

Electrification is anti-inflationary.

Unpacking the U.S. Inflation Reduction Act: What was in it? What could it mean for Australia? A plan for how Australia can follow suit even more ambitiously.



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Electrification is anti-inflationary!

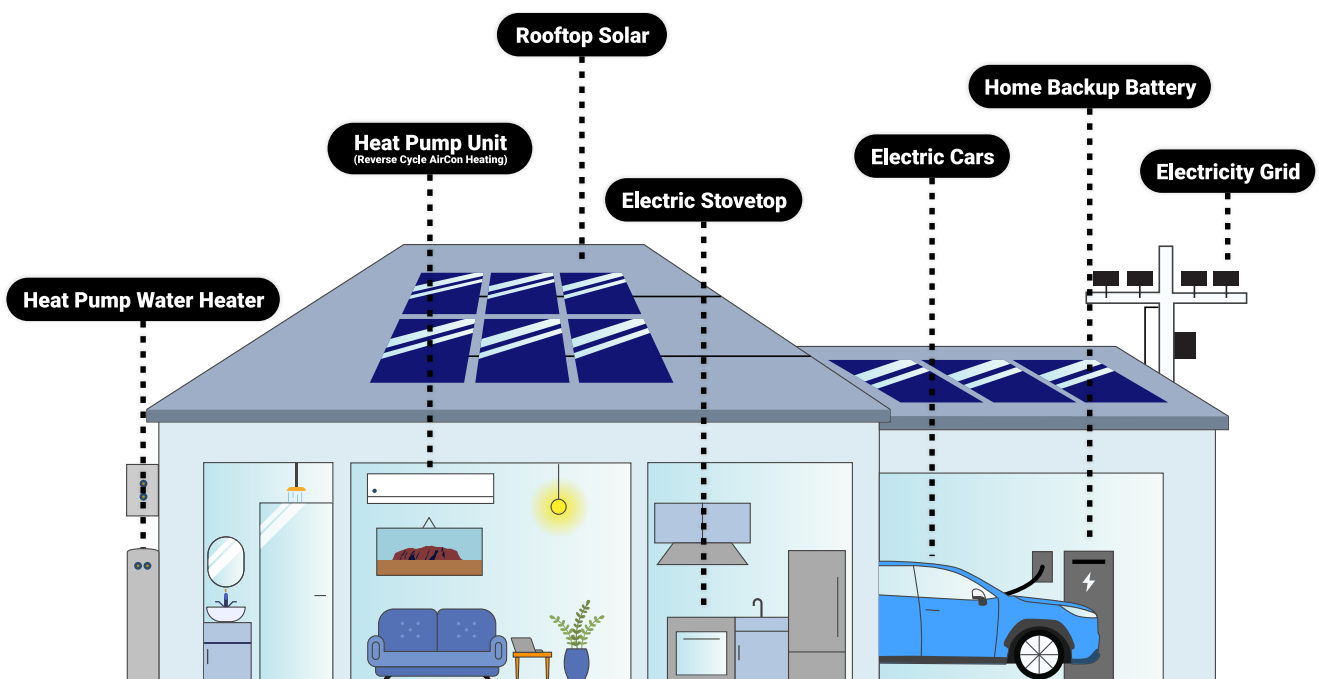
The Inflation Reduction Act (IRA) was an extraordinary piece of U.S. climate legislation obscured by the name. In combination with the Defence Production Act (DPA) and the Infrastructure Investment and Jobs Act (IIJA) the IRA represents the Biden Administration's bold action on climate and the elimination of carbon emissions from the American economy. The simplest takeaway from the IRA is **"electrify everything"** through incentives to transform the market to clean energy.

Australia has the opportunity to learn from and build on this legislation as we pave our own path towards aggressive emissions reduction over the next 10 years while controlling rising costs of living largely driven by inflationary and volatile energy prices.

This report outlines the details and focus of the American IRA and where it could have been improved. From this we draw an ambitious plan for the Australian government to build its own version of the Inflation Reduction Act.

In prioritising a more ambitious Act, Australia should provide accessible and affordable finance and incentives to support households to electrify. We should also invest in electrifying public and social housing to ensure an equitable transition. We should demonstrate intensive electrification through community pilots, build the skilled workforce for installation and maintenance of this 21st century technology, and optimise local, state, and federal codes and regulations to lower cost. The government should support Australia's role in the global supply chain of modern electric appliances, electric vehicles, and renewable sources of electricity and the critical role our primary industry and manufacturing sectors can play.

Figure 1 - Electrified household

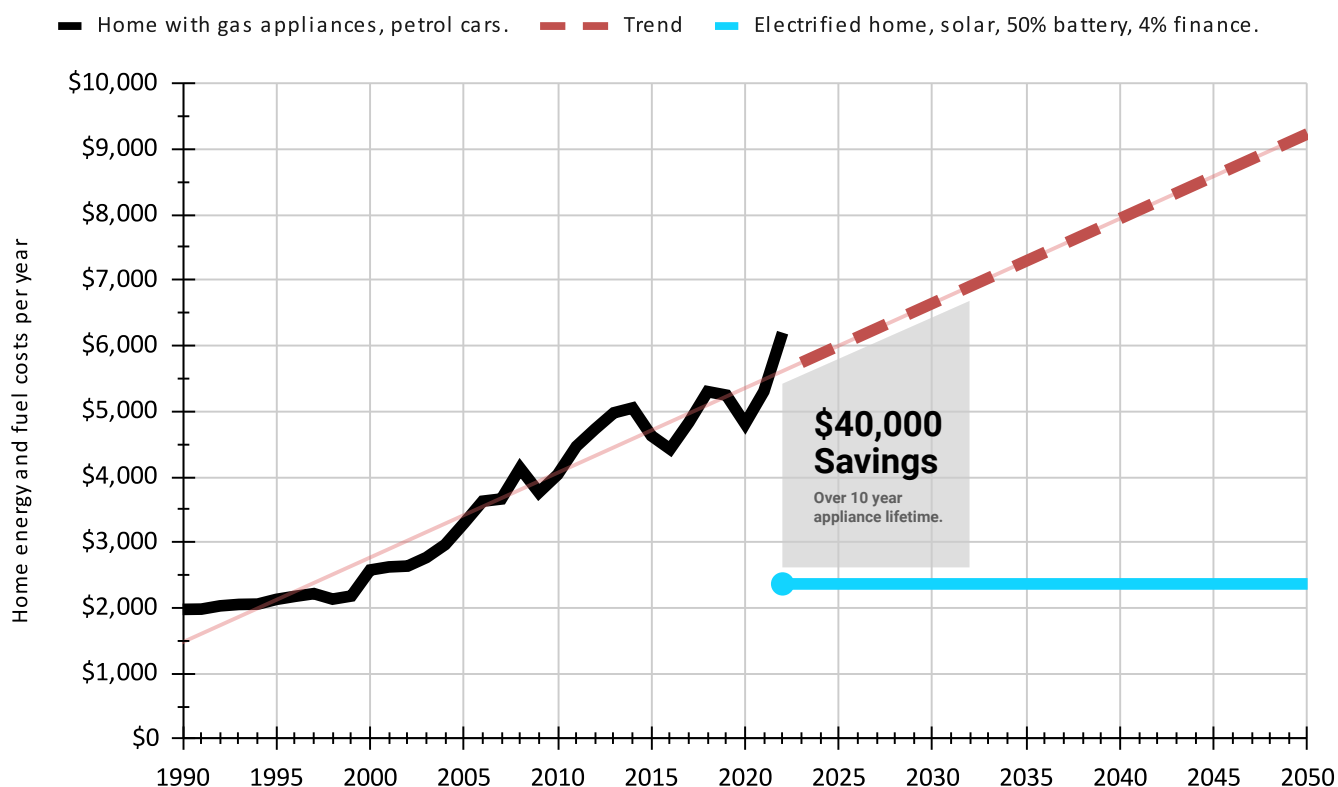


Why call it the Inflation Reduction Act?

Clean electrification is the transformation of our energy economy away from one based on low-cost fossil-fuelled machines that require expensive future commitments to fossil-fuels, to higher-cost electric machines that are powered by clean electricity. This turns the energy economy from one of fuels to one of finance, and the beauty of finance is that it locks in the cost of something for the period of that finance. It is literally anti-inflationary as can be seen in Figure 2.

Figure 2

Australian home running costs with CPI trend | Gas and petrol home vs Electrified financed



Source: ABS Consumer Price Index June 2022, Rewiring Australia Castles & Cars Report 2021.

Figure 2 shows the 30-year price history of all of the energy consumed in an average Australian household using gas appliances, petrol cars, and some electricity (the black line). It can be seen steadily increasing over this period. Not surprisingly, the prices increase at roughly the rate of inflation, as these fuels are part of the Consumer Price Index that tracks inflation. Based on the linear trend from the last 30 years, by 2050, homes are forecast to be paying over \$9,500 a year in energy bills (dotted red line). The same household driving all electric vehicles and using all electric appliances would be paying only 1/3 of that if using rooftop solar energy and a sufficiently sized battery, paid off with finance at 4% (blue line).

This is an extremely important chart and points to why Australia would benefit enormously from something akin to the IRA.

Breakdown of spending in the IRA

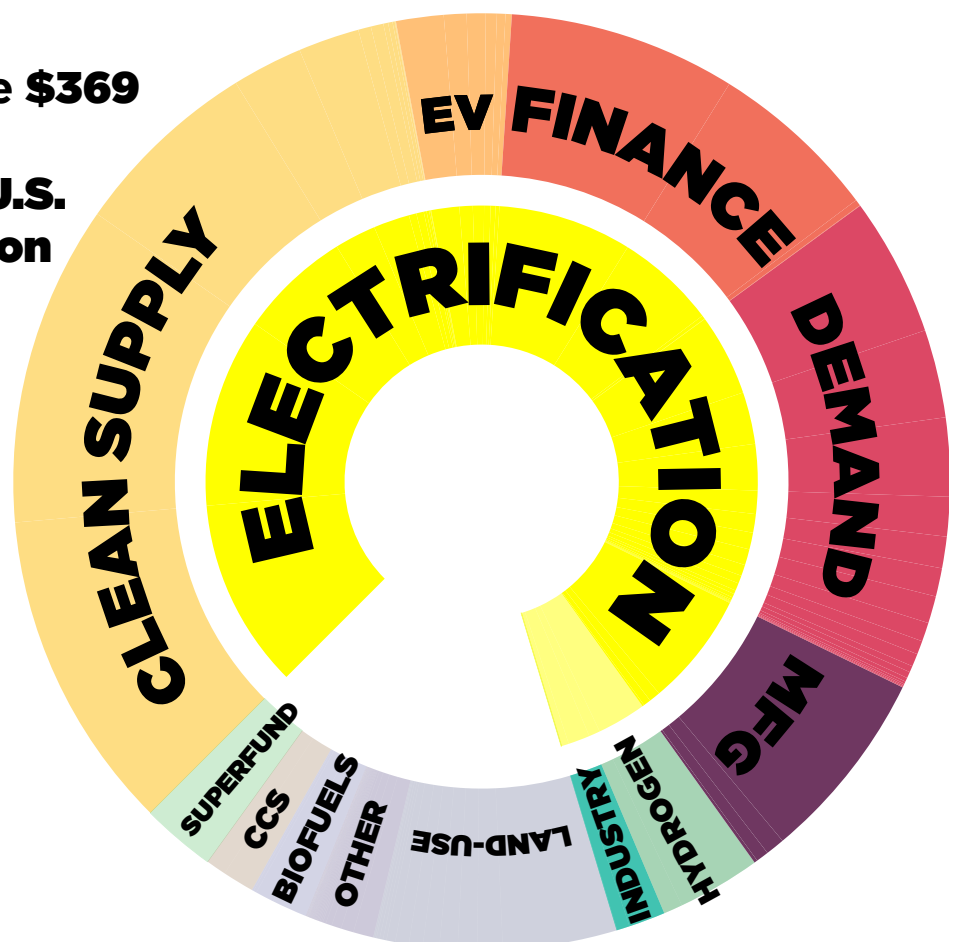
The IRA was a spending bill, which meant that it wasn't so much the creation of new legislation as it was the allocation of budget, mostly through tax credits, to various spending programs. The Congressional Budget Office (CBO) estimated spending of \$369 billion on the climate and energy components of the Act. Additional components of the Act were focussed on increasing the capacity of the Internal Revenue Service (IRS) to more comprehensively implement the tax code, and some funding to health care including lowering the cost of prescription drugs.

The \$369 CBO estimate contains many assumptions about the uptake of the tax incentives. If the IRA is implemented well and American households take full advantage of the Act, it could release closer to \$900 billion dollars in demand-side electrification incentives.

Figure 3 and 4 provide a detailed breakdown of IRA spending from the data available from the [CBO](#). The only variation in the data is around the Department of Energy, Loan Program Office, (DOE, LPO) program which was allocated \$3.6 billion but will be able to deploy something closer to \$36 billion in capital as it is highly leveraged loan guarantees. Further analysis can be found at [Rewiring America](#) including a [calculator](#) that shows the effect of incentives to individual households throughout the U.S. who on average qualify for around \$14,000 to electrify their homes, vehicles, and appliances, including solar and batteries.

Figure 3

**Summarized
breakdown of the \$369
Billion in climate
spending in the U.S.
Inflation Reduction
Act.**



I.R.A EXPLAINED. Saul Griffith, Sam Calisch, REWIRING AMERICA (Non healthcare, non-IRS provisions)



About half of the money allocated to electrification is for the supply of clean electricity (\$150 billion) either as clean electricity production credits (\$50 billion) or clean electricity infrastructure investment credits (\$50 billion).

Key to the IRA was placing the demand side—where Americans use energy in their homes, vehicles, and small businesses—on an equal footing to the production of zero-emission electricity. This is to acknowledge that we need to electrify the demand side at the same time we provide ever more clean electricity (eventually we will require three times the electricity that is delivered today, which is what will be required of the energy system to reach zero emissions). The demand side incentives (~\$140 billion) include low cost financing, direct electric vehicle rebates and incentives, and multiple different incentives to electrify appliances and buildings. The intent of these investments is to permanently transform the marketplace for these machines in the US such that eventually the only available product will be zero emission options. This is a giant demand side market signal and an area where Australia can follow in America's footsteps.

Emphasis on American manufacture of clean electricity production and demand side machines

A further \$40 billion is dedicated to the manufacturing of both supply and demand side electrification machines be they vehicles, batteries, heat pumps, solar, wind, even electric kitchen appliances to replace gas appliances. The IRA firmly rejects the idea of a gas transition in favour of immediate market transformation to all-electric.

Very little in reality for hydrogen and nuclear

Notable is how small the role of hydrogen and nuclear are in the IRA, and in the likely energy future of the U.S. Of the spending, only \$10 billion went directly to hydrogen (as a production tax credit that may not even be fully deployed at predicted production rates). Another \$3 billion for cleaning air quality around ports could be argued to be oriented towards hydrogen as it is a testbed for hydrogen freight vehicles. There is \$30 billion in production tax credits for zero-emission nuclear power, which is more earmarked towards keeping the existing set of nuclear plants running, and not obviously oriented towards development of new technology or capacity.

What does the IRA mean for American households and communities

The average American household will receive up to \$14,000 in federal government incentives to electrify. If the United States successfully ramps up to 100% electric adoption by the end of the IRA, \$858 billion in residential electrification benefits will have been invested across every community, generating 1.4M direct and 5.0M total new jobs in the United States.

Switching to electric appliances

Households will have access to up to \$14,000 in up-front discounts to switch to electric appliances in their home. The legislation is targeted at low-income households who will have up to 100 per cent of the project costs of electrifying appliances covered. Moderate income homes will have up to 50 percent of costs covered.

In addition to the up-front discounts, the IRA also includes tax credits for electrification and household energy efficiency upgrades. All 120.7M households in the United States will be eligible for an average of \$5,739 in tax credits and an average of \$367 in performance rebates.

Purchasing electric vehicles

Up-front discounts on the purchase of EVs of up to \$7,500 for cars and \$4,000 for used cars can be accessed from 2024, extending existing incentives.

Installing rooftop solar and home battery storage

The IRA provides 30 percent off the cost of rooftop solar, home batteries and geothermal systems.

Ongoing annual savings

Electrifying space and water heating would reduce energy bills for over 120 million households in the United States across every county and fuel type, saving \$516 per year on average.

Shortfalls of the IRA: what's missing and what could be done better

The full regulatory suite of changes needed

The IRA didn't legislate improved building codes, or vehicle standards, sunset periods for fossil machines or coal-fired electricity generation. All of these pieces would have been more perfect implementations of scheduled emissions reductions and also would have helped stall fuel driven inflation. Unfortunately these key elements weren't able to be included as the Act was limited to only spending measures. Such a limitation does not apply in Australia and we should be ambitious about being holistic in our approach to electrification and addressing the inflationary pressure of rising fuel costs.

The IRA had little funding for transmission and grid upgrades, which were largely addressed in the separate climate bill, the [IIJA](#), where up to \$65 billion is directed towards the grid and critical clean energy technologies. Around \$8 billion was allocated in the IIJA for vehicle charging infrastructure.

Embedding an equitable transition

The IRA attempted to focus as many resources as possible on Low-Middle-Income (LMI) households and Environment Justice (EJ) communities. It fell somewhat short of this goal because the Act was largely tax incentive based—a regressive Act in the sense that not everyone will be able to afford the capital to take advantage of the incentives. [Here](#) is an excellent analysis of equity aspects of the bill by the Just Solutions Collective.

Incentives play an important role in moving homes towards modern, electric appliances and vehicles, but this needs to be paired with access to finance and pathways for renters to electrify.

Including commercial and small business

Not all sectors of the U.S. energy economy were adequately addressed in the IRA, which will limit the emissions reductions potential, though [analysis from Jesse Jenkins](#) of Princeton suggest the Act could achieve as much as 42% emissions reductions. The IRA was very strong on residential sector electrification but was less strong on the commercial and small business sector. There is a huge opportunity to support businesses with the transition to clean electric appliances, that will generate cost savings and drastically reduce domestic emissions.

Including industrial electrification

There is very little additional research funding for the sectors of the economy for which there currently are not zero emissions solutions: heavy industry, high temperature industrial heat, cement, steel, etc. Apart from the manufacturing incentives, and a small \$5.6 billion for advanced industrial facilities targeting steel and cement, there was not nearly the resources spent on industrial decarbonization as is justified by the importance of this heavily emitting sector.

Supporting modal shifts in transport

The IRA does not include rebates for electric bicycles, even though these are an increasingly popular zero-emission solution to short-distance mobility. In fact, there is very little funding for public transport in the Biden climate acts so far.

What can the Biden Administration do to further reduce climate emissions by 2030?

Rewiring America's "[Electrify My Government](#)" has nine overarching recommendations and 30 specific policies for federal agencies to accelerate economy-wide electrification and help get us closer to Biden's goal. This includes training and workforce development, government procurement, electrification of schools, electrification of public and social housing and government buildings, aggressive building, vehicle and appliance standards, and perhaps most importantly packaging federally guaranteed mortgages with electrification financing.

What are the risks to Australia?

The IRA is intended to permanently alter American and global supply chains and workforces towards electric appliances, electric vehicles and clean and renewable electricity. By not matching the intensity and ambition of the IRA, Australia could find itself the dumping ground of last century's technologies as corporations focus their supply chains towards America.

America is consciously choosing domestic manufacturing clauses to keep as much of the production and assembly of solar, batteries, electric vehicles, heat pumps, and even electric appliances, within the U.S. as possible. Either Australia aligns with the international coalition willing to do this decarbonization and becomes a supplier of components and raw materials and perhaps value added products, or it will be left behind in last century's economy.

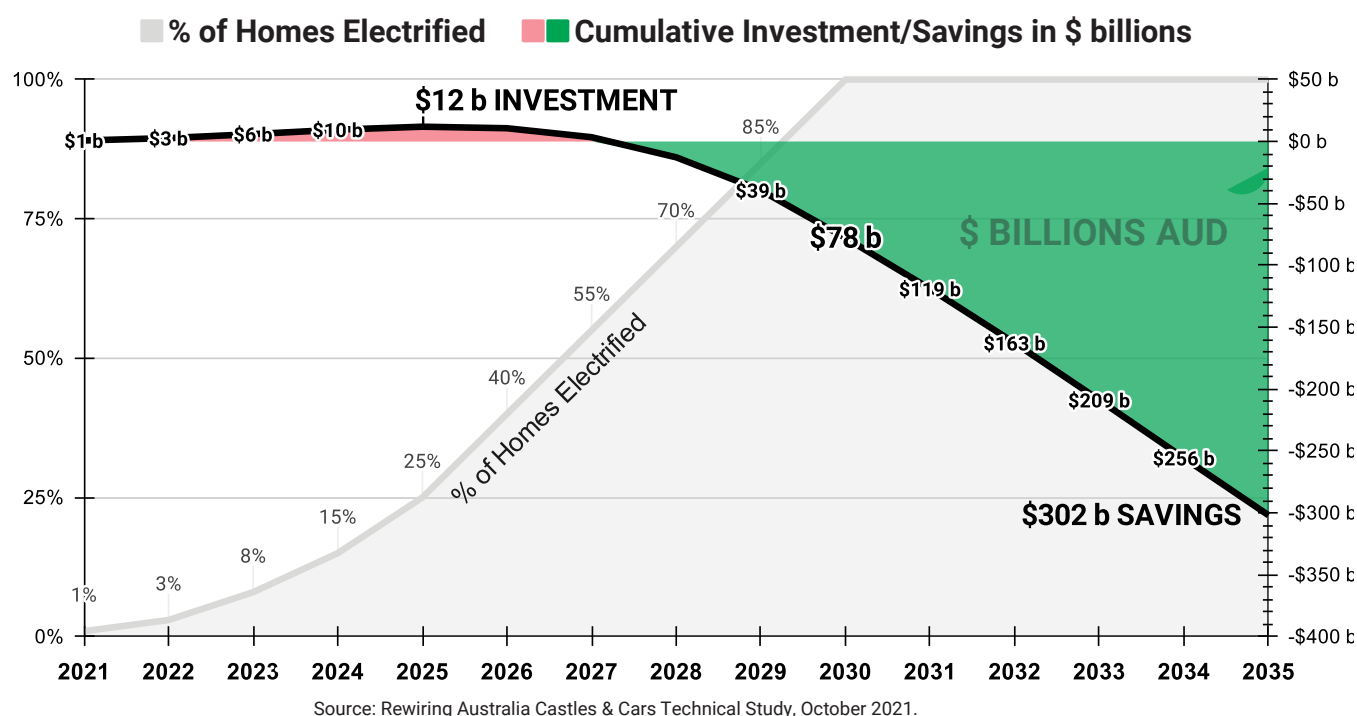
What are the opportunities for Australia?

Australia leads the world on rooftop solar, on household batteries, and the digital integration of these DER assets. Our mild climate, and relatively high price of petrol, diesel, and natural gas, mean that the economics of electrification are attractive in Australia before they are in America. With a large commitment to electrification, Australia can reap the economic savings sooner, pass the savings onto real Australian families, and achieve the near-term emissions reductions required to meet and exceed our climate emissions targets. If Australia capitalised on this natural advantage there would be ample opportunity to export these integrative and digital technologies to the U.S. as they follow us in mass electrification. The economics of the domestic savings to Australia from total household electrification is summarised in Figure 5 below.

Figure 5

Australia - Cumulative Investment and Savings with Accelerated Electrification

Accelerated ramp in homes electrified per year to 100% electrified in 2030. Investment/Savings in \$ billions.



Australia can afford to be very ambitious. We succeeded with the federal STC program for solar in transforming the marketplace for rooftop solar, creating the cheapest retail electricity in human history. With a similar incentive scheme that buys down the upfront cost while these electrification technologies are still high in capital cost, we can systematically lower the cost of whole-household electrification for everyone. Ultimately, we will phase out those rebates the same way we are currently phasing out the STC now that rooftop solar works economically without subsidy.

What should Australia prioritise in legislating a more ambitious Inflation Reduction Act

Direct incentives for homes to electrify

Households need direct support to shift to the modern electric versions of their current gas appliances, specifically to install: heat pump hot water heaters, heat pump space heaters (reverse cycle air conditioners), electric cooking, and to power those appliances install rooftop solar with storage capacity in household and community batteries. Up-front discounts on the purchase of electric appliances will make the choice to switch to electric easier for homes and further maximise the energy savings received by homes.

Over the 10-20 year lifetimes of the vehicles and appliances the savings on energy bills more than pay for the up-front costs. The challenge is the credit or cash access to enable these downstream savings.

Support to electrify through accessible and affordable finance

Incentives and discounts should be paired with cheap, accessible finance. The CEFC should facilitate low-interest loans for electrification. Access to finance is also critical. In the best of all worlds, this would be paired with loan guarantees for electrified housing. Many homes may not have access to lines of credit; the government can play an important role as a guarantor. This is a low-risk bet for the government—the ongoing energy savings captured by newly electrified homes will cover the upfront costs of the capital investment over time.

Market certainty through building codes and regulations

Retrofitting buildings with energy efficiency isn't always the cheapest option, and we should embrace transforming our built environment as a long project best achieved through all-electric building codes with tighter envelopes. Building and electrical codes should be optimised to reduce the soft costs and installation costs of electrification.

Best-in-class vehicle standards with a sunset date for cars that produce emissions would promote Australia as a leader, not follower, on emissions reductions and put us at the front of the supply chain line.

Reform the tax-code to disincentivise fossil fuels and incentivise electrification

Much of what is achieved in the IRA is through the tax-code and incentivising tax concessions for electrification expenses. Removing subtle and hidden subsidies for fossil fuels and promoting tax incentives for zero-emission electrification should be a priority for our tax code.

Investment in electrifying public and social housing

The Australian government owns and funds much of Australia's housing for our lowest income households. These homes can be set to save on cost of living for the next decade if they have the support they need now to access solar and electrified appliances and cars. Public and social housing assets should be the starting place for investment in modern electric appliances, through both the proactive replacement of gas appliances as well as ensuring no new gas appliances are installed in homes when they break down. Low-income households stand to benefit proportionately much more from the low operational costs of electric vehicles.

Testing intensive electrification through community pilots

Now is the time to run trials of full electrification in Australian communities at scale. Pilots would be focussed in a particular suburb or postcode area and fully electrify 500-2,000 homes. This will create the knowledge and experience that enables a faster, smoother transition to bring along all Australian homes. These communities can be "living laboratories" for best practices. Demonstration communities will showcase the role electrified homes can play in reducing grid infrastructure costs, balancing the grid, and generating a significant proportion of their own energy. It will develop the industry, jobs, and frameworks required for Australia to lead the world in this transition, and output the products and learnings that Australia can export to the world.

Selling the benefits of electrification to the community

Historically Australia has been quite effective at public communication of publicly good policy. Many households remain unaware that electrification is their most effective path to combating climate change. Many households are unaware that indoor and community air quality is our leading cause of respiratory illness and that both can be addressed through household and community electrification with renewables.

Building the skilled workforce for installations

Electrification can create hundreds of thousands of jobs. It's important that our workforce has the support to learn the skills they will need to install and service this future. We need a shared vision of the machines that will make up all future homes, so electricians, HVAC technicians, plumbers, and builders understand what homes will need and how they can use their skills and business to facilitate the transition. TAFE and industry lead RTO's would be a logical place to scale-up our commitment to zero-emissions workforce development.

All of government(s) response

Emissions reduction is urgent and cuts across all layers of Australian government. An effective program of electrification needs to be well-coordinated and holistic. The government should establish an Office of Electrification, which will act as a co-ordinating body within the Department of Climate Change, Energy, the Environment and Water and would be responsible for:

- National and state electricity policy and market design (e.g. wholesale demand response, two-sided market reform)
- Safety and technical standards (EV charges, DER management systems)
- Workforce development (training, apprenticeships, accreditations, skill shortages)
- Supply chain (manufacturing, bilateral trade agreements)

A comprehensive and focussed R&D agenda that exploits Australia's strengths

Australia has an opportunity to become a world leader in electrifying the primary production of materials from ores and doing so with renewables. This however is reliant on increased funding for targeted primary industry and manufacturing. Emphasis on start-ups and innovators alongside at scale producers is needed to most effectively harness a diverse set of contributors.

Prioritise transition communities and use of existing infrastructure

The existing footprint of Australia's fossil industry, including mines and generation facilities, freight rail, transmission pipelines and transmission lines connects existing fossil industry communities. This footprint is significant and if repurposed for renewable generation and transition represents a pathway to transition communities and jobs towards our 21st century energy infrastructure.

About Rewiring Australia

Rewiring Australia is a research and advocacy organisation focussed on mass and rapid electrification of homes, vehicles, business and industry. Founded in 2021 by Dr Saul Griffith, Rewiring Australia highlights the positive climate and economic outcomes possible for Australia, and the world, with electrification of fossil fuel machines. www.rewiringaustralia.org

In addition to founding Rewiring Australia, Saul Griffith is also the co-founder and Chief Scientist of Rewiring America. Rewiring America and Saul worked closely with the Biden Administration in the drafting of the Inflation Reduction Act to drive investment in clean electric machines and in supporting households and the larger U.S. economy to electrify.

www.rewiringamerica.org

Additional Information

The Act can be found here

<https://www.congress.gov/bill/117th-congress/house-bill/5376/text>

The Budget assessment can be found here

https://www.cbo.gov/system/files/2022-08/hr5376_IR_Act_8-3-22.pdf

Additional Resources:

- Sierra Club Fact-Sheet: [Real-World Benefits of the IRA's Historic Climate Investments](#)
- Rewiring America [Savings Calculator](#)
- Rewiring America [Updated Savings Map](#)
- RMI - [The Inflation Reduction Act Could Transform the U.S. Buildings Sector](#)
- National Housing Trust [IRA policy brief on affordable housing](#)
- Center for American Progress on [Inflation Reduction Act](#)
- Department of Energy on the [Defense Production Act](#)
- The Whitehouse summary of the [Infrastructure Investment and Jobs Act](#)

