the exponential agency

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A 2030 VISION FOR NEW ZEALAND

Aotearoa's Energy Prosperity

A regular Kiwi household spends **$8,739** a year on energy today.

today.

By 2030 that number can be a **$3,300 - $5,600 less**.

TODAY	2030 · EV-OWNED	2030 · TAAS
$8,739	**$5,417**	**$3,125**
Household energy spend / yr	−38% total spend	−64% total spend

The Exponential Agency

Strategy for an exponential world.

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Aotearoa's Energy Prosperity. A 2030 Vision.

The shift from $8,739 to $5,417 — or $3,125 — is one energy transition, fought across six distinct battles. Each has its own physics, its own incumbents, its own near-term policy levers.

THE THESIS

Solar, batteries, EVs and heat pumps are commodities being deployed globally at exponential pace. What's holding New Zealand back is a market designed for market designed for centralised generation, regulatory frameworks designed for passive consumers, and a financing system designed for a different kind of asset. different kind of asset.

Energy prosperity by 2030 is a choice.

— EXECUTIVE SUMMARY

The household energy bill, a third to two-thirds smaller.

A regular New Zealand household spends $8,739 a year on energy. By 2030 that could be $5,417 with an EV or $3,125 with Transport-as-a-service fleets, a 38-64% cut, on technology that already exists. The main thing missing is the structural policy reform to make that future equitable and fast.

The destination is a household energy bill that's a third to two-thirds smaller. Electricity costs that fall rather than rise. Transport that costs $10 per 100 km instead of $46. An energy system that's more resilient to global shocks than the one we have today.

The path runs across six battles: who supplies the electrons, who powers motion, who heats things, who supplies the molecules that remain, who captures the deflation in delivered prices, and who owns the coordination layer above the meter. Each battle has its own physics, its own incumbents, and its own near-term policy levers.

What's holding NZ back is structural. Solar, batteries, EVs and heat pumps are technologies being deployed globally at exponential pace. The regulatory framework is designed for centralised generation and passive consumers, and the financing system is designed for user-owned assets. Until those structures are reformed, the technology cannot deliver the prosperity it promises at a pace that is possible.

Energy prosperity by 2030 is a choice. The technology has done its job. Policy reform is what remains. Time is running out; New Zealander’s have run out of patience with policy makers that protect incumbents and scarcity-based business models at the expense of energy users who see their energy bills skyrocket.

Where the savings come from

COST LINE	TODAY	2030 · EV-OWNED	2030 · TAAS
Electricity (incl. electrified heat)	$2,625	$1,925	$1,925
Gas	$800	$0	$0
Petrol / charging	$2,734	in elec	in TaaS
Vehicle ownership ex-fuel	$2,580	$2,580	$0
Road User Charges	$0	$912	$0
TaaS (12,000 km @ $10/100km)	$0	$0	$1,200
Total	**$8,739**	**$5,417** -38%	**$3,125** -64%

TEA analysis. NZ household of four, 12,000 km/yr, gas-connected.

01

SECTION 01 · THE BURDEN TODAY

A regular Kiwi household spends $8,739 a year on energy.

Three components — electricity, transport, heat. Each is moving in a direction that direction that makes it more expensive.

01 THE BURDEN TODAY

Where the $8,739 goes.

The burden has three components. Electricity, transport, and heat. Each is moving in a direction that makes it heavier. makes it heavier.

FIGURE 1.1 · HOUSEHOLD ENERGY SPEND DECOMPOSED

A regular Kiwi household: $8,739 a year

Allocation across electricity, gas, petrol and vehicle ownership (ex-fuel).

ELECTRICITY	GAS	PETROL	VEHICLE
$2,625	**$800**	**$2,734**	**$2,580**
7,500 kWh @ 35 c/kWh	~50 GJ hot water water / heat / cooking	12,000 km @ 8.6 L/100km @ $2.65/L	Ownership ex-fuel (MoT)

TEA analysis from MBIE QSDEP, MoT vehicle ownership survey, EECA residential energy data.

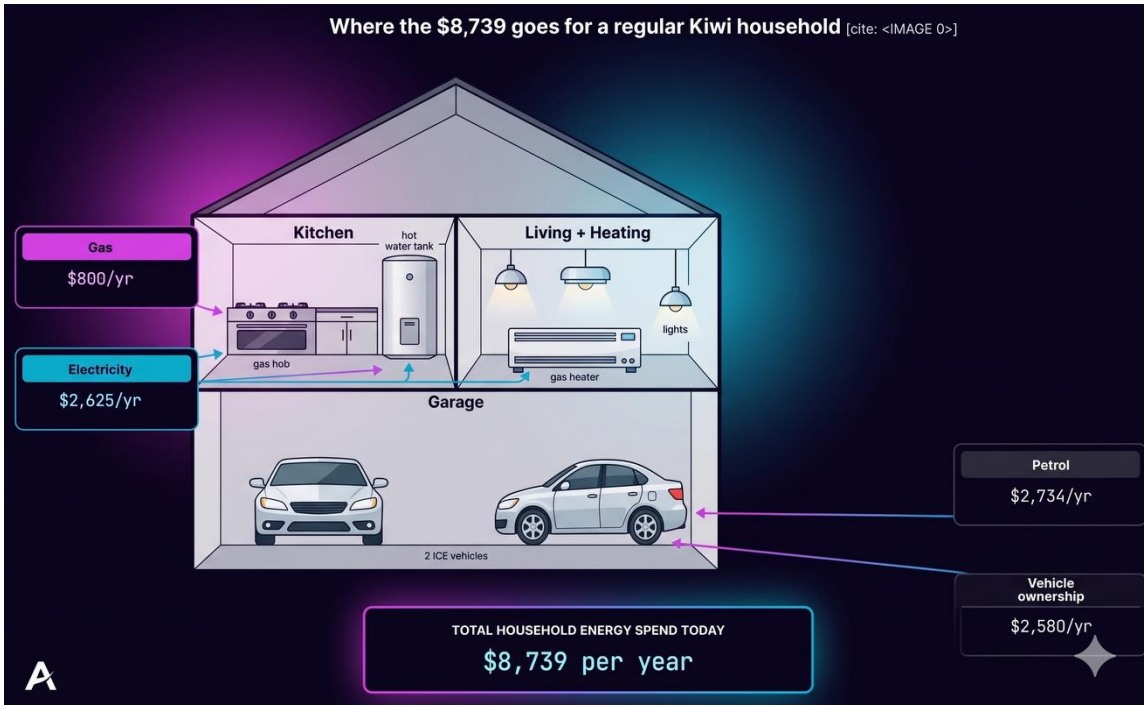
Figure 1.1 — where a regular Kiwi household's $8,739 a year goes today.

WHAT THIS LOOKS LIKE IN A HOME

Gas cooktop, gas hot water, two ICE vehicles in the garage and electricity for everything else. The gas and petrol lines together account for $3,534 — 40% of the bill — and both are on upward price trajectories.

THE COMPOUNDING PROBLEM

Electricity prices have risen ~35% nominal in a decade while upstream upstream unit costs fell 70–90%. Gas is getting more expensive and supply and supply is contracting. Petrol remains directly exposed to global oil global oil markets.



1.1 ELECTRICITY

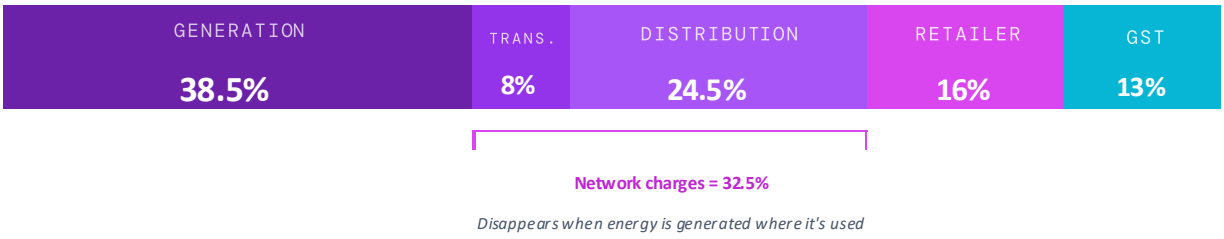
A centralised system passing on its costs.

The average household pays approximately **35 cents** per kilowatt-hour delivered. 32.5% of that is network charge — the structural fee for moving energy from where it's generated to where it's used.

FIGURE 1.2 · RESIDENTIAL ELECTRICITY BILL COMPOSITION

Where every dollar of a power bill goes

NZ residential, Electricity Authority component breakdown.



Electricity Authority bill component breakdown.

Figure 1.2 — 32.5% of every bill is the network charge that behind-the-meter generation bypasses.

WHY THIS MATTERS FOR WHAT COMES NEXT

Any technology that generates and stores energy at the point of consumption — rooftop solar, home batteries — competes with the **full delivered cost** , including the 32.5% network charge that disappears when energy is used where it's made. The economic value of distributed generation is systematically undervalued when compared only to wholesale generation costs.

There's a deeper market failure underneath. The cost of generating electricity has fallen dramatically dramatically over the past decade. **Upstream solar costs are down 90%, batteries down 90%, wind down 90%, wind down 70%** (BNEF, Lazard, 2014 to 2024). NZ's delivered residential price went the price went the other way, rising around 35% in nominal terms over the same period, well above well above wages and above CPI. The technology deflation that should have flowed to consumers consumers has been captured somewhere in the delivery chain.

Network costs are not done rising. The Commerce Commission has approved EDB revenue increases of approximately 37% in real terms across the next regulatory period. Transpower forecasts further multi-billion investments in grid-exit points and substations. SEANZ puts cumulative network investment over the next decade at $12 to 14 billion under current planning.

1.2 TRANSPORT

Direct exposure to global commodity markets.

A typical Kiwi family driving 12,000 km a year in a petrol car spends $2,734 on fuel. That's direct exposure to global oil markets. The like-for-like comparison is already in favour of EVs.

PETROL TODAY

$46/100km

8.6 L/100 km @ $2.65/L. Volatile, imported, rising. rising.

EV TODAY · -37%

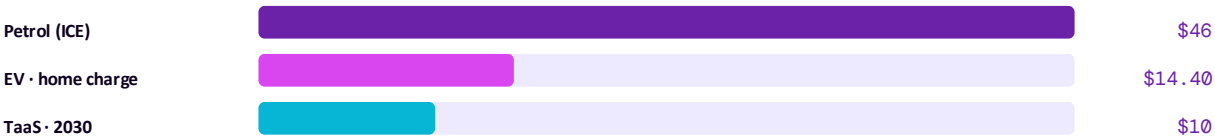
$14.40/100km

15.7 kWh/100km @ 35 c/kWh + RUCs. Gap widens as grid electricity falls.

FIGURE 1.3 · COST PER 100 KM, LIKE-FOR-LIKE VEHICLE

EVs are already 37% the per kilometre cost compared to petrol and diesel

NZ retail prices, 2026. TaaS figure is 2030 forecast.



TEA analysis. TaaS: RethinkX central 2030 forecast adapted to NZD.

TaaS compounds this further. If the destination is autonomous shared mobility at $10 per 100 km, the full cost of transport collapses to a quarter of today's TCO because of utilisation of otherwise idle vehicles.

1.3 HEAT

Gas getting more expensive while supply contracts.

About 30% of New Zealand homes use piped gas for hot for hot water, space heating, or cooking, paying around around $800 a year on average. **Domestic gas production has fallen sharply** — industrial and SME users SME users report up to 100% price increases on contract contract renewal.

EECA research shows **70 to 80% of gas-dependent businesses** see electric alternatives as theoretically possible but financially unattractive. Yet heat pumps at COP 3 to 5 versus gas at 75 to 95% have been ready for years.

GAS CONTRACTION

–45% supply, 6 yrs

2× on renewal

Domestic production falling, contracts doubling for SME and industrial users.

02

SECTION 02 · THE 2030 DESTINATION

Same household. Same life. A third to two-thirds less energy spend.

Three changes get us there. Electricity becomes substantially self-generated. generated. Transport runs on electrons or dissolves into a service. Heat goes Heat goes electric.

02 ENERGY PROSPERITY BY 2030

What regular Kiwis could be paying in 2030.

The same household that spends $8,739 a year today could spend $5,417 by 2030 if they own an EV, or $3,125 if they $3,125 if they shift to Transport-as-a-Service. Numbers anchored to NZ-realistic technology costs and a conservative conservative deflation trajectory.

BASELINE
$8,739
Today's annual household energy spend. spend.

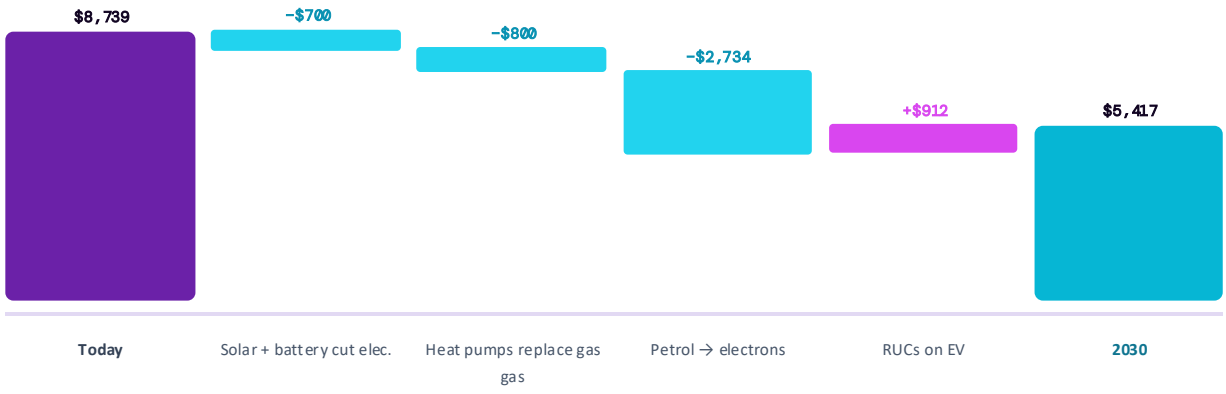
EV-OWNED 2030
$5,417
–$3,322 / yr. Household still owns the vehicle.
–38%

TAAS 2030
$3,125
–$5,614 / yr. Autonomous shared mobility replaces ownership.
–64%

FIGURE 2.1 · SAVINGS WATERFALL · EV-OWNED SCENARIO

Today → 2030 · what changes in the EV-owned household

Each bar is a line on the energy bill that moves between today and 2030.



TEA analysis. Vehicle ownership ex-fuel unchanged.

Figure 2.1 — electricity self-generation, gas elimination and petrol→electrons deliver the bulk of the saving. RUCs add back $912/yr but the net remains –38%. remains –38%.

The destination is reached through three changes. **Electricity at home becomes substantially self-generated.** A 7 kW rooftop system (approx. $7,000 in 2030) produces ~10,200 kWh/yr. A 13 kWh home battery (~$5,200) stores midday generation through to evening peak. Combined with V2H from the household EV, self-consumption reaches 80%.

02 THE THREE CHANGES

How the 2030 household bill actually gets built.

01 · ELECTRONS

Electricity at home becomes substantially self-generated. A 7 kW **generated.** A 7 kW rooftop solar system (approximately $7,000 in $7,000 in 2030) produces around 10,200 kWh per year — roughly roughly equivalent to an average household's full annual demand demand once gas heating's been replaced by heat pumps. pumps.

A 13 kWh home battery (~$5,200) stores generation through to through to evening peak. With V2H from the household EV, self- EV, self-consumption reaches 80%, leaving only 20% to be drawn be drawn from the grid.

02 · MOTION

Transport runs on electrons. Vehicle ownership cost is roughly roughly unchanged. Fuel cost collapses. Charging is largely from largely from rooftop solar via V2H. The only direct cost is RUCs at RUCs at $912 per year.

The vehicle becomes mobile household storage, supplying peak- supplying peak-hour power back to the home and reducing the reducing the dedicated stationary battery requirement by roughly roughly a third.

03 · OR, MOTION AS A SERVICE

Transport becomes a service. Autonomous shared mobility at $10 per 100 km replaces vehicle ownership entirely. The household no longer buys, fuels, registers, insures, or maintains a vehicle.

The full transport cost line collapses to $1,200 a year — a 77% reduction on today's combined cost of vehicle ownership and fuel.

04 · HEAT

Heat is electric. Heat pumps deliver 300 to 500% efficiency (COP 3 to 5) compared to gas at 75 to 95%. The gas line on the bill goes to zero.

The additional electricity demand is largely covered by the rooftop solar. Residential electrification of heat is already settled economics in most cases.

Three conditions for the destination

These outcomes require three things to be true. **The technologies need to continue their cost decline** — they will. **The household needs to be able to access capital to install them** — a financing question. **The regulatory architecture needs to allow distributed energy resources to compete fairly with centralised generation** — a policy question. The technology will look after itself. The financing and policy questions are what the rest of this vision is about.

SIDEBAR · NZ BATTERY COST TRAJECTORY

NZ's most recently published residential battery cost is $900/kWh installed (Rewiring Aotearoa, 2025). Applied with a 15% per year cost reduction (conservative against the global trajectory), battery costs reach $399/kWh by 2030. A 13 kWh home battery, downsized from 20 kWh because EV V2H reduces dedicated storage requirement, costs approximately **$5,200 installed**.

Today's global benchmark for utility-scale batteries is $125/kWh all-in (BNEF 2025). NZ at 2030 ($399 residential, $367 grid-scale) remains roughly 3× more expensive than today's global utility-scale price. The 15%/yr deflation assumption leaves substantial headroom.

03

SECTION 03 · THE TECHNOLOGIES

Solar –94%. Batteries –91%. In fifteen years.

Three technologies do the work: solar generates the electrons, batteries store them, electric drivetrains and heat pumps use them. All three follow the same falling cost curve.

03 THE TECHNOLOGIES MAKING THIS POSSIBLE

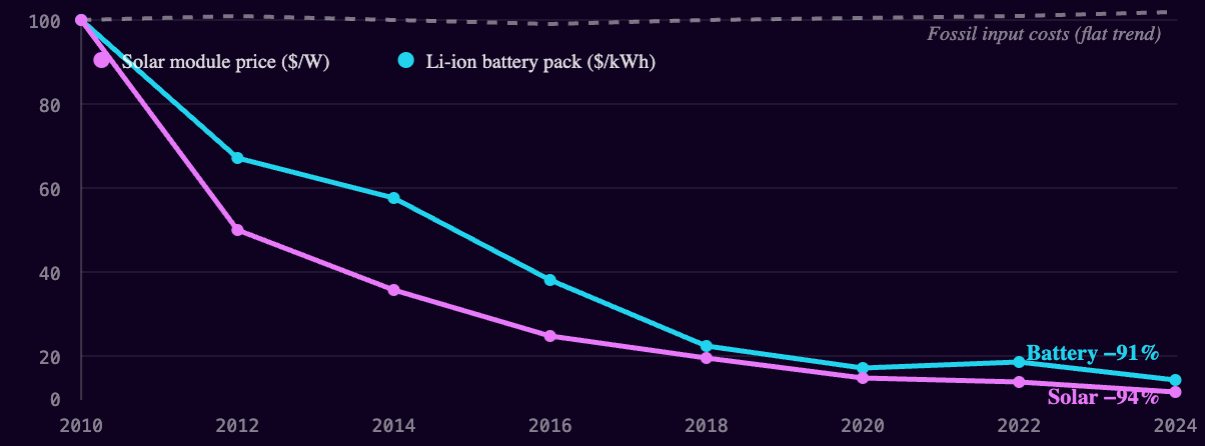
The same cost curve that drove TVs, smartphones, smartphones, broadband.

In a resource-dependent system, every kilowatt-hour requires fresh extraction — the curve trends up. In a technology- a technology-dependent system, every kilowatt-hour is the output of a manufactured thing that gets cheaper with every cheaper with every doubling of cumulative production.

FIGURE 3.1 · TECHNOLOGY COST INDICES, 2010 = 100

Solar –94%. Batteries –91%. Fossil input costs haven't followed the same curve.

Indexed unit costs, 2010 to 2024. Fossil line shows flat-to-rising trend.



BNEF Lithium-Ion Battery Price Survey 2024; ITRPV / Lazard LCOE module price series.

Figure 3.1 — unit costs are declining 20–27% with every doubling of deployment, and deployment is doubling every 2 to 3 years. Globally these technologies have only just hit the steep part of the s- the steep part of the s-curve of adoption.

Three technologies do the work. Solar panels generate the electrons. Batteries store them. Electric drivetrains and heat pumps use them. All three follow the same falling cost curve.

3.1 SOLAR

Democratised generation.

ROOFTOP SOLAR · 2030

8-10¢

Per kWh all-in. $1,000/kW installed, 5% finance, 25 yrs.

DELIVERED GRID · TODAY

35¢+

Per kWh residential. Behind-the-meter solar competes with the full price. full price.

Every kWh generated and consumed behind the meter avoids not just the 38.5% generation component, but the **full 32.5% network charge** . Once compared honestly against delivered electricity, the case for rooftop solar is overwhelming for any household that can finance it.

3.2 BATTERIES

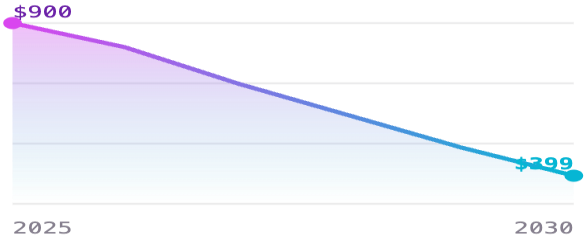
The prosumer enabler.

Solar without storage covers only the daytime. Batteries time-shift cheap midday energy to the evening peak — turning a household from passive consumer into active *prosumer*.

The historical barrier was cost. NZ's most recent published residential battery cost is $900/kWh installed (Rewiring Aotearoa, 2025). At 15%/yr cost reduction, that reaches $399/kWh by 2030. A 13 kWh battery + V2H allows **80% self-consumption**.

FIG 3.2 · NZ RESIDENTIAL BATTERY $/KWH

$900 → $399 by 2030



Rewiring Aotearoa 2025 base, 15%/yr decline.

AGGREGATED, THIS IS A VIRTUAL POWER PLANT

Coordinated, the distributed fleet becomes a vast virtual power plant — absorbing excess generation, injecting power to stabilise the grid at peak, and slashing the need to run fossil peakers. System costs fall for everyone, not just battery owners.

3.3 TRANSPORT-AS-A-SERVICE (TaaS)
(TaaS)

The disruption of personal mobility.

Autonomous EVs under a TaaS model change two structural things about transport: asset utilisation and operational lifetime. The combination amortises capital cost over a vastly larger number of revenue-generating kilometres. Personal mobility at $10 per 100 km is plausible because the full cost of transport collapses to a quarter of today's TCO thanks to utilisation of otherwise idle vehicles.

FIGURE 3.3 · ASSET UTILISATION — PRIVATE OWNERSHIP VS TAAS FLEET

Same vehicle, two roles. Capital amortised over ~110,000 km/yr vs 11,000.

RethinkX central 2030 forecast, 16 US¢/mile private → 5 US¢/mile shared pooled.

Figure 3.3 — the combination of utilisation (10× higher) and operational lifetime (~800,000 km) amortises capital over a vastly larger number of revenue-generating kilometres.

3.4 ADOPTION

The product is just better.

Mass adoption happens when a new product is much better and cheaper than the incumbent. The energy transition's no different. Consumers won't switch primarily for climate reasons or because of government mandates. **They switch because the new options are tangibly better.**

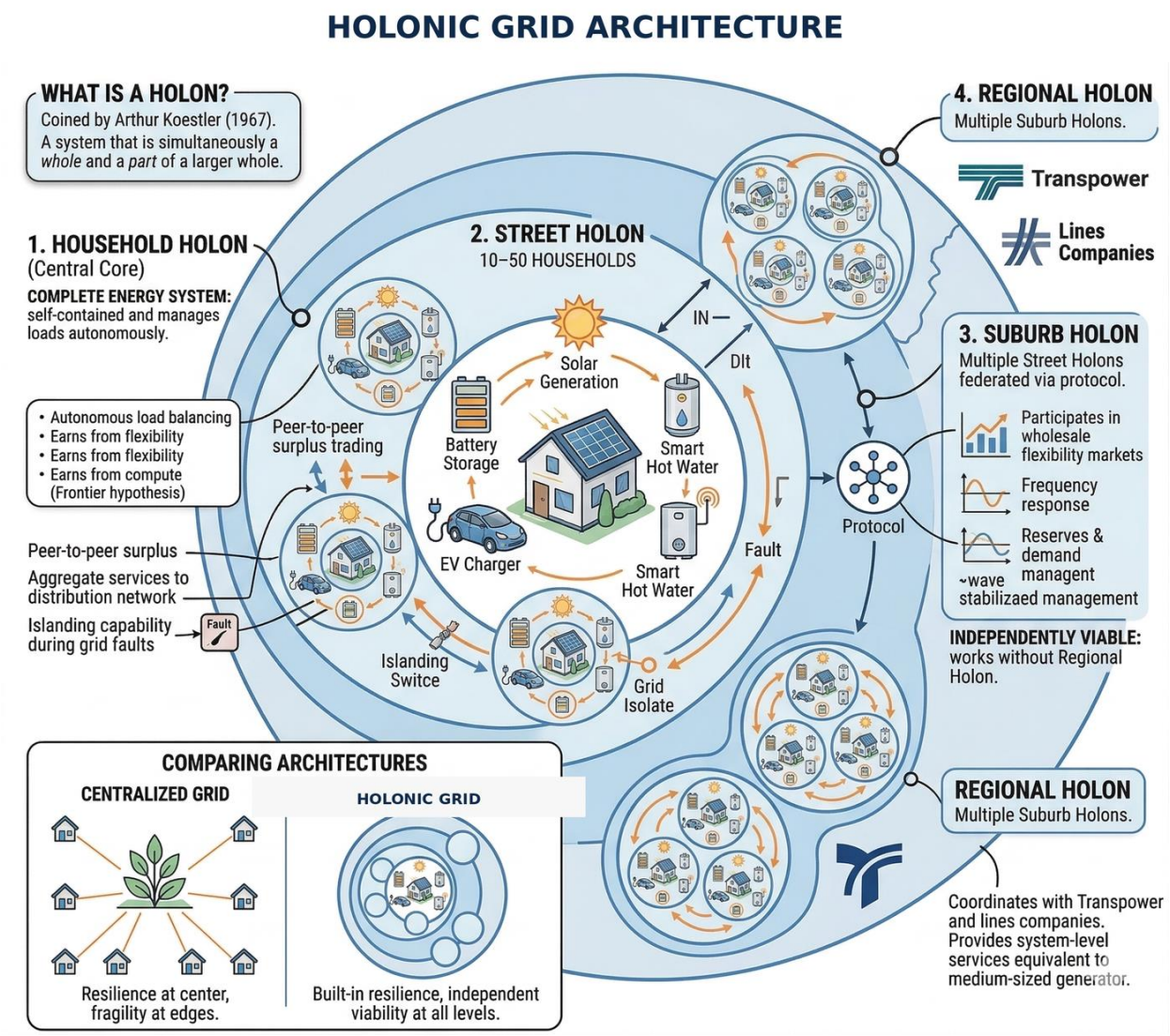
EVs are quieter, accelerate harder, require less maintenance, and cost less to run than equivalent equivalent petrol cars. Solar and battery ownership turns the household from a passive bill-payer bill-payer into an active producer. Even heavy logistics electrifies because the running-cost gap is too cost gap is too big to ignore. On the Auckland to Tauranga freight corridor, an electric truck saves truck saves roughly NZ$277 per trip against diesel — an 81% reduction in fuel cost, with fleet payback running under 5 years at current crisis pricing.

04 A NEW GRID ARCHITECTURE

From centralised to cellular.

A house with rooftop solar, battery and EV becomes a *holon* — a system that balances its own internal supply and demand while connecting to a published protocol that lets it federate with its street, its suburb, and the national grid.

FIGURE 4.1



MINIMISES GRID COSTS

The majority of balancing happens at the local level. The national national grid only manages the smaller, smoother, less volatile net volatile net demand of entire self-balancing neighbourhoods — neighbourhoods — reducing the multi-billion capex currently currently driving rising lines charges.

CREATES RESILIENCE

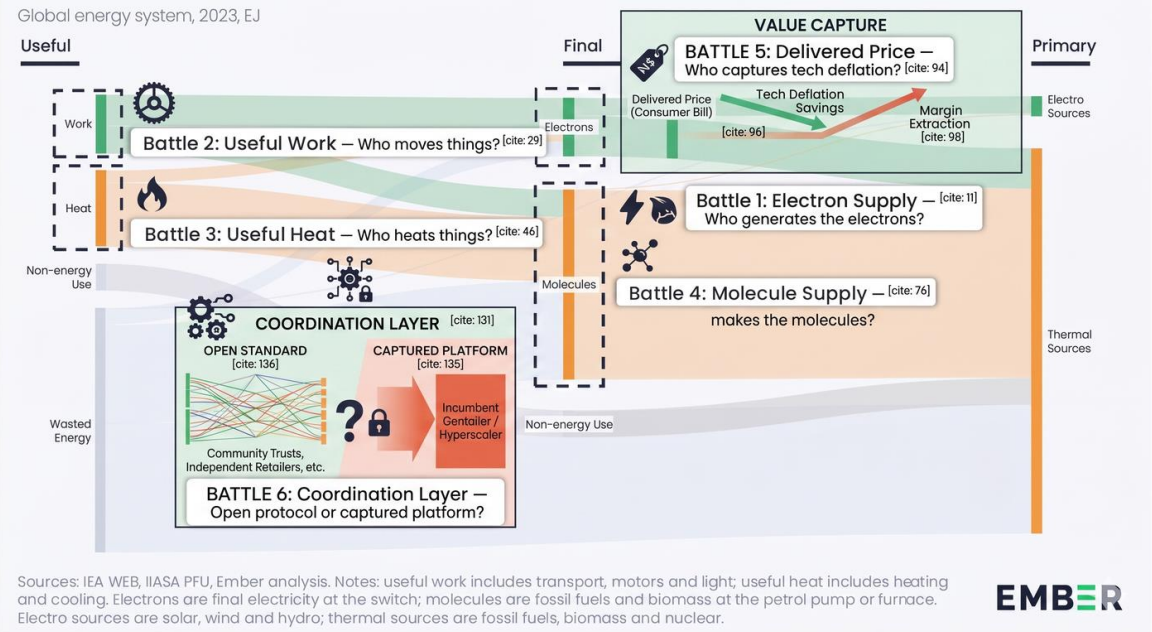
A cellular grid keeps working when one piece fails. Individual Individual holons can island themselves from the main grid and grid and continue on local solar and battery resources — a a structural advantage for a country exposed to seismic events events and extreme weather.

05 THE SIX BATTLES

The path from today to 2030.

The shift from $8,739 to $5,417 — or $3,125 — is one transition but six battles. The first four are about the energy we use. The last two are about the delivery chain itself.

FIGURE 5.0 - Six Battles overlaid on the global energy Sankey



1 Electron Supply · Who generates the electrons?

Clean sources vs thermal.

NZ starts in a strong position thanks to our grandparents' hydro infrastructure. About **85% of generation is renewable** . That sounds good. What it hides is that solar is only **3%** of our generation today, despite being the cheapest source of electricity available over its lifetime. The market structure rewards scarcity (gas peaking to protect lake levels) not abundance. That's a policy failure, not a resource constraint.

END STATE · 2045

70 TWh

Annual supply with daily battery firming. 35 GW solar, 8 GW wind, 201 GWh GWh storage.

~$308 / person / yr · RethinkX

BENDS WHICH COST LINE

The electricity bill — by reducing wholesale prices and letting distributed generation bypass network charges.

2 Useful Work · Who moves things?

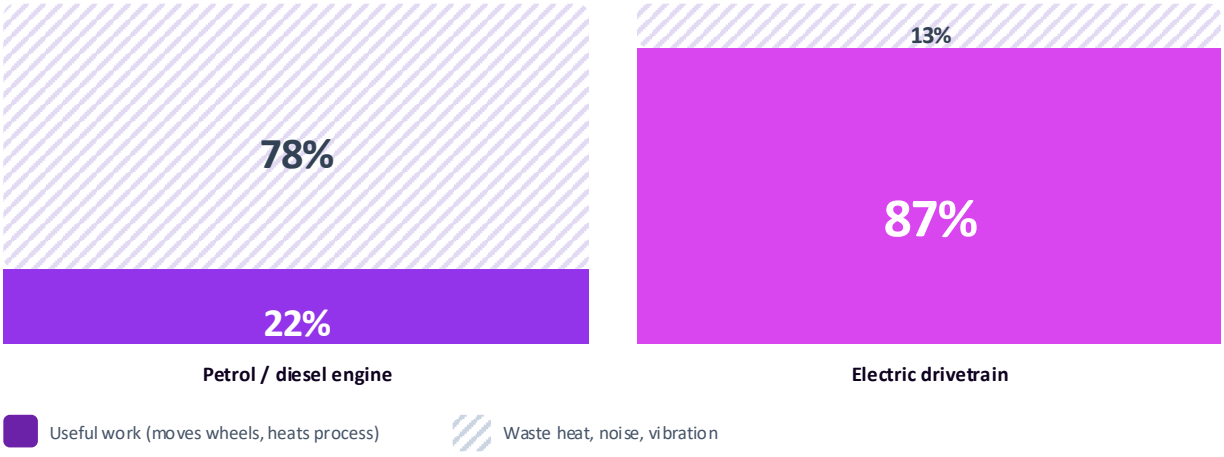
Electrons versus molecules to power motion.

Electric motors convert electricity to motion at over 90% efficiency. Internal combustion engines manage around 25%. That's a **3× efficiency gap** baked into the physics.

FIGURE 5.2 · ENERGY → USEFUL WORK, TANK-TO-WHEEL

Electric drivetrains do ~3× the useful work per unit of energy

Same truck, same factory, same milk powder. Electric version needs about a third of the energy.



US DOE fueleconomy.gov tank-to-wheel efficiency; IEA; typical industrial heat pump COP 3–4 vs gas boiler ~90%.

Globally, electricity supplied **80% of the change in useful work demand** between 2019 and 2023. Oil demand in transport could peak around now, per the IEA. China appears to have already passed its peak-oil phase. In NZ, EV adoption is happening but slowly, farm machinery electrification is underway, and the economics already make sense.

BENDS WHICH COST LINE

The petrol line and the vehicle ownership line — the largest single chunk of the household energy spend. Because fuel is an input cost into most of the other domestic industry, households will see a decrease (relative to still using fossil-fuels) as industry transitions to electricity too. For example, farmers, logistics companies, forestry, fertilizer.

3 Useful Heat · Who heats things?

Heat has a temperature structure — so does the solution.

Low-temperature heat under 100°C is fully electrifiable today with heat pumps at 300–500% efficiency vs gas at 75–95%. Medium-temperature heat (100–300°C) is the frontier, and industrial heat pumps are entering it now.

FIGURE 5.3 · NZ HEAT DEMAND BY TEMPERATURE BAND (TWH/YR)

18 TWh of fossil heat is in the heat-pump-viable range today

TEMPERATURE RANGE	TOTAL DEMAND	FOSSIL FUEL	ALREADY ELECTRIC	ELECTRIFIABLE?
Low Temp<100°C	25.3	12.9	10.3	Yes, now
Medium Temp100–300°C	14.8	5.4	1.8	Yes, near-term
High Temp>300°C	13.4	8.4	5.1	Hard, Battle 4
Cooling & Refrigeration	5.5	0	5.5	Already done
Total	59.1	26.7	22.7	18.3 TWh prize

MBIE End Use Energy Database (EEUD) 2023; EECA Industrial Heat Pumps analysis.

Dairy is the single biggest target. 7.6 7.6 TWh of fossil heat/yr — by far the the largest industrial heat user in NZ. NZ. Dairy processing sits mostly in the in the 80–160°C range, squarely where where industrial heat pumps now compete.

TRANSITION GAP

80% financing gap

EECA research finds **70–80% of gas-dependent businesses businesses** see transition as theoretically possible but financially unattractive. Gas contracts are doubling on renewal; supply has fallen 45% in six years.

BENDS WHICH COST LINE

The gas line on the household bill, and indirectly the cost of every dairy product, meat product, and processed food a Kiwi household buys. household buys.

4 Molecule Supply · Who makes the molecules?

What's left after we electrify everything we can.

The fourth battle is about who supplies the molecules that remain once we've electrified everything we can — petrochemical feedstocks, high-temperature industrial processes, hard-to-abate sectors. Converting electricity back into molecules (green hydrogen, ammonia, synthetic fuels) runs at ~ **70%** efficiency vs ~**85%** for fossil. **Winning Battles 1, 2 and 3 makes Battle 4 smaller** : ~8 TWh of hard-to-abate high-temp heat remains vs today's 27 TWh.

Markets cheap solar opens up

TIER	MARKETS	$/KWH THRESHOLD	TWH / YR	KEY EXAMPLE
01	**Grid & Electrification** Grid displacement; EVs & transport; heat pumps	$0.03–0.05	~50,000	China added 329 GW solar in 2024; BYD BYD EV at $0.01/km vs petrol $0.08/km $0.08/km
02	**Water & Nutrition** Desalination; phosphorus recovery	~$0.03	~1,500	Saudi Arabia: world's largest desalination capacity
03	**Industrial Heat** Green steel; cement; aluminium; chemicals chemicals	~$0.025	~25,000	SSAB HYBRIT fossil-free steel; Boston Boston Metal
04	**Clean Molecules** Green hydrogen; SAF; shipping fuels; green ammonia	$0.015–0.02	~38,000	IRENA 1.5°C: 614 Mt H_2 + 350B L SAF SAF
05	**Remediation** Direct air capture; PFAS destruction	$0.01–0.016	~18,000	Climeworks Mammoth (36,000 (36,000 t/yr); 3M PFAS settlement settlement
	TOTAL ADDRESSABLE		~135,000	~4× current global generation; 56× current solar

Figure 5.4.1 — Markets that cheap solar electrification opens up, by price threshold and global TWh/yr.

Six Battles of the Energy Transition framework, drawing on Exponential View, IRENA, BNEF.

BENDS WHICH COST LINE

The macroeconomic line that runs through every Kiwi household. Replacing imported fossil molecules with domestic clean ones flows ones flows through wages, exports, and the cost of every imported good.

NZ as a green-molecule producer

RethinkX's Prosperity scenario models NZ generating **104 TWh total by 2045** : 64 TWh of firm TWh of firm baseload and 40 TWh of surplus, built to cover the worst-case winter day. The day. The surplus has near-zero marginal cost. At that price, green hydrogen and ammonia ammonia become economically viable to manufacture domestically.

NZ stops importing fossil fuel molecules and starts making the clean molecules that remain in that remain in the system. The flow runs both ways: domestic decarbonisation, and an export an export footprint for the clean-molecule markets coming online globally over the 2030s. the 2030s.

Long term energy storage for dry-year risk

Having excess electricity can also be put towards solving the dry-year risk issue that the current that the current government is willing to spend $1-2 billion on, in the form of an LNG terminal. LNG terminal.

Routing that electricity surplus into pumped hydro or long-duration storage, such as vanadium flow or heat batteries, converts wasted electrons into dry-year insurance with one-off capex, where an LNG terminal locks NZ into 40-60 years of imported gas at global market prices.

Figure 5.4.2 — NZ Prosperity scenario: 104 TWh by 2045, with 40 TWh of near-zero marginal-cost surplus producing clean molecules.

RethinkX Prosperity scenario adapted for NZ; IRENA 1.5°C scenario for global molecule demand.

5 Delivered Price · Who captures the technology cost reductions?

Upstream –90%. Delivered price +35%. That gap is margin.

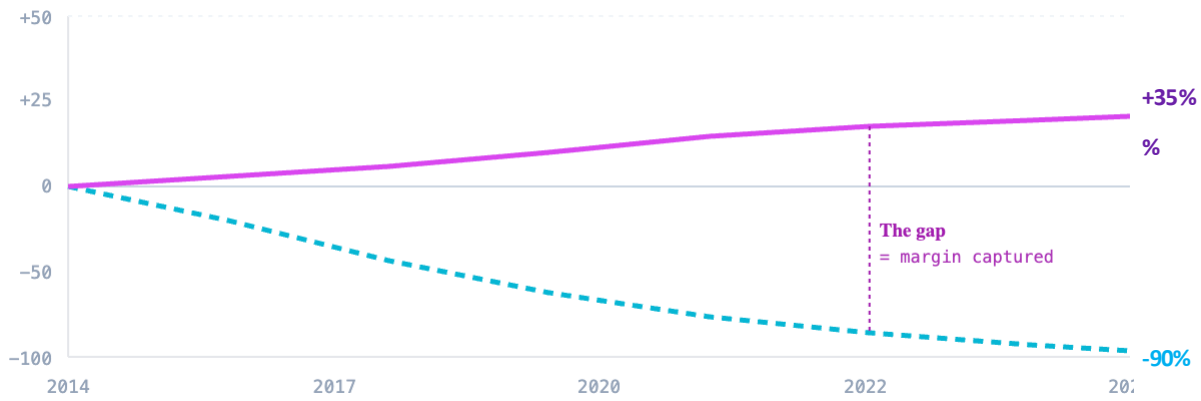
Every input to electricity is a technology — panels, batteries, turbines, inverters, chips — and technologies get technologies get cheaper. Solar costs are down 90%, batteries down 90%, wind down 70% over the last decade. the last decade. NZ's delivered residential price went the other way, rising around 35% in nominal terms over the terms over the same period.

2014 → 2024

NZ delivered residential

Upstream solar / batteries

Indexed change in cost (2014 = 100)



SOURCE: BNEF / LAZARD UPSTREAM COST DATA; STATS NZ RESIDENTIAL ENERGY CPI SERIES.

Figure 5.5.1 — Supply-side unit costs fell 70–90%; NZ delivered residential price rose ~35% nominal. The gap is margin captured downstream.

Three extractors do most of the work.

01 · NETWORK

Cost recovery on shrinking volume volume

Comm. Commission's last reset increased EDB revenue allowances by **~37% real** . Per-capita demand falls; fixed costs spread across fewer kWh.

02 · WHOLESALE

Marginal-pricing windfall

Hydro and renewables paid the gas-set set clearing price. **~$1.66 b/yr** windfall to windfall to hydro generators on 2021–24 2021–24 data.

03 · HEDGING

Forward market thinness

Spot ranged**$32 → $519/MWh** (Dec '22 → Aug → Aug '24). Generator-retailers sell hedges to hedges to their own competitors.

Eleven years of extraction over investment

Over the eleven years since partial privatisation, the major generator-retailers paid **$9.45 billion in dividends against $1.38 billion in new renewable capex** — a 7:1 ratio of extraction to investment. The cheap renewable energy is being priced as if it were expensive thermal energy, and the difference is kept as margin.

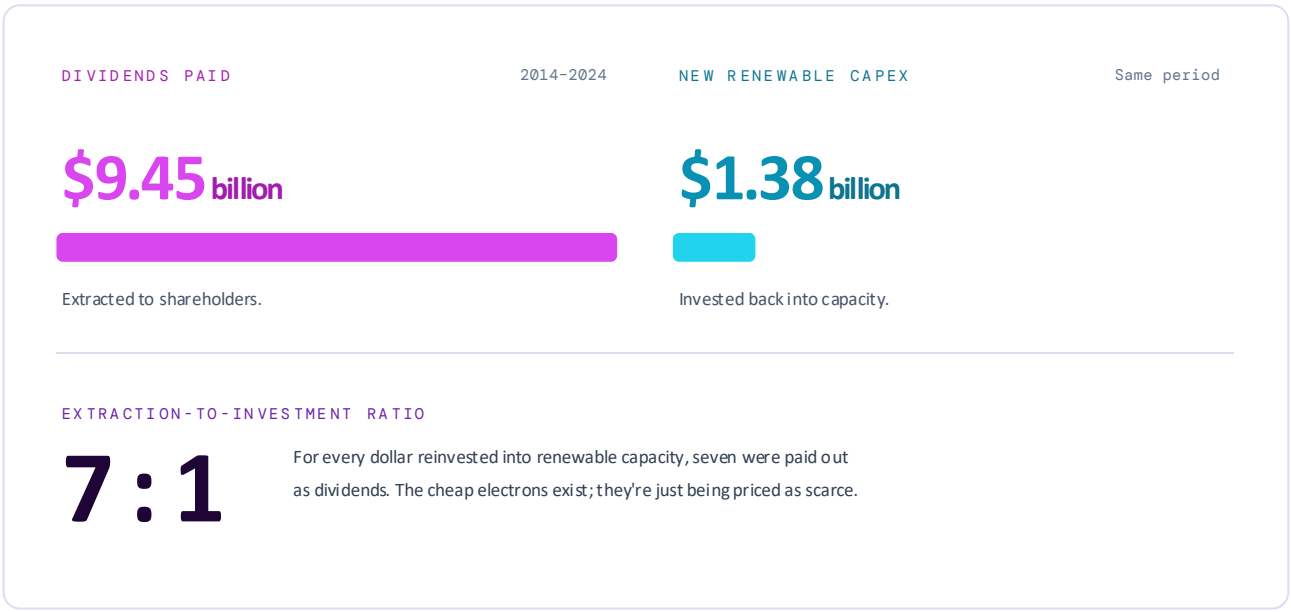


Figure 5.5.2 — Combined gentailer dividends vs new renewable capex, 2014–2024.

End state

Distribution pricing prioritises asset utilisation over peak capacity expansion. Network cost recovery moves onto moves onto time-of-use signals, away from the escalating fixed daily charge that penalises households investing in households investing in solar and batteries. Wholesale design removes the windfall margin in abundant hours. Retail abundant hours. Retail bills publish the makeup of every delivered kWh by component.

BENDS WHICH COST LINE

The lines and retail components of the electricity bill — the parts distributed generation can't bypass on its own.

6 Coordination Layer · Open protocol or captured platform?

Above the meter, below the market.

Between household hardware (solar, batteries, EVs, hot water, heat pumps) and the wholesale market sits a coordination layer. It does metering, aggregation of flexibility, wholesale bidding, and settlement. **Whoever owns this layer captures the value the hardware below produces.**

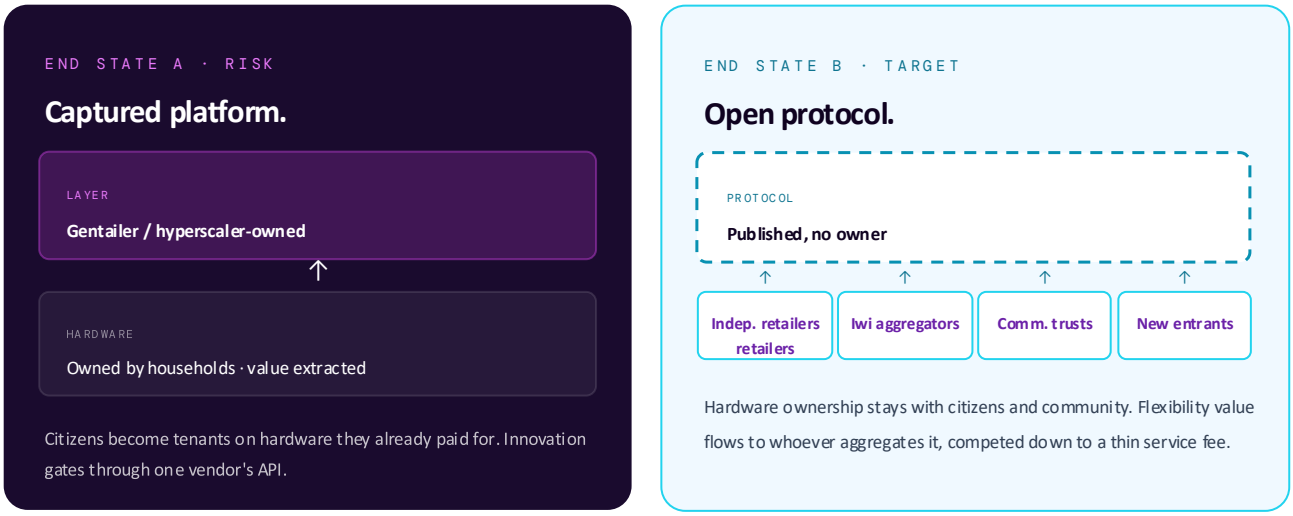
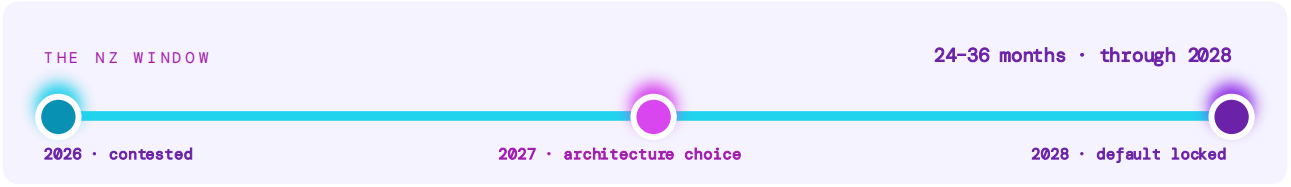


Figure 5.6.1 — Two end-states for the coordination layer. The next 24–36 months decide which one NZ defaults into.



What "open" looks like

NZ adopts an open coordination standard covering covering **metering data, telemetry from household household solar and battery hardware, flexibility flexibility bids, and settlement** . Any firm meeting the meeting the standard can compete. The layer's not not owned by anyone — it's published. Hardware ownership stays with citizens and community. Flexibility value flows to whoever aggregates it, competed down to a thin service fee. fee.

In other markets, platform incumbents are setting the setting the default right now. In NZ, the layer is still still contested. **The next 24 to 36 months decide decide** whether the default is platform or protocol. protocol.

IF WE GET IT WRONG

Tenants on their own hardware hardware

An extractive oligopoly captures aggregation. Households pay Households pay for the hardware; the platform owner captures the value.

What the standard must cover

01 METERING

Household-owned, portable consumption + generation data. Read access by any consented party.

02 TELEMETRY

Open APIs to inverters, batteries, EV chargers, hot-water and heat-pump controllers.

03 FLEXIBILITY

Common bid format for aggregated flexibility into wholesale, ancillary, and distribution markets.

04 SETTLEMENT

Transparent, audit-able settlement protocol so households can verify they're paid correctly.

BENDS WHICH COST LINE

The household's ability to capture revenue from its own solar and battery assets, and to participate in flexibility markets at a fair price.

06 CROSS-CUTTING REFORMS

Without equitable financing and and better metrics, the transition transition delivers prosperity narrowly.

Two reform questions cut across all six battles. They determine whether the path is open to every household — or only to those who can afford the upfront capital.

§6.1

Equitable financing

Or the transition concentrates wealth.

§6.2

Better metrics

Measuring what actually matters.

6.1 EQUITABLE FINANCING

Equitable financing or the transition concentrates wealth.

The technologies that underpin the new system — EVs, rooftop solar, home batteries, heat pumps — share an economic profile: **high upfront capital, very low running cost** . That profile means wealthier households go first.

The two-tiered system that follows

TIER 1 · EARLY ADOPTERS ↓ bills

An "energy elite" enjoys cheap, clean, resilient resilient power.

- Own roof, own capital → install solar + battery
- Buy EV → escape petrol entirely
- Heat pump → escape gas entirely
- First to escape rising lines and gas charges

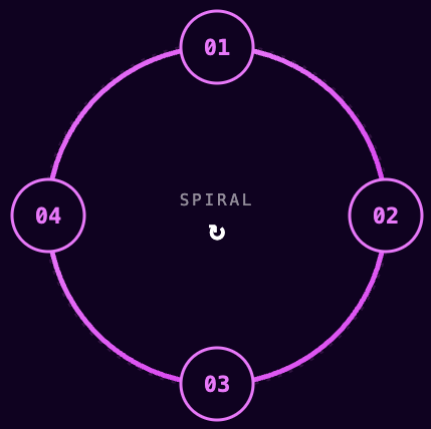
TIER 2 · LEFT ON LEGACY ↑ bills

Lower-income, renters, apartment dwellers stay on legacy.

- No capital, no roof, no decision rights
- Pay rising lines charges to maintain a grid that's now a backup for Tier 1
- Stay exposed to imported petrol
- Cross-subsidise the transition without benefiting

DEATH SPIRAL BY DESIGN

A SELF-REINFORCING NEGATIVE FLYWHEEL



01 TIER 1 EXITS
Affluent households install solar + battery and reduce grid consumption.

02 COST CONCENTRATES
Fixed network costs spread across across a shrinking pool of grid volume.

03 PRICES RISE
Per-unit price rises for everyone still on the network — Tier 2 pays.

04 MORE DISCONNECT
Rational response is more disconnection from anyone who can can afford it. Repeat.

Figure 6.1.1 — Without intervention, capital-led adoption produces a regressive cross-subsidy.

The market response makes it worse

Distribution companies will move more revenue onto fixed daily charges. That does two damaging things at once. It makes **disconnecting from disconnecting from the grid the rational choice** for any household that can afford to build its own infrastructure — accelerating the death accelerating the death spiral. And it kills the business case for the very household investments that would have helped the system out, because system out, because savings from your own electrons get neutralised by the rising fixed charge regardless of how little grid power you use. power you use.

A comprehensive equity strategy needs three pillars

Government intervention here is an economic necessity. Without it, the transition delivers prosperity narrowly and accelerates inequality for everyone else.

PILLAR 01

Accessible finance

The primary barrier for most households is households is upfront cost. The **Ratepayer Ratepayer Assistance Scheme (RAS)** , promoted by Rewiring Aotearoa, is the leading solution.

HOW IT WORKS

Long-term, low-interest property-property-linked loans for solar, batteries, EVs and heat pumps, repaid through council rates over over 20+ years to match asset life. life.

✓ Cash-flow positive day one
✓ No new public debt
✓ Existing local-gov't infrastructure

PILLAR 02

Targeted support

For the most vulnerable households, loans are insufficient. **Direct subsidies** for solar and batteries in social housing and for low-income owner-occupiers.

THE TRADE

Convert existing state cost (energy hardship, winter energy payment) into a durable asset on the household's balance sheet.

✓ Asset replaces recurring subsidy
✓ Permanent reduction in hardship
✓ Fiscal cost falls over time

PILLAR 03

Solutions for renters

About a third of New Zealanders rent, with very low rates of solar and heat-pump installation. The **split-incentive problem** — landlord pays, tenant benefits — has to be addressed.

MECHANISMS

Landlord tax incentives. On-bill finance that transfers cleanly between tenancies.

✓ Aligns landlord and tenant economics
✓ Reaches a third of the population
✓ Bill-portable financing

WITHOUT THESE THREE PILLARS

The technology transition delivers prosperity to those who can afford it and accelerates inequality for everyone else. The choice between an inclusive transition and an exclusive one is a policy choice, not a technology one.

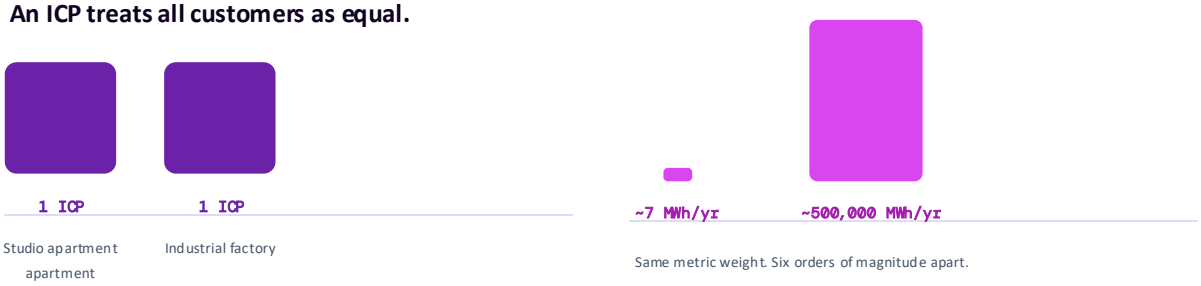
6.2 **BETTER METRICS**

Measuring what actually matters.

The effectiveness of any regulatory regime depends on what it chooses to measure. For too long, the assessment of competition in NZ's electricity retail market has relied on the number of active retailers and their share of **installation connection points (ICPs)** . That metric is fundamentally misleading.

THE FLAW

An ICP treats all customers as equal.



A market can look competitive on an ICP basis with dozens of small retailers (albeit decreasing), while in reality the dominant generator-retailers still supply **over 90% of the actual energy in MWh**.

Figure 6.2.1 — One ICP per customer flattens six orders of magnitude in actual energy throughput.

What the regulator should measure instead

SWITCH TO

MWh share by independent retailers

Actual energy traded — not connection counts.

SWITCH TO

MW share of demand response

Aggregator MW reducing peak load.

SWITCH TO

Distributed generation share

% of mix coming from behind the meter. meter.

> **A seemingly small administrative change — switching the metrics — is one of the most powerful levers available. It redefines the market as a dynamic system of active, distributed participants.**

07 CONCLUSION

The choice in front of New Zealand.

There's a leadership vacuum on energy in NZ. Energy will be a dominant 2026 election issue. The party that wins it is the one that names the 2030 destination clearly and commits to the regulatory and policy reform that delivers it.

New Zealanders will no longer tolerate policy choices that continue to protect incumbents and scarcity-based market design that increases energy costs while solutions exist that make energy deflationary, like technology.

This document has described the vision that is possible for New Zealand much faster and more affordably than current opinions and thinking. Please read the companion Policy Kick-start document to see the individual policies that will get us there, fully costed, ready for uptake by politicians and review by policy people and agencies.

IN ONE LINE

The destination is clear. The technology technology and economics are viable. viable. The path is a policy choice.

What's left is structural reform and political will.

Without active reform, the existing market structure will **absorb and slow the transition** rather than enable it. The fixed-charge trap, the wholesale market windfall, the captured coordination layer — these are designed responses by the institutions that built the current system. They won't dismantle themselves.

IF WE CHOOSE TO DRIFT

Prosperity narrowly distributed.

- Energy elite captures most of the savings
- Death spiral on the legacy grid for everyone else
- Coordination layer captured by platform incumbents
- Tech deflation absorbed by margin, not delivered to households
- NZ becomes a rule-taker on green molecules, not a producer

IF WE CHOOSE TO ACT

Prosperity broadly distributed.

- Household energy spend falls $3,300 to $5,600/yr
- Open coordination protocol; flexibility revenue flows to households
- Wholesale and network reform delivers the deflation downstream
- RAS-style finance + targeted support reach renters and low-income households
- 40 TWh of surplus generation makes NZ a green molecule producer

THE THESIS, IN ONE SENTENCE

Energy prosperity by 2030 is a choice.

END · §7

The Exponential Agency · designed for an exponential world

AOTEAROA'S ENERGY PROSPERITY

Energy bills dropping $8,739 → $3,125. $3,125. A 2030 vision for New Zealand.

This document was prepared by The Exponential Agency to describe what energy prosperity looks like for a regular Kiwi household by 2030, the technology pathways that get us there, and the structural reform needed to deliver the savings to every household — not just those with capital to go first.

DOCUMENT

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AUTHOR

The Exponential Agency

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