Cost of the Transition to Renewables

This submission concerns a key statement in the ISP underlying the planned changes to our electricity generation to support Net Zero. The statement is on page 44 of the draft-2024-isp.pdf, Under the heading “Part B: An optimal development path for reliability and affordability”.

Here is the statement: “Renewable energy connected with transmission, firmed with storage and backed up by gas-powered generation is the lowest cost way to supply electricity to homes and businesses throughout Australia’s transition to a net-zero economy.“

The above statement referring to our renewable energy conversion being lowest cost is thoroughly refuted in the German paper, translated to English, Ref 1. Please refer to that paper for full details but I have selected key sections below {in italics} to illustrate why our planned conversion to renewables, as described in the ISP, is a huge waste of resources and an unnecessary destruction of our environment.

Abstract

Understanding electricity generation’s true cost is paramount to choosing and prioritizing our future energy systems. This paper introduces the full cost of electricity (FCOE) and discusses energy returns (eROI). The authors conclude with suggestions for energy policy considering the new challenges that come with global efforts to “decarbonize”.
In 2021, debate started to occur regarding energy security (or rather electricity security) which was driven by an increase in electricity demand, shortage of energy raw material supply, insufficient electricity generation from wind and solar, and geopolitical challenges, which in turn resulted in high prices and volatility in major economies. This was witnessed around the world, for instance in China, India, the US, and of course Europe. Reliable electricity supply is crucial for social and economic stability and growth which in turn leads to eradication of poverty.
We explain and quantify the gap between installed energy capacity and actual electricity generation when it comes to variable renewable energy. The main challenge for wind and solar are its intermittency and low energy density, and as a result practically every wind mill or solar panel requires either a backup or storage which adds to system costs.
LCOE is inadequate to compare intermittent forms of energy generation with dispatchable ones and when making decisions at a country or society level. We introduce and describe the methodology for determining the full cost of electricity (FCOE) or the full cost to society. FCOE explains why wind and solar are not cheaper than conventional fuels and in fact become more expensive the higher their penetration in the energy system. The IEA confirms “…the system value of variable renewables such as wind and solar decreases as their share in the power supply increases”. This is illustrated by the high cost of the “green” energy transition.
We conclude with suggestions for a revised energy policy. Energy policy and investors should not favor wind, solar, biomass, geothermal, hydro, nuclear, gas, or coal but should support all energy systems in a manner which avoids energy shortage and energy poverty.
All energy always requires taking resources from our planet and processing them, thus negatively impacting the environment. It must be humanity’s goal to minimize these negative impacts in a meaningful way through investments – not divestments – by increasing, not decreasing, energy and material efficiencies.
Therefore, the authors suggest energy policy makers to refocus on the three objectives, energy security, energy affordability, and environmental protection. This translates into two pathways for the future of energy:

(1) invest in education and base research to pave the path towards a New Energy Revolution where energy systems can sustainably wean off fossil fuels.
(2) In parallel, energy policy must support investment in conventional energy systems to improve their efficiencies and reduce the environmental burden of generating the energy required for our lives.
Additional research is required to better understand eROI, true cost of energy, material input, and effects of current energy transition pathways on global energy security.

EROI

EROI measures the net energy efficiency of an energy gathering system. Higher eROI translates to lower environmental and economic costs, thus lower prices and higher utility. Lower eROI translates to higher environmental and economic costs, thus higher prices and lower utility. When we use less input energy to produce the same output energy, our systems become environmentally and economically more viable. When we use relatively more input energy for each unit of output energy, we risk what is referred to as "energy starvation."

Figure 6 represents the results in Ref 2.

It shows that the Full Cost of Electricity is highest for renewables and lowest for coal and gas power.
It shows that the Energy Return on Investment is highest for Nuclear and lowest for Renewables.

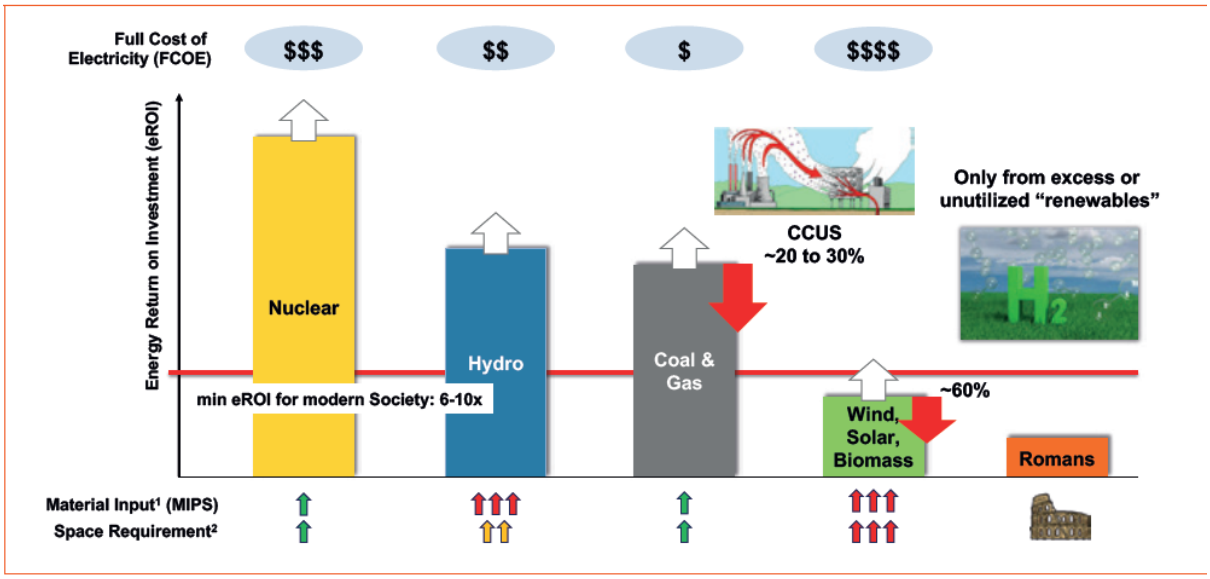

Figure 6: The Concepts of eROI and Material Efficiency – Illustrative
Note: white arrows illustrate future technological improvements, red arrows illustrate loss of energy and therefore loss of eROI from CCUS or "green" H_2 systems; (1) Material Input MIPS measures the resource efficiency, i.e., material input required per unit of output, here for example MW capacity or MWh of produced electricity. (2) Space requirement measures the land footprint per unit of electricity produced.
Source: Schernikau Research and Analysis

Conclusion

If we account for the Full Cost Of Electricity, it is clear that the cost of nuclear is actually less than that of renewables. This certainly seems plausible in Australia. We are beginning to understand the enormous environmental and social costs of the destruction of vast areas of productive and valuable farmland and bushland to accommodate renewables. This involves thousands of hectares of solar panels, and most available skyline ridges strewn with windmills. Not to mention the enormous pylons marching across our land to connect power generated remotely to where it is used. This results in a huge loss of power in the long transmission links. These pylons interrupt normal use and fire protection of the farms they are imposed on. Nuclear power stations, including modern modular stations, could avoid all of that by simply locating where coal fired power stations had been. Nuclear power also eliminates the need for costly backup and firming.

Given that China, Russia, India and other countries are in no hurry to reduce their massive CO2 output., Net Zero by 2050 from the one percent CO2 source, Australia, is what might well be referred to as an "Own Goal" given that it has the potential to reduce our standard of living whilst vandalising our environment.

Please cease this rush to unreliable, anti-social, expensive and unnecessary renewables.

Ref 1 Schernikau, Lars and Smith, William and Falcon, Rosemary, En: Full Cost of Electricity 'FCOE' and Energy Returns 'eROI' De: Strom-Vollkosten 'FCOE' und Energierenditen 'eROI' (March 1, 2022). Reprint of Peer-reviewed paper, DOI: 10.5539/jms.v12n1p96 https://www.ccsenet.org/journal/index.php/jms/article/view/0/47241 Journal of Management and Sustainability; Vol. 12, No. 1; 2022 ISSN 1925-4725 , Available at SSRN: https://ssrn.com/abstract=4000800 or http://dx.doi.org/10.2139/ssrn.4000800

Ref 2 *Weissbach et al. 2013, "Energy intensities, EROIs, and energy payback", Energy 52, S. 210-221,* Energy intensities, EROIs (energy returned on invested), and energy payback times of electricity generating power plants - ScienceDirect

Geoffrey D Houston, PhD

Diddillibah, Qld 4559