

Submission FSR Project, Electricity Authority. 14 Dec. 2021

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The Authority's FSR project is based on Transpower's proposed increase in generation by two thirds - and Transpower's attached report goes beyond that and chooses the most ambitious of their growth scenarios, to nearly double today's electricity demand. A basic flaw in this vision has never been addressed, that the energy return on energy invested (EROI) of wind and solar energy is far less favourable than the EROI of existing power stations, especially the hydro that still provides around half our electricity.

Wikipedia describes EROI under rapid growth: "A related recent concern is energy cannibalism where energy technologies can have a limited growth rate if climate neutrality is demanded. Many energy technologies are capable of replacing significant volumes of fossil fuels and concomitant greenhouse gas emissions. Unfortunately, neither the enormous scale of the current fossil fuel energy system nor the necessary growth rate of these technologies is well understood within the limits imposed by the net energy produced for a growing industry. This technical limitation is known as energy cannibalism and refers to an effect where rapid growth of an entire energy producing or energy efficiency industry creates a need for energy that uses (or cannibalizes) the energy of existing power plants or production plants."

The European Environmental Bureau published a critique of Europe's Green Growth agenda, <https://eeb.org/decoupling-debunked1/> noting that "green growth clearly dominated policy-making with policy agendas at the United Nations, European Union, and in numerous countries building on the assumption that decoupling environmental pressures from gross domestic product (GDP) could allow future economic growth without end." They note that "there is no empirical evidence for such a decoupling currently happening. This is the case for materials, energy, water, greenhouse gases, land, water pollutants, and biodiversity loss for which decoupling is either only relative, and/or observed only temporarily, and/or only locally." They conclude that "addressing environmental breakdown may require a direct downscaling of economic production and consumption in the wealthiest countries", and call for "a new conceptual toolbox to inform and support the design and evaluation of environmental policies".

The FSR project addresses only the short- "resilience" of the bulk electricity supply system, and specifically excludes resilience to dry hydro years. In fact resilience is needed, and could be provided, at local levels often with far less investment in materials, and lower energy losses. Two of the most important providers of local resilience would be rooftop solar panels with batteries, and local wood burning in both houses and community facilities including papakainga, schools or other community centres.

Rooftop solar will be suppressed by the massive solar projects now proposed, which could provide so much energy at favourable times that paybacks for individual rooftop installations would fall so as to make them completely uneconomic, becoming the preserve of wealthy consumers instead of means for communities to reduce hardships to their members. The FSR project should include a comparison of costs and benefits between bulk supply solar farms and community solar, the latter fostered by electrical microgrids. A true "Future Security and Resilience" project requires such a widening of scope.

Local wood burning is more interesting and truly demands independent (of Government policy) analysis. It should score highly on EROI analysis because home wood stoves contain little embodied energy; the good ones use firebrick or castable refractory to contain the fire so it burns hot and

reasonably efficiently. Today the firewood market is transport-intensive, with much of our commercial firewood brought in from long distances, such as the central North Island. But the flameless combustion stove now being researched by Ian Cave is burning billets of locally grown green wood such as pine, wattle or willow - or even wet pine cones - with no visible smoke emissions. Thus wood could be left to grow in most years, and cut in dry years when electricity is scarce. Now that's resilience indeed, without a \$4 billion investment in Lake Onslow.

The July floods in the Ahr valley in Germany killed over 100 people; the biggest problem for the population is now how to survive the winter just started in their flood damaged houses. Electricity supply was partially reestablished within a few weeks, but capacity is insufficient to make houses habitable in freezing conditions during the winter. There is now a huge wave of solidarity, especially from farmers all over Germany, to provide firewood): [in German but you get the point from the video:] <https://www.br.de/mediathek/video/ueberschwemmungen-hilfe-fuers-ahrtal-av:61a49d6b4b43f400070ff50e>

I call on the Electricity Authority to hold a workshop to discuss the role of local energy supply and energy efficiency in providing resilience to electricity outages, especially those driven by climate change, with a view to comparing EROI of investment in bulk electricity supply against investment in local energy options, microgrids, and energy efficiency.