. Etc Etc... the list goes on.



...rapidly becoming faster and cheaper.

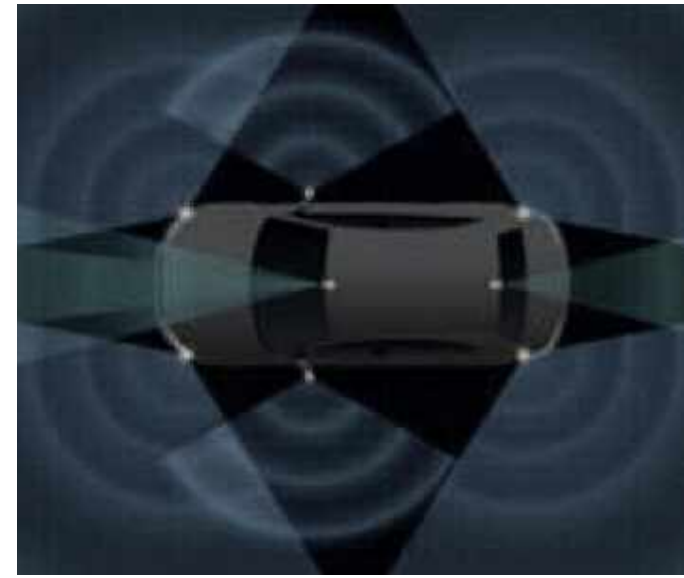


3D Printing

2007: \$10,000

2017: \$100

100X price drop



LIDAR Sensors

2007: \$20,000

2017: \$200

100X price drop



DNA Profiling

2007: \$10,000,000

2017: <\$100

100,000X price drop



Drones

2007: \$100,000

2017: <\$100

1,000X price drop

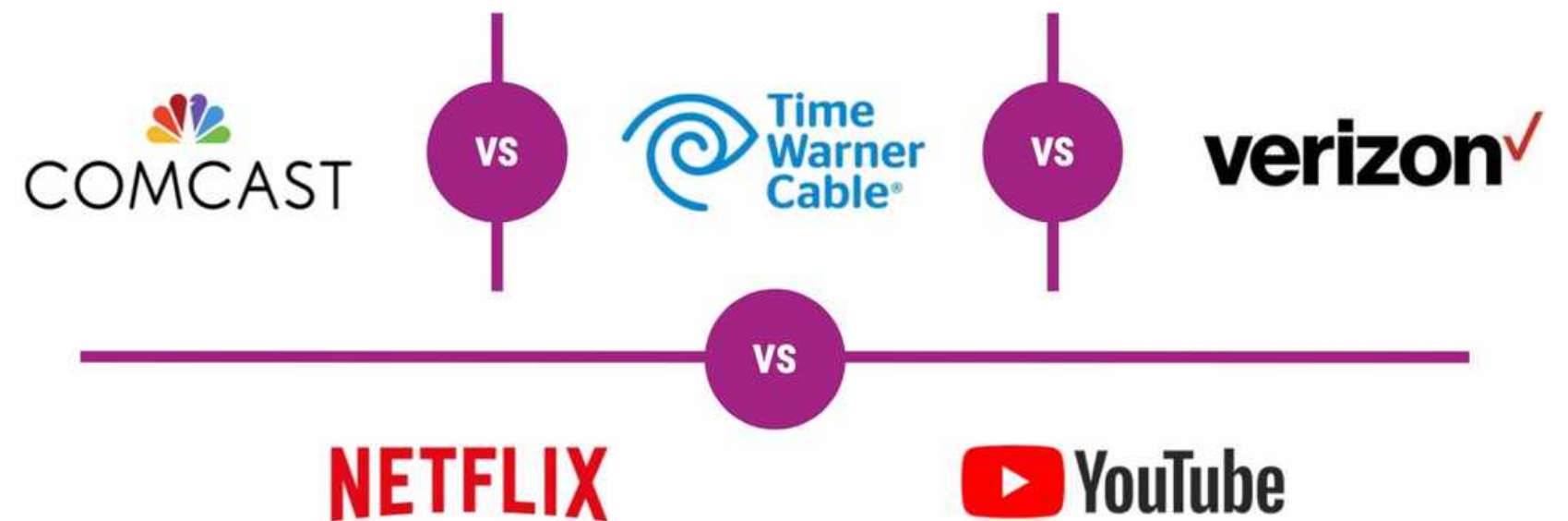
Doubling (price, speed, performance) every few years defines exponential technology

No one is staying in their lane anymore, redrawing competitive lines in all industries.

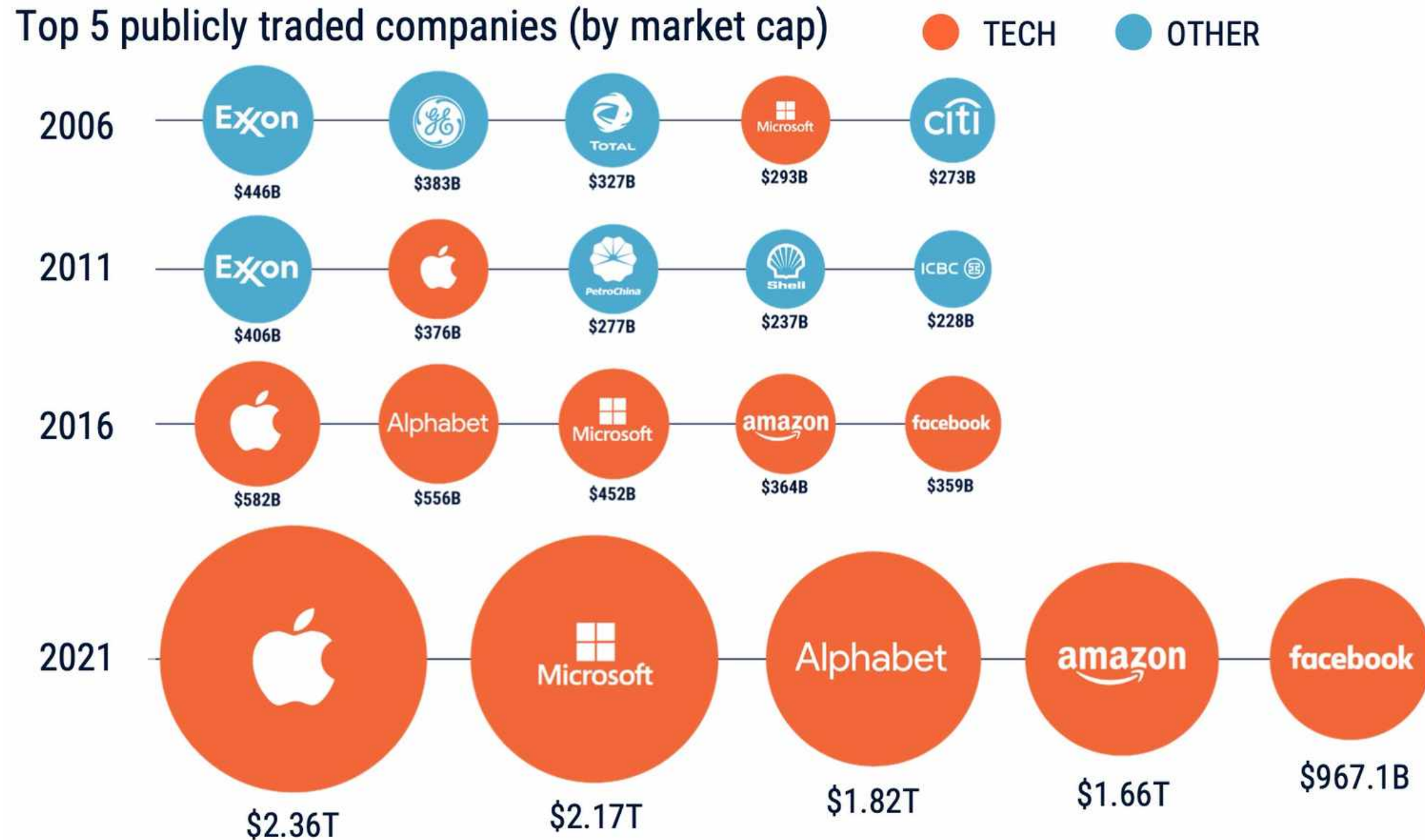
Benz competitors were BMW and Lexus
Now it's Tesla, Uber, Google



Comcast vs. Time Warner vs. Verizon
Now it's them plus Netflix, Youtube



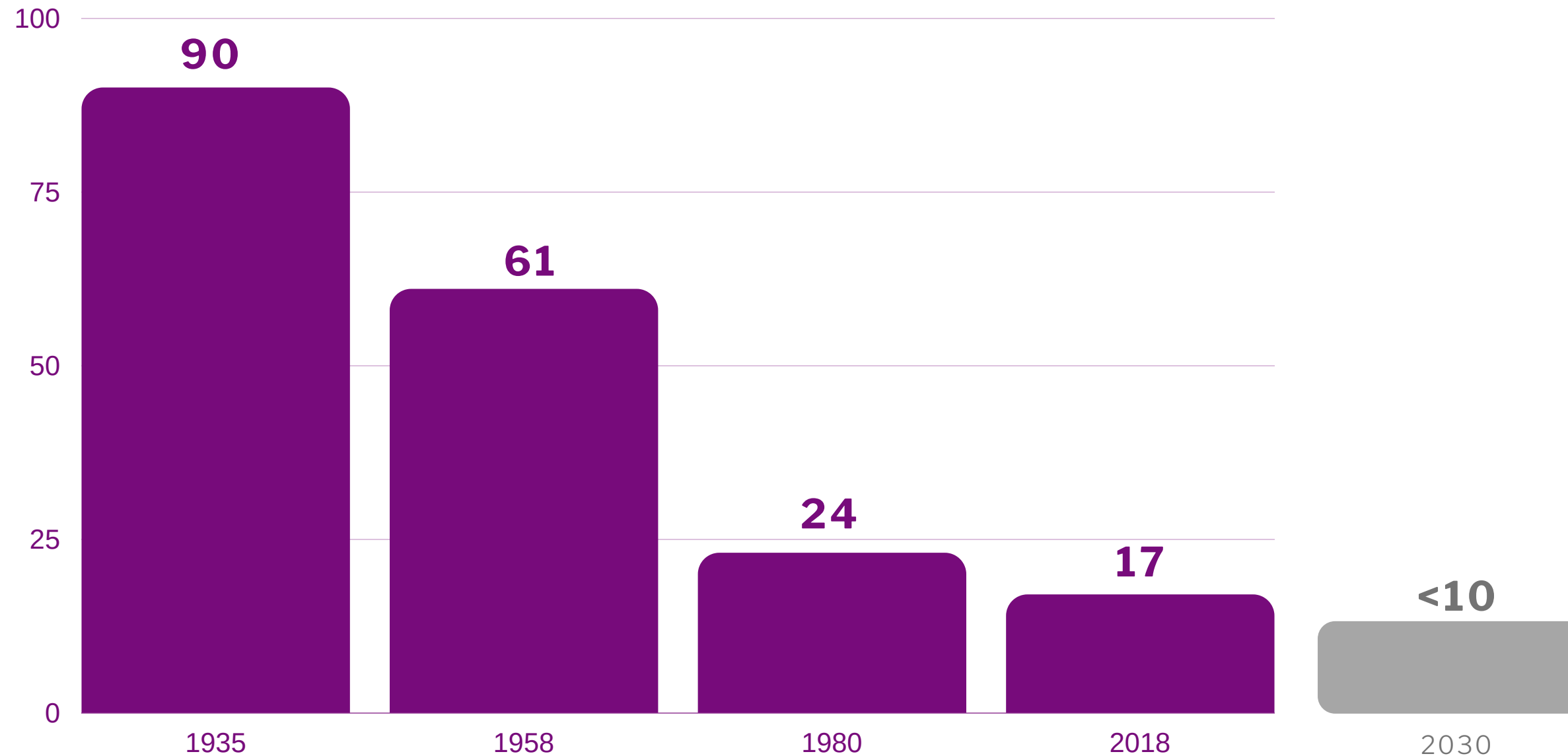
Technology is eating all industries



Source: Visual Capitalist

Incumbents are losing the battles and the war.

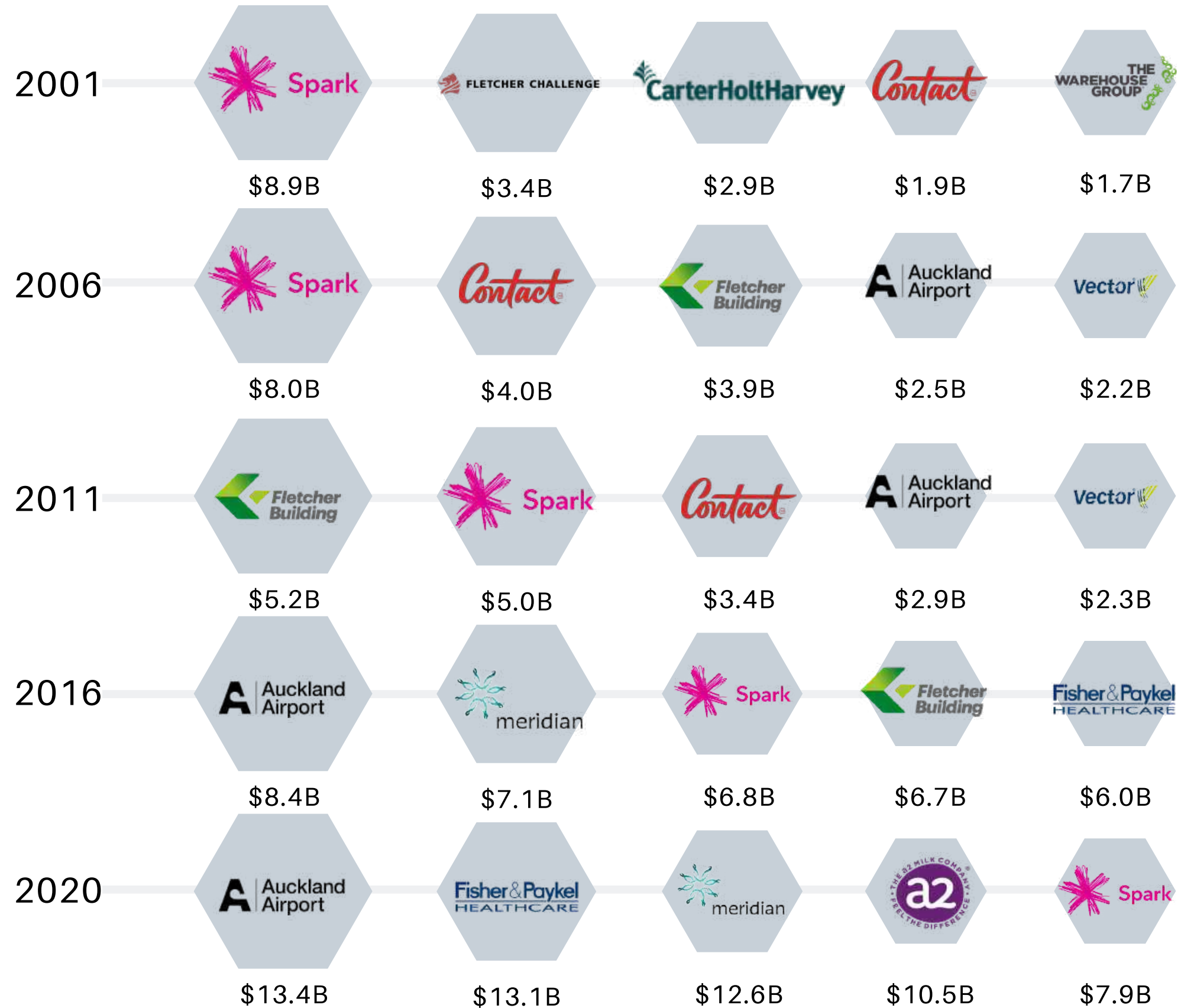
Average Lifespan of S&P500 Listed Companies In Years



Source: Innovation Solutions; Inc Magazine

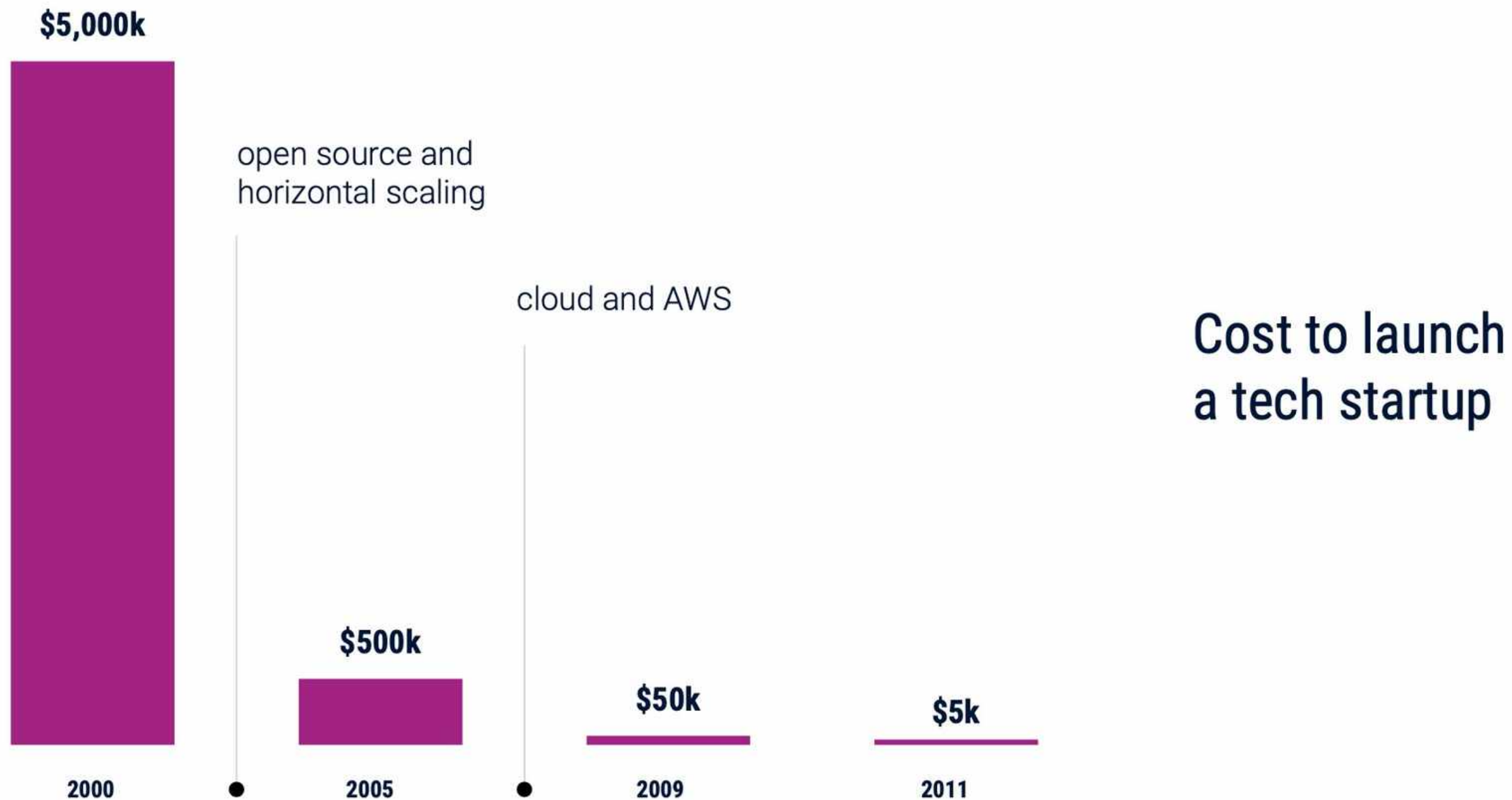
**50% OF THE S&P500
DISAPPEARED OVER
THE LAST 10 YEARS,
THIS WILL
ACCELERATE AGAIN
POST-COVID.**

...except in NZ?



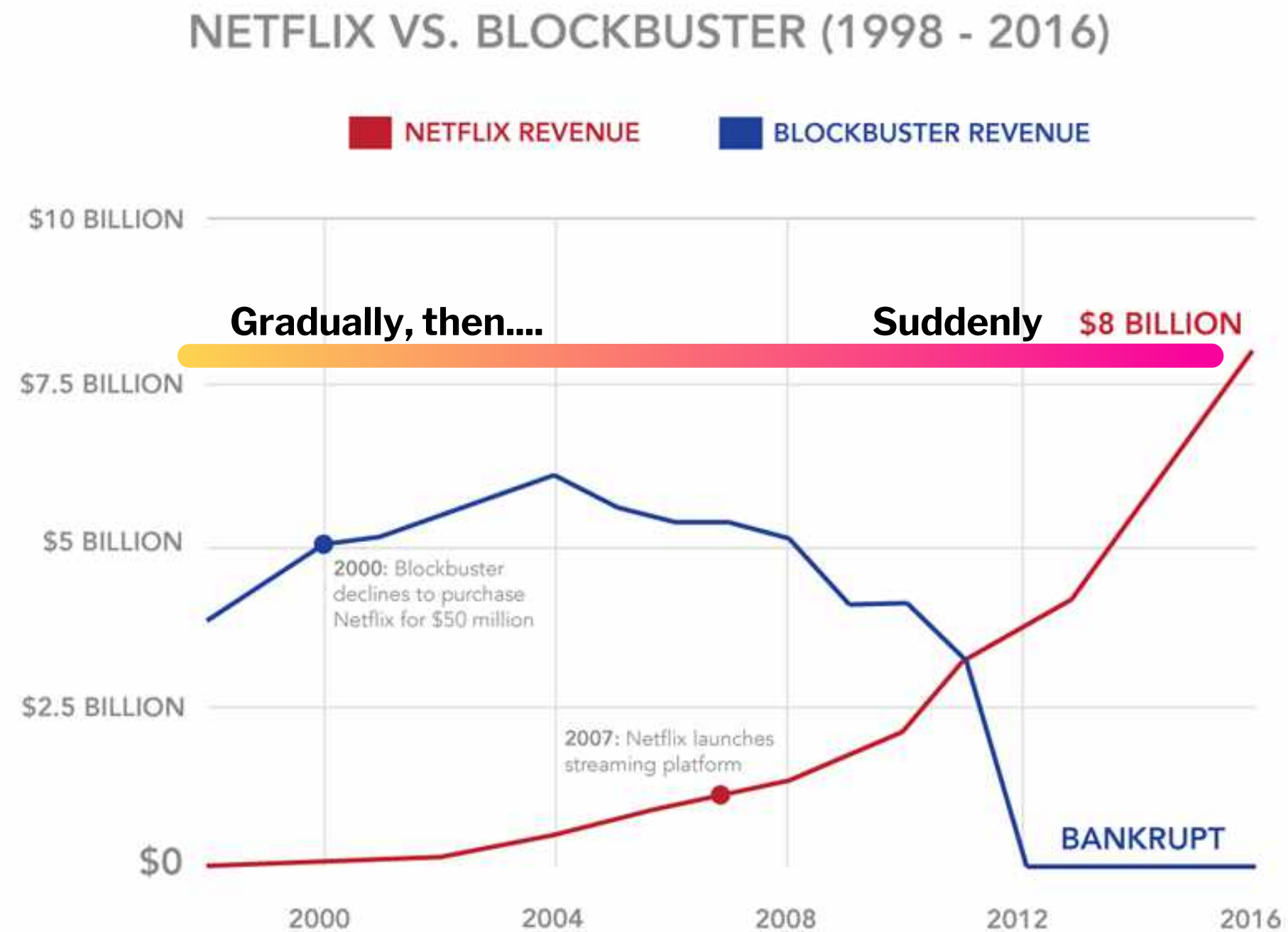
Source: The Exponential Agency

In addition to the FAANGs, incumbents have to worry about startups too.



Source: Upfront Ventures

This is not about technology, it is about how quickly old business models become obsolete.



Source: Growth Institute; Cloud Technology Partners

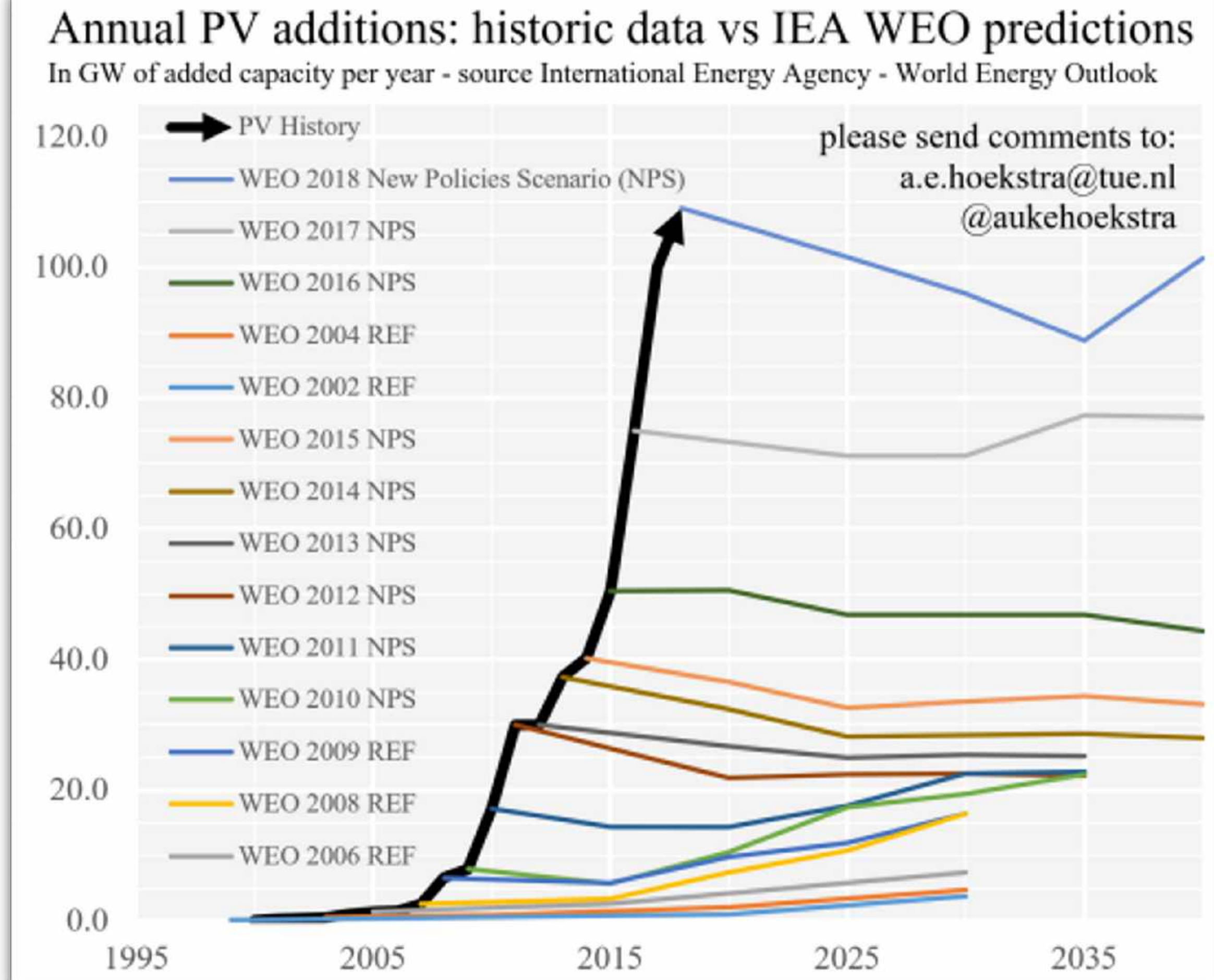
IF THERE IS ONE
EXPONENTIAL
GROWTH CURVE IN AN
INDUSTRY, THERE ARE
EXPONENTIAL DEATH
CURVES FOR
INCUMBENTS.

So how does "suddenly" happen? and is this happening in NZ energy?

- ① Incumbents under-estimate how near it is...
- ② and defer taking action...
- ③ while customers are losing...
- ④ with massive value is at stake...
- ⑤ attracting a flood of new capital...
- ⑥ searching for the game-changing application.

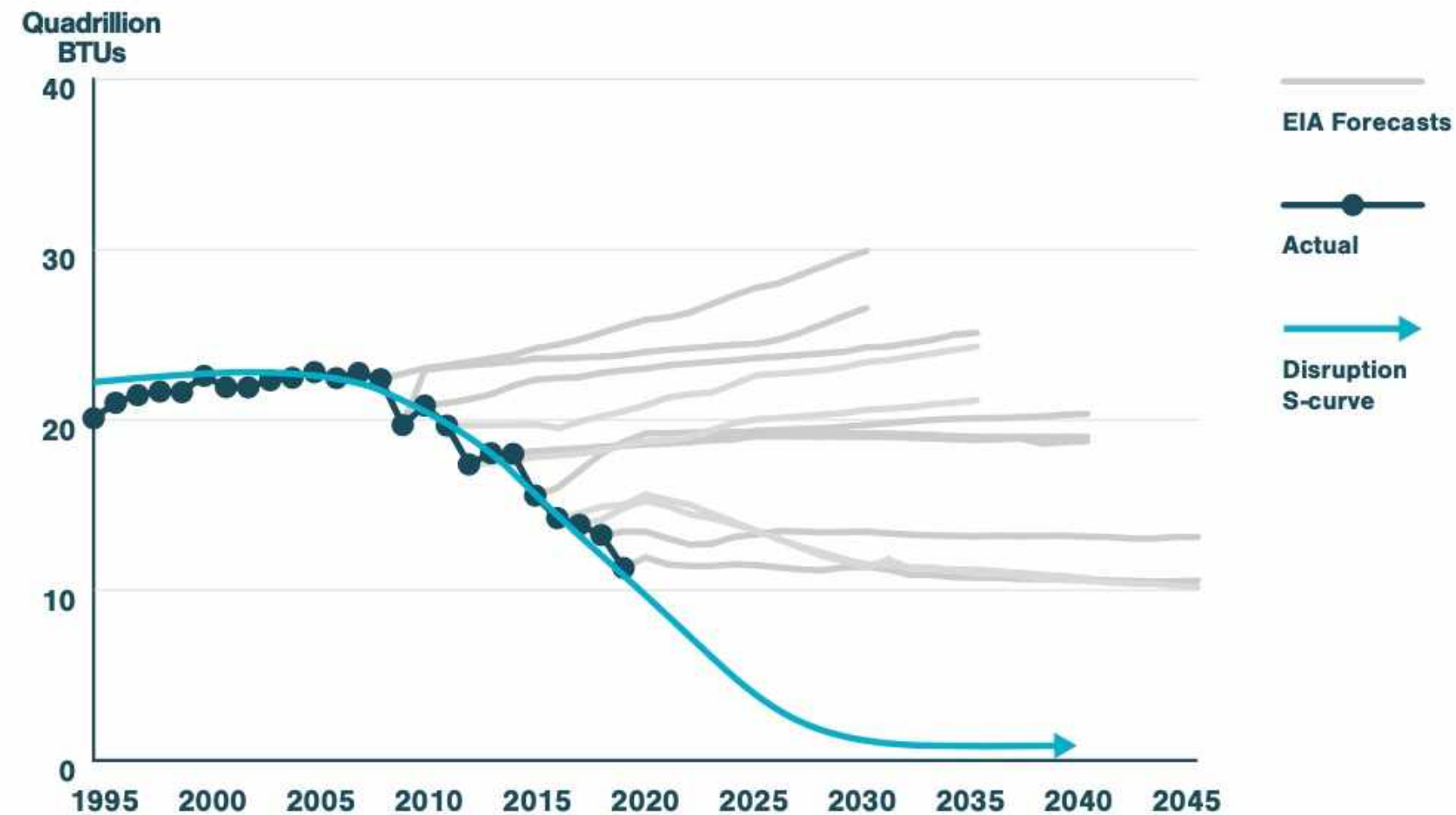
Experts are really, really bad at predicting exponential trends.

The black line is the real added capacity of solarPV. The horizontal lines are the expert's consensus predictions at that point in time.



As one curve goes up, others go down while entire industries convince themselves otherwise.

Figure 3: Disruption of Coal Power in the United States

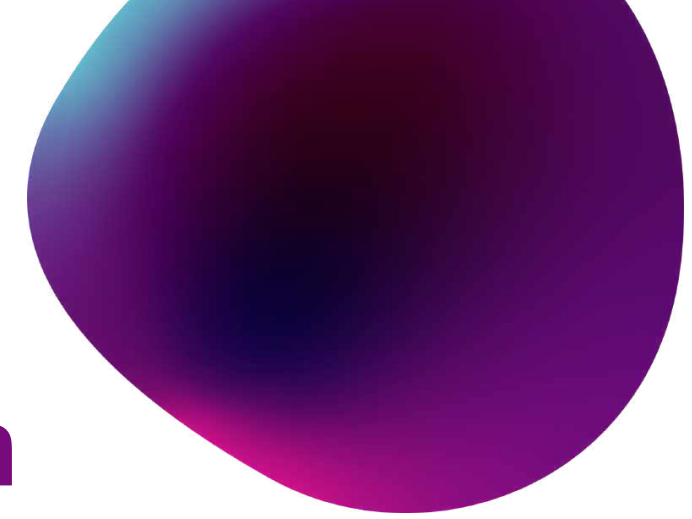


"Coal use peaked in the US in 2008 and is now charting a textbook disruption trajectory towards collapse. Yet forecasts from the U.S. EIA fail to understand this and continue to project linear recovery or stabilization of coal demand."

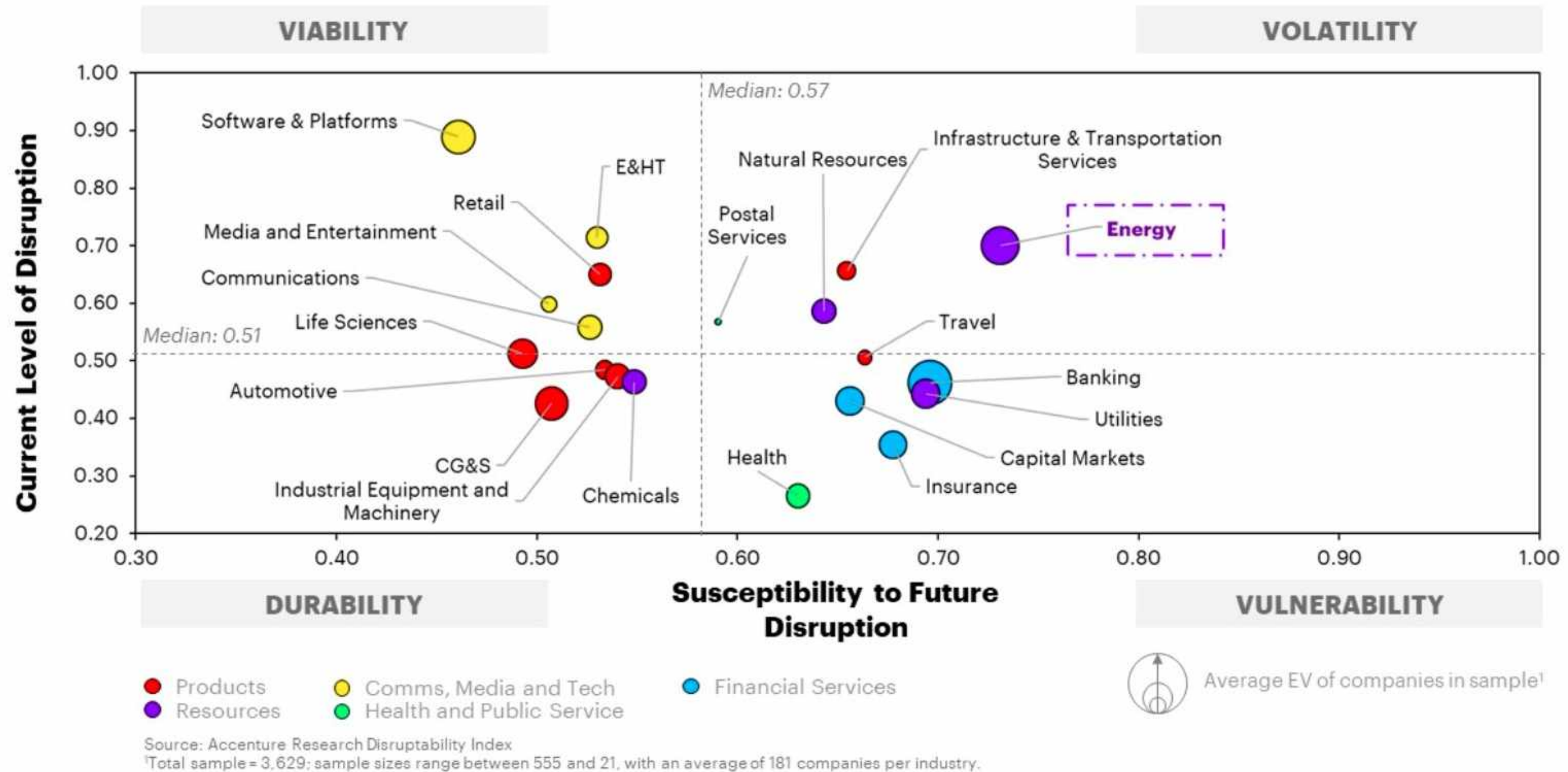
- Rethinkx

Source: U.S. EIA Annual Energy Outlook series, 1995-2020.¹⁸

Source: Rethinkx Rethinking Energy



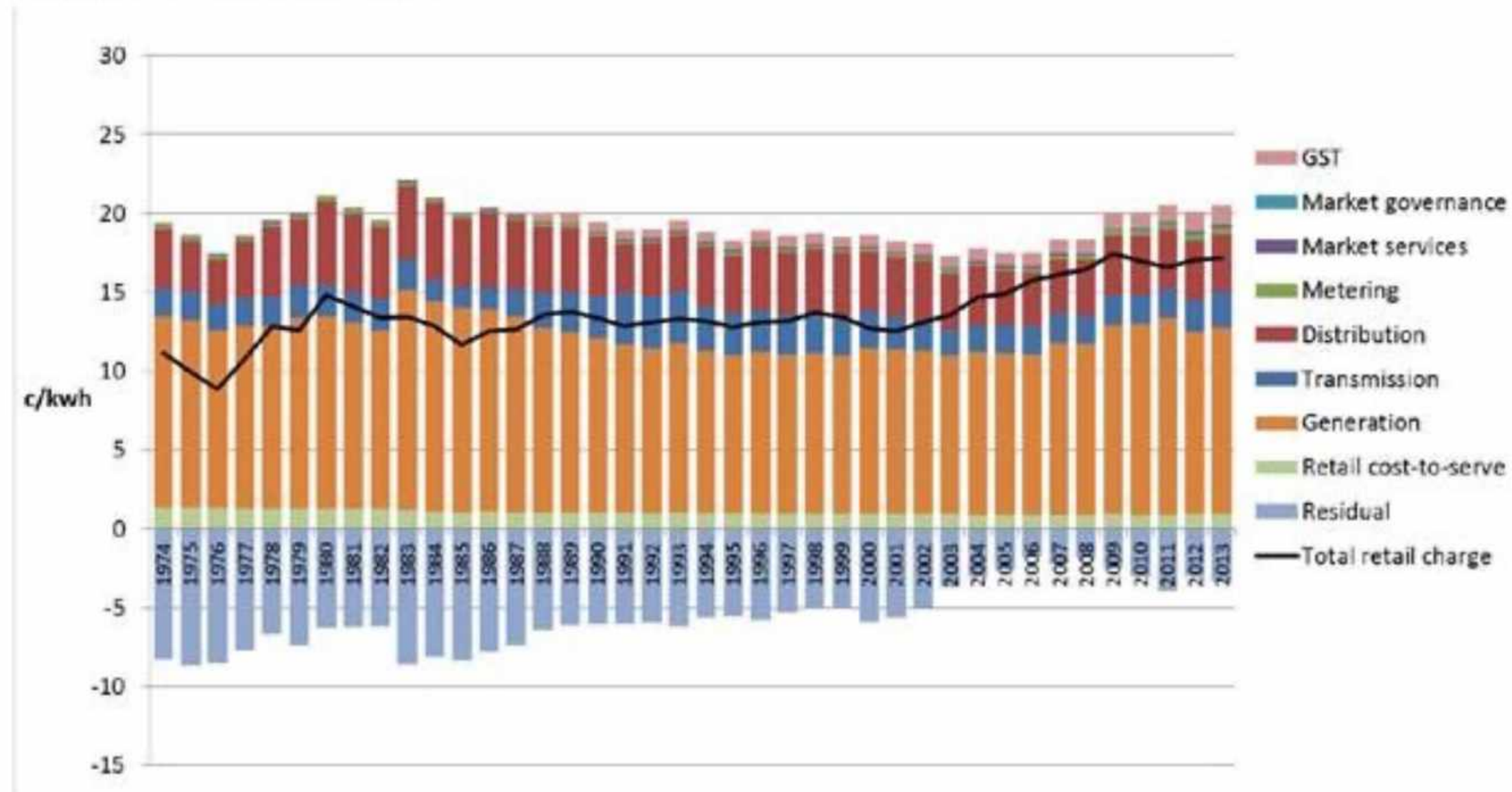
The energy sector as a whole is ripe for disruption



Source: Accenture

Meanwhile in NZ... the average retail energy price has barely changed in 40 years

Figure 1 Modelled cost components between 1974 and 2013
Averaged for all consumer types

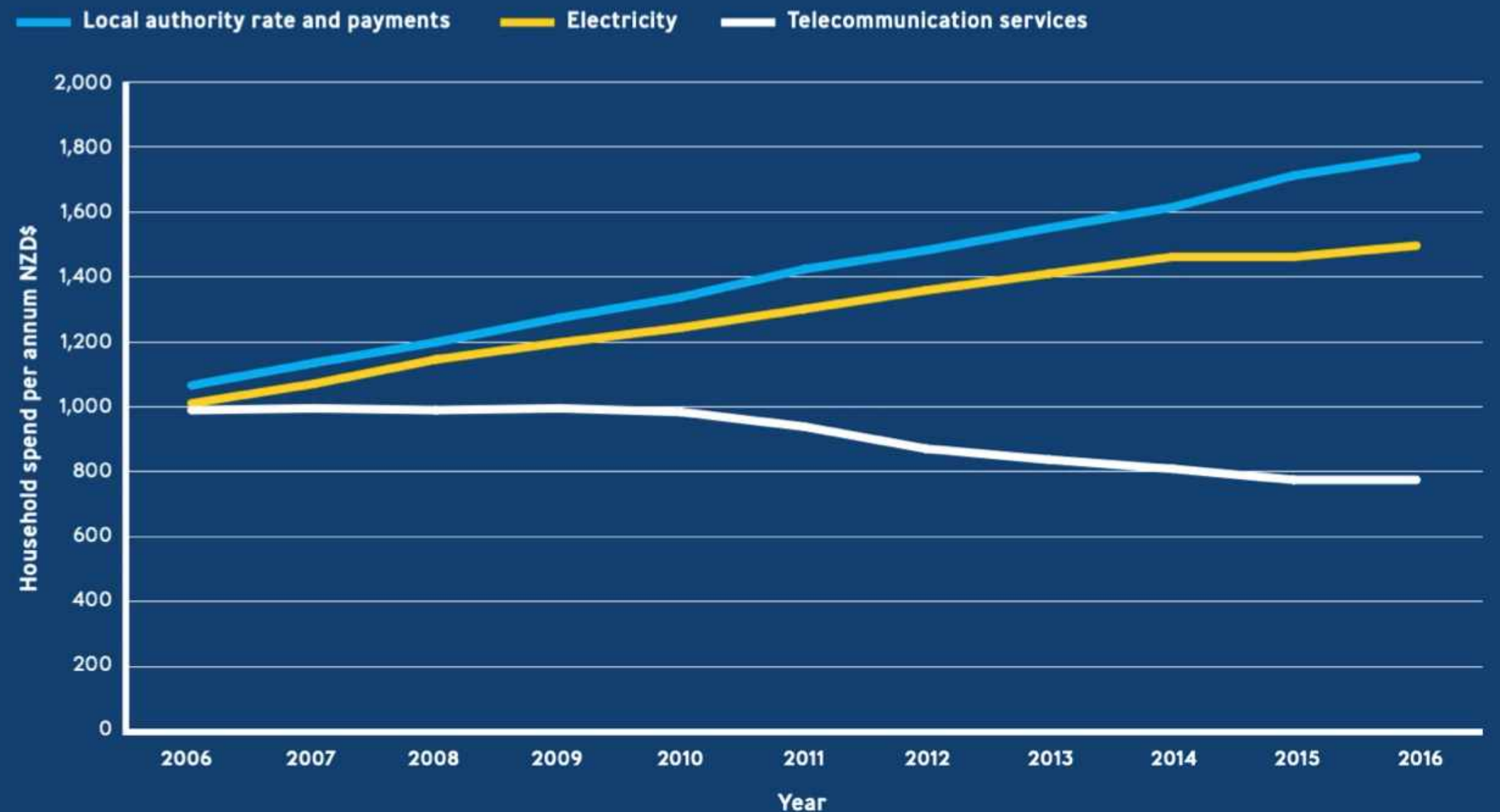


Source: Electricity Authority

**As a comparison,
the telco consumer
won following the
disruption,
innovation,
regulation and
competition**

Comparative consumer costs

Across the board in New Zealand, real costs of comparable utilities for consumers are increasing over time, while the cost of telecommunications services continues to decrease, even as consumer demand and the quality of services provided are increasing.



Only 1 in 3 customers is satisfied and significant segments are underserved resulting in energy poverty

21,131 NEW ZEALANDERS
completed the
survey

35% were very
satisfied

with their current electricity retailer

AND 12% indicated
they were
dissatisfied

Energy poverty is a reality for at least a fifth
of New Zealanders

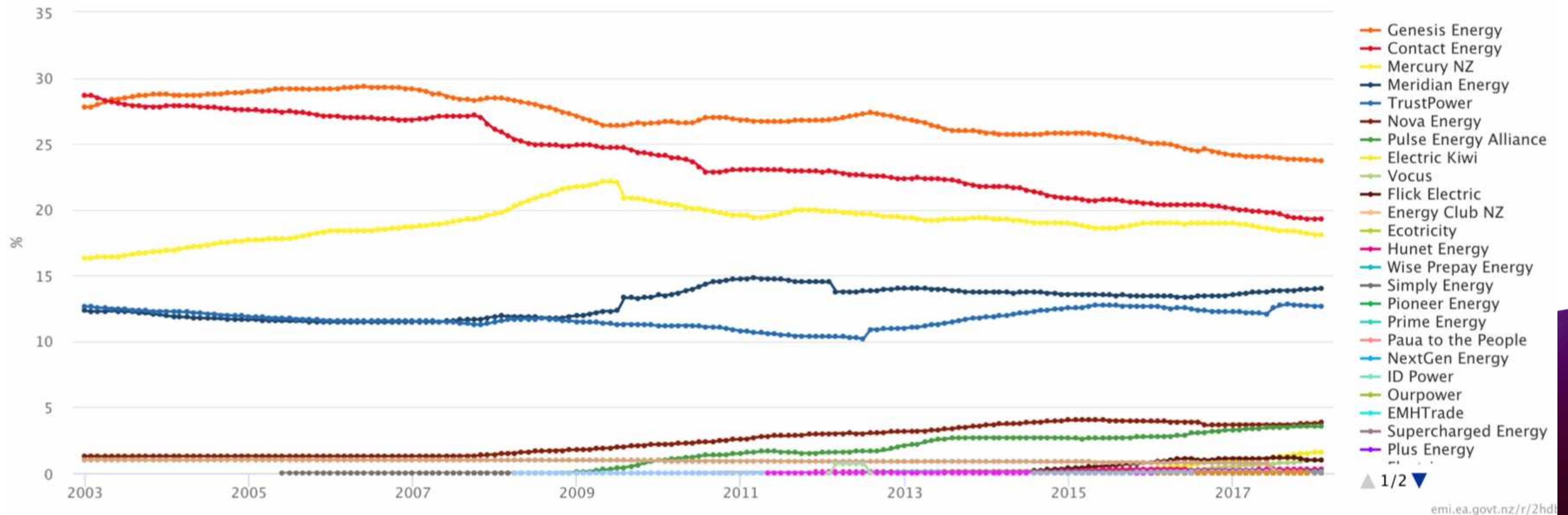
Eleanor Wenman · 20:17, Dec 16 2017



39% are very
active in trying to
reduce
household energy consumption

45% are enjoying
not being
locked
into a contract

But still no one has managed to break into the 85+% market share of the Gentailers for the last 20 years



Source: EA

Leading to typical responses by executives and directors ranging from incompetence to negligence

1- DENIAL

Unconsciously Incompetent

"It might be happening to others, but my company is different."

2- DELAY

Consciously Incompetent

"Yes, things are changing, but don't panic. Let's wait for things to clarify a bit; there's plenty of time to respond."

3- DEFENSIVENESS

Unconsciously Negligent

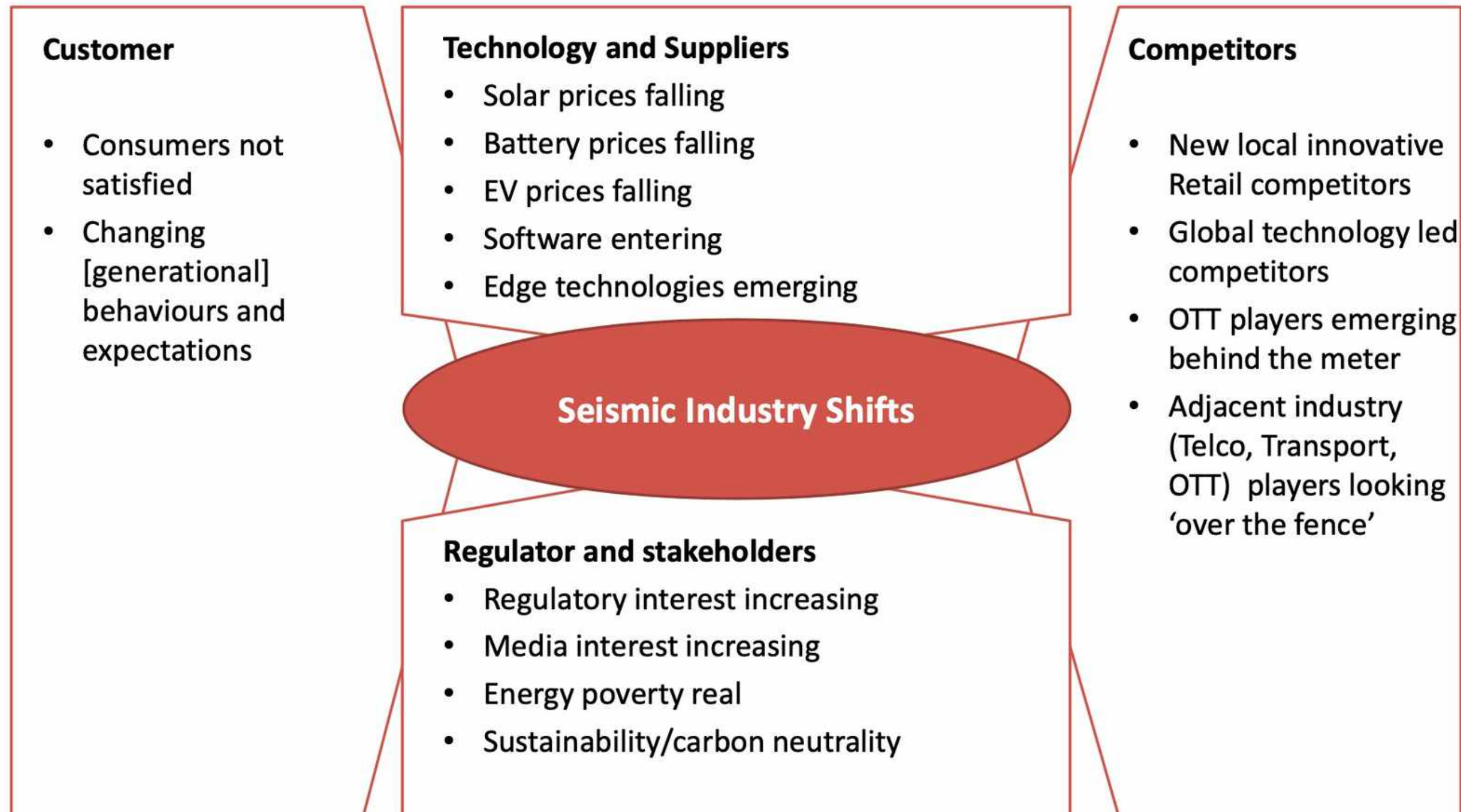
"Time to move aggressively! To survive, we need to do what we've always done, but just push harder, using technology to make it faster and cheaper."

4- DEFERRAL

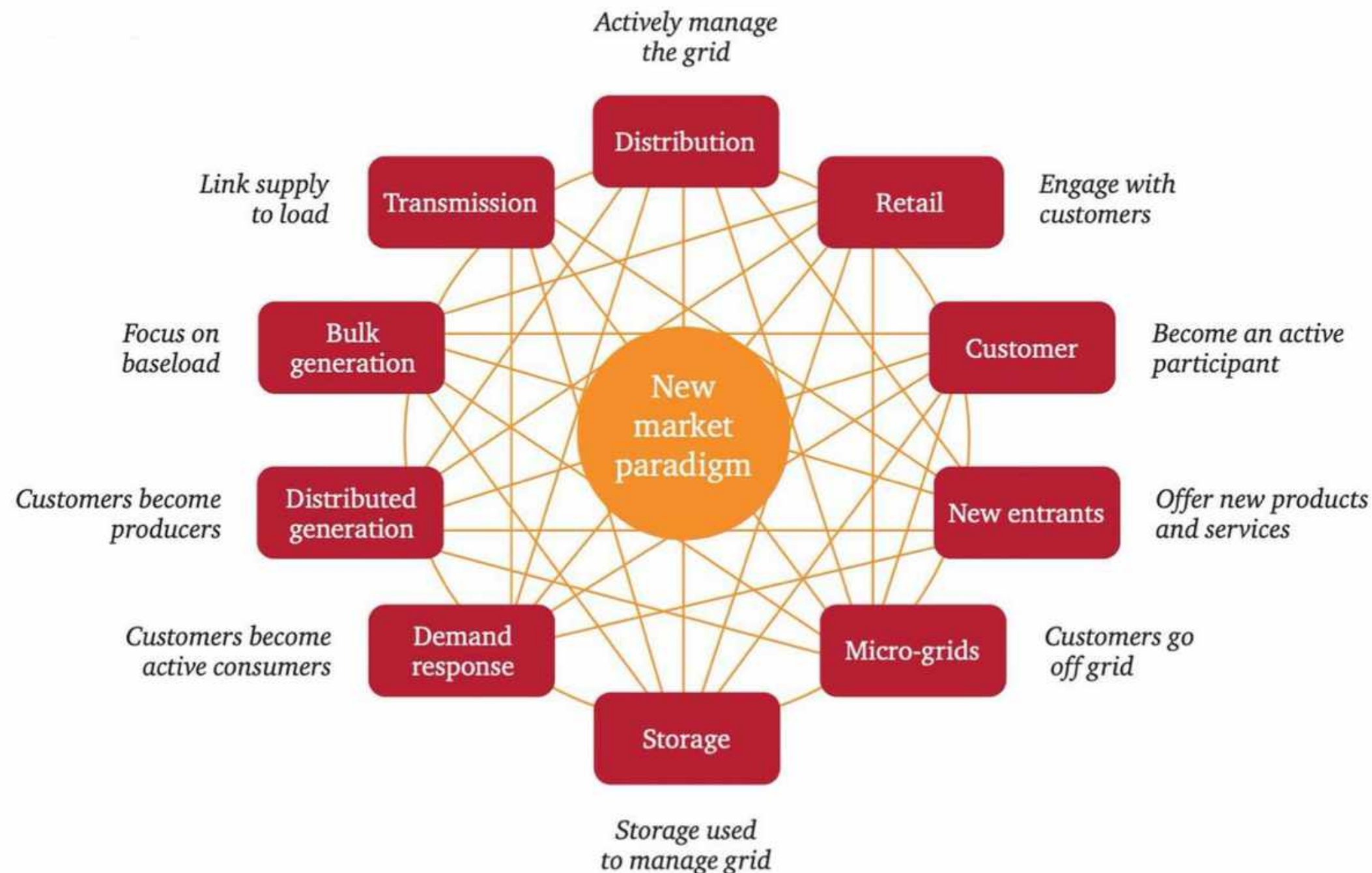
Consciously Negligent

"My tenure is almost up. So long as the cliff does not arrive in my tenure it will be someone else's problem to deal with"

All the preconditions are present for seismic shifts



Creating a new market paradigm



Multi Directional

The old value chain was a single direction from centralised generation sources to consumers. The new paradigm will be multi-directional as consumers actively participate in various parts of the value chain.

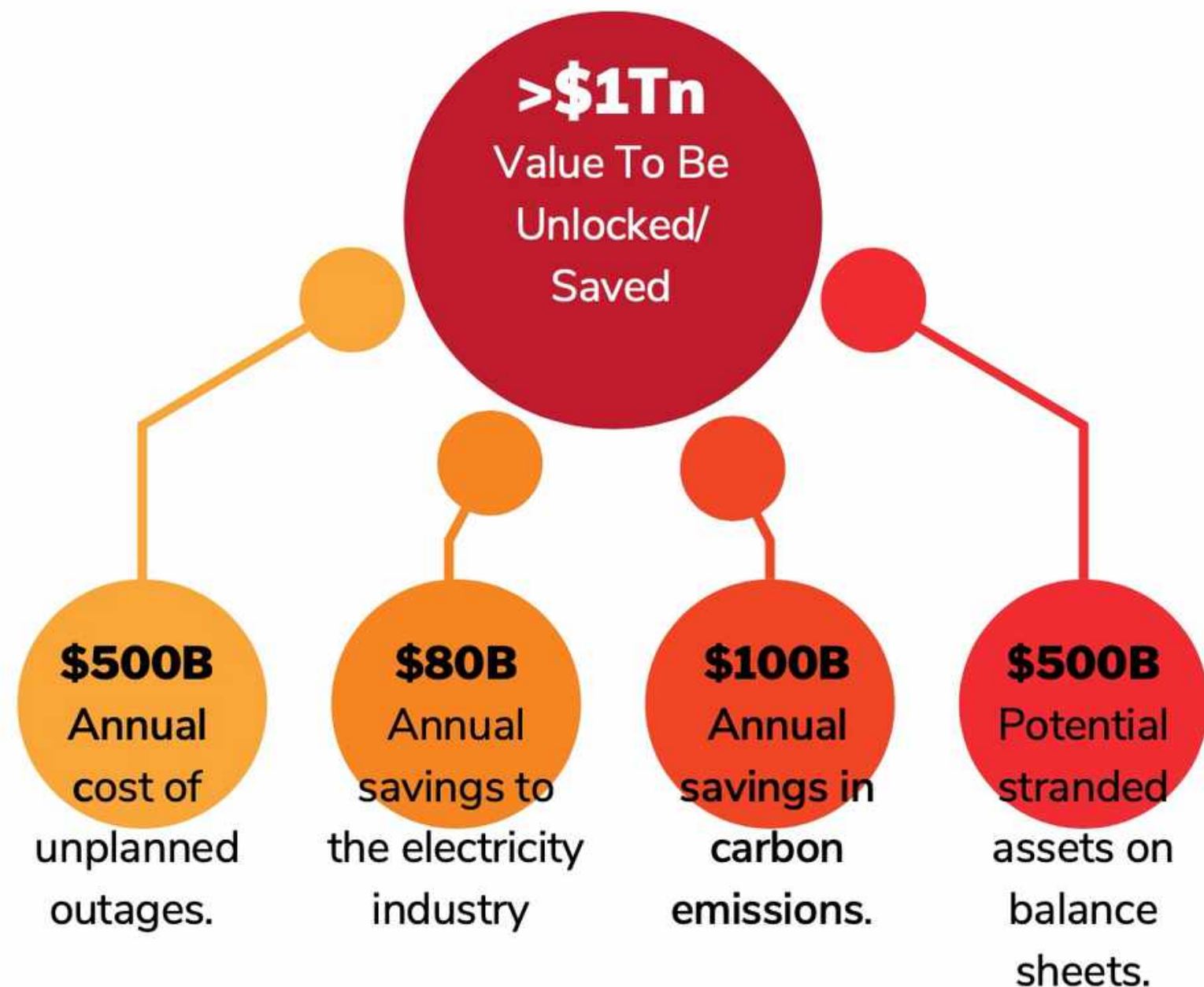
Customer Centric

Demand side influence means customer needs become more important, replacing the supply-driven mindset driven by the engineering delivery model.

Dynamic

Electrons can be stored and moved around in a dynamic multi-participant network responsive to many signals.

The transition could unlock more than \$1tn for the global industry



Social Benefits

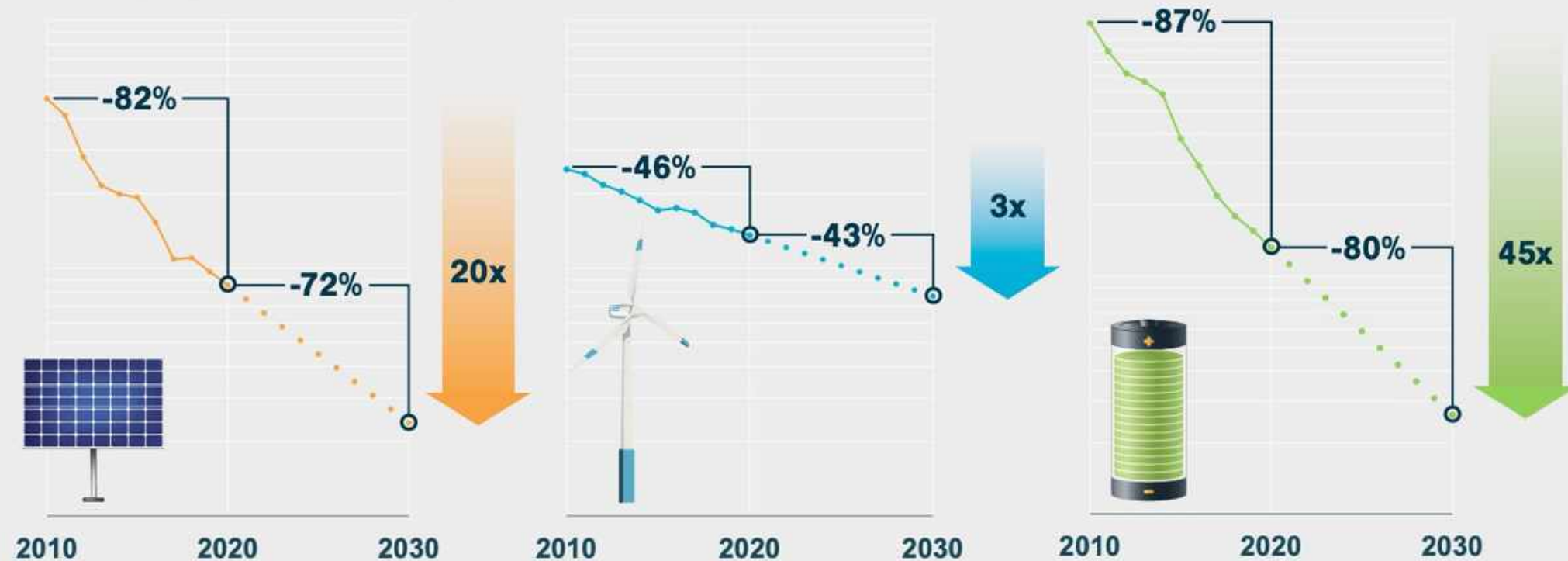
- Lower air/water pollution
- New jobs
- Lower power costs
- Public and worker safety
- Productive income
- Community resilience

Triggered by exponentially falling costs

100% Solar, Wind, and Batteries is the Cheapest System by 2030

Falling costs drive technology disruptions. Solar and wind are already the cheapest new generation options, and cost less than existing coal, gas, and nuclear power plants in many areas. The cost of SWB systems will fall another 70% by 2030, making disruption inevitable.

\$/kWh (logarithmic plot)



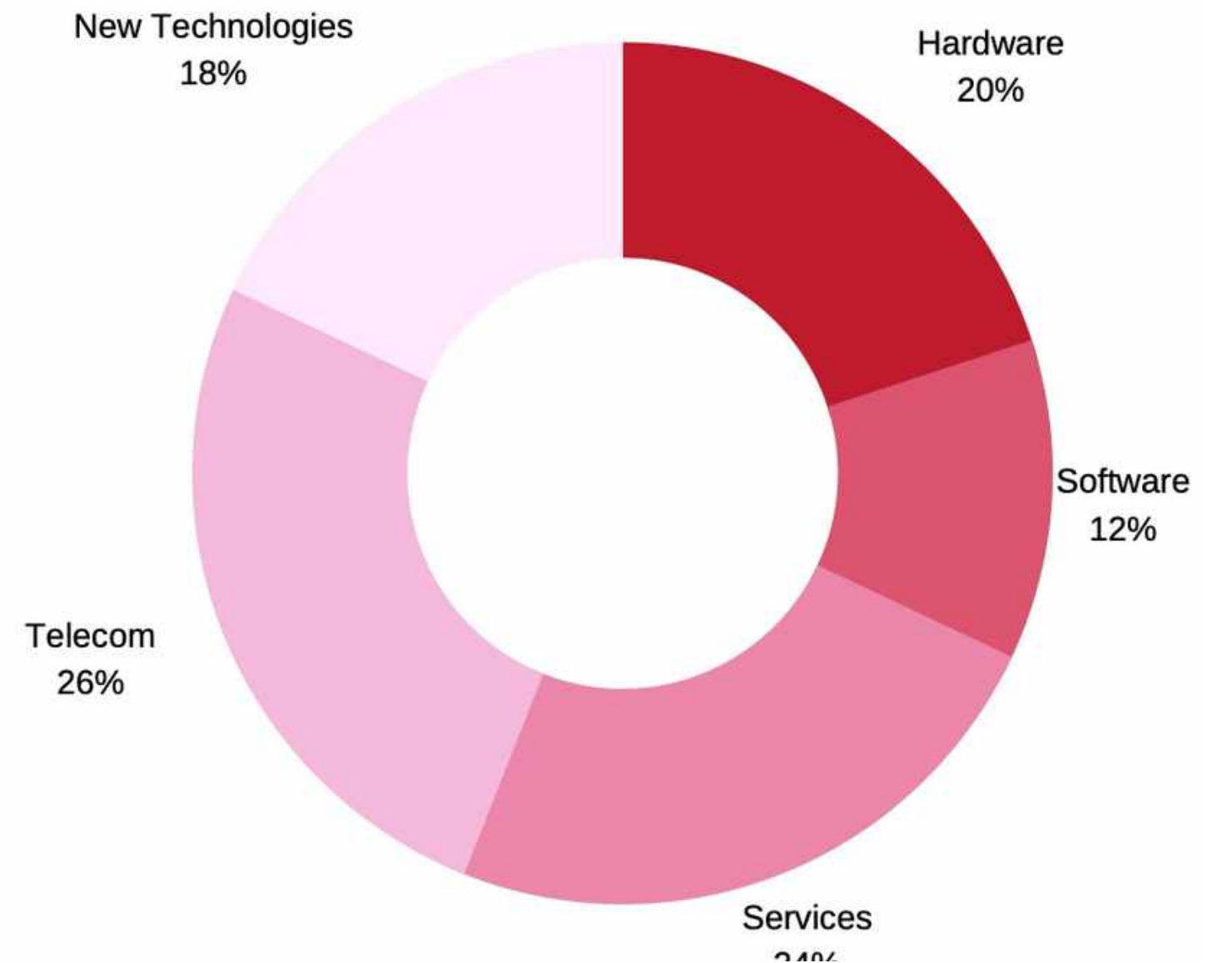
- » **We are beyond the rupture point, and the bulk of disruption will unfold rapidly over the next decade.**
- » **Electricity from a 100% SWB system in 2030 will cost less than 3 cents per kilowatt-hour.**
- » **New investments in coal, gas, or nuclear power is financially unviable.**
- » **Existing coal, gas, and nuclear assets will be stranded.**

The tech industry sees this as a \$3Tn+ opportunity with \$11bn pumped into startups by VCs last year

Market Size Potential By 2025 in USD Billions

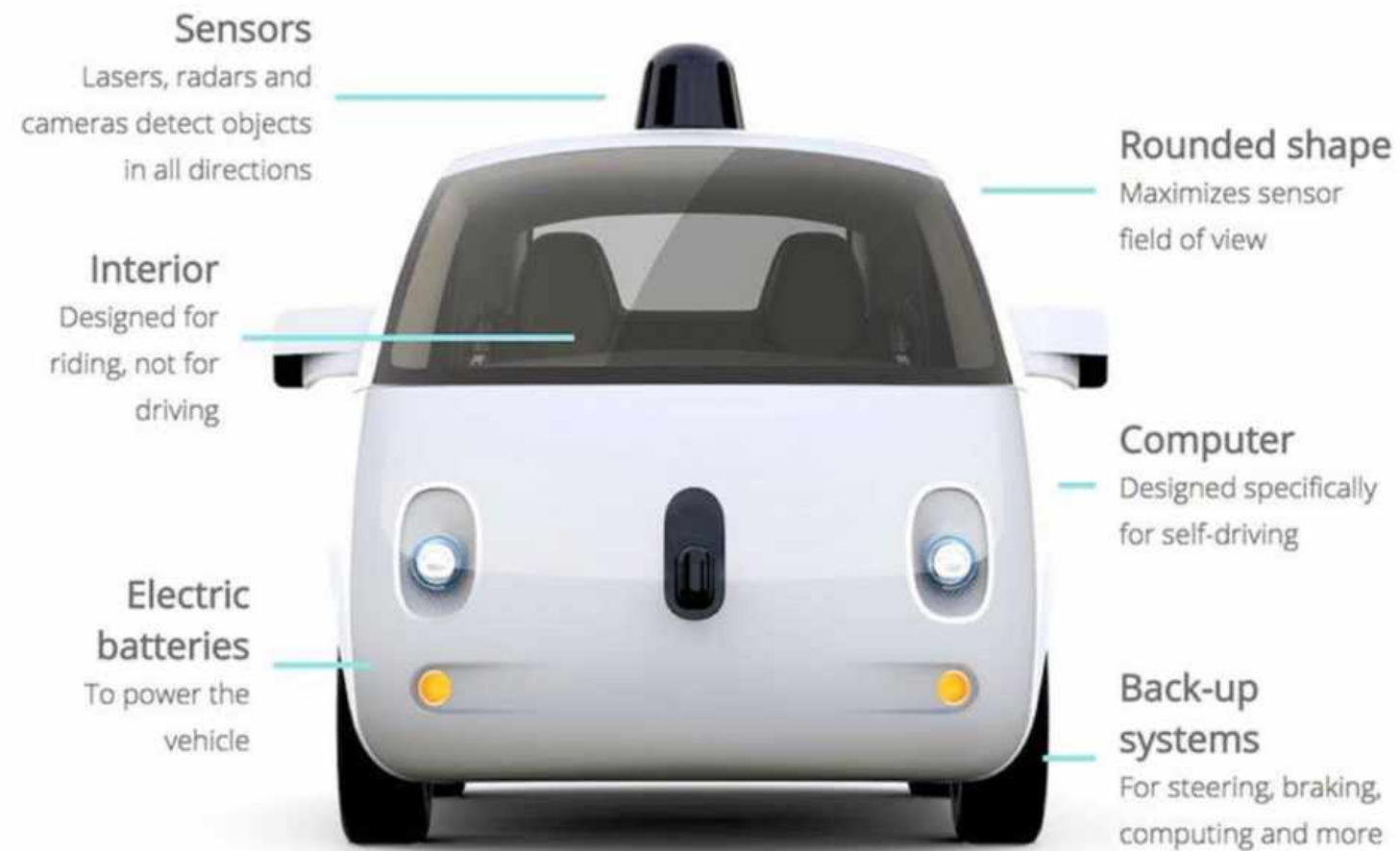


ICT Industry Revenue Split In 2020



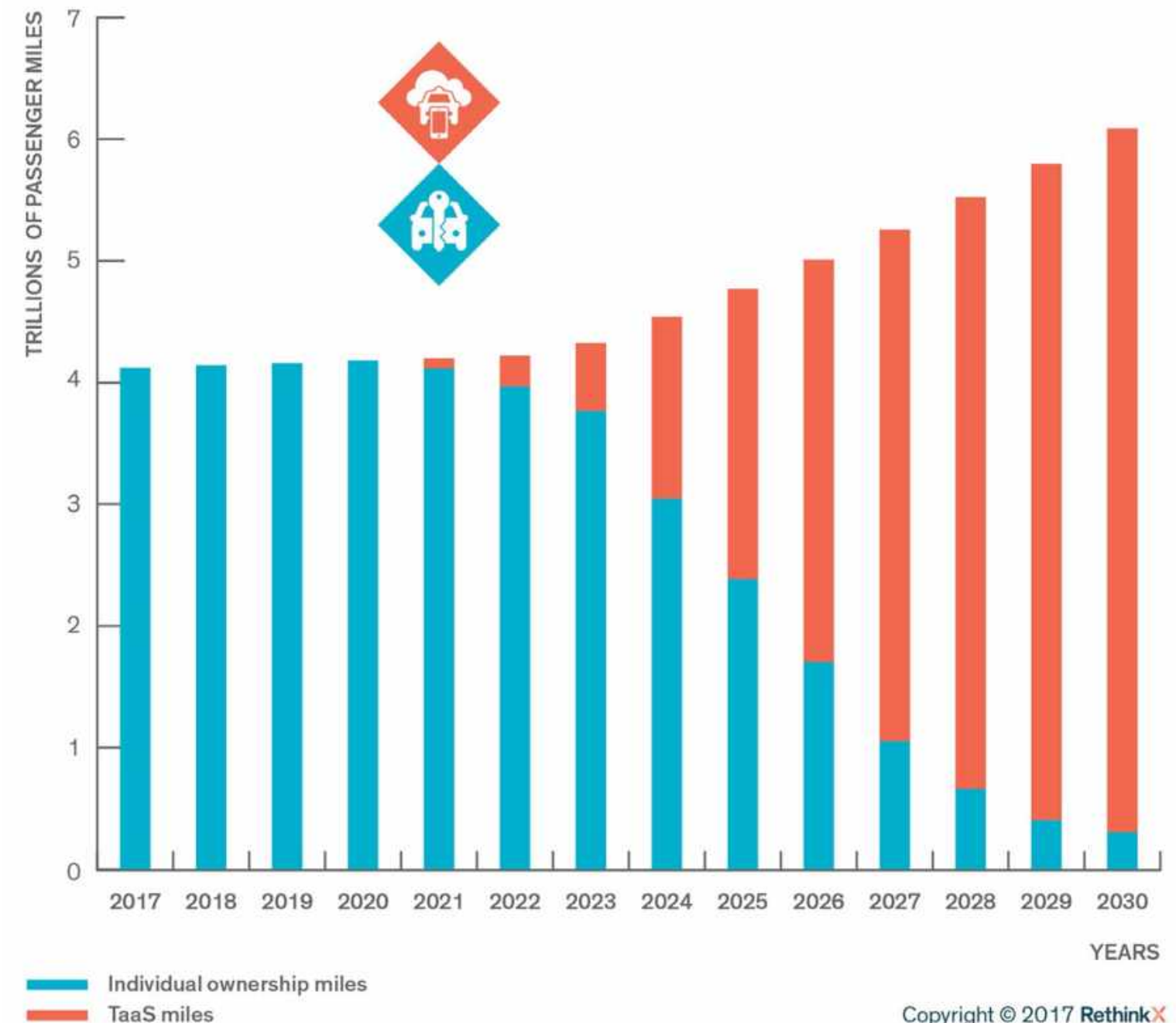
Source: Singularity U; nc+ Ventures; Forrester.

One possible 'killer app': Transport as a service. The collision of 3 industries: Energy; Transport; Tech



A smart connected [energy] movement platform

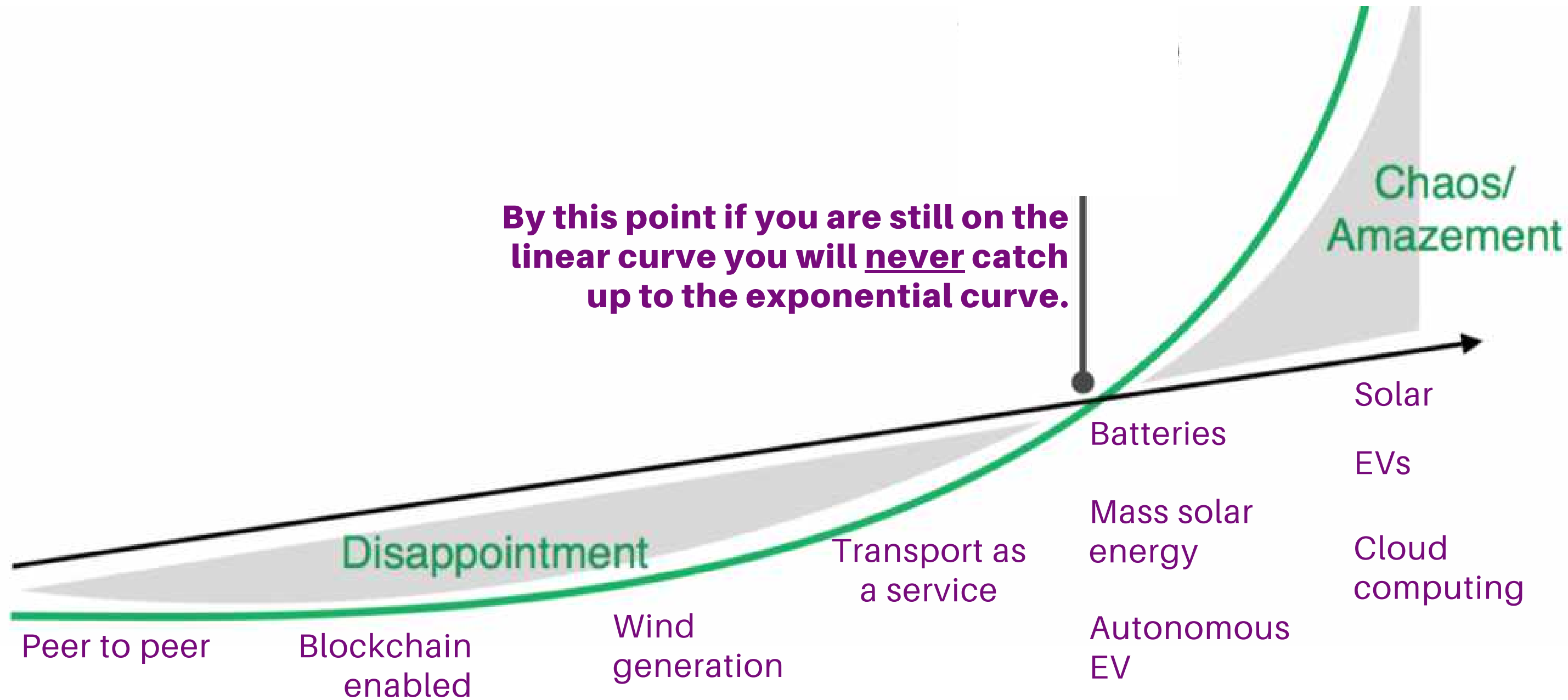
» Speed of TaaS adoption



Source: Rethinkx - Rethinking Transport 2017

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Most technology is initially disappointing but beware of ignoring it, until its too late.



**THANKS.
WANT TO KNOW WHAT CAN BE DONE
ABOUT ALL THIS? CONTACT US.**



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