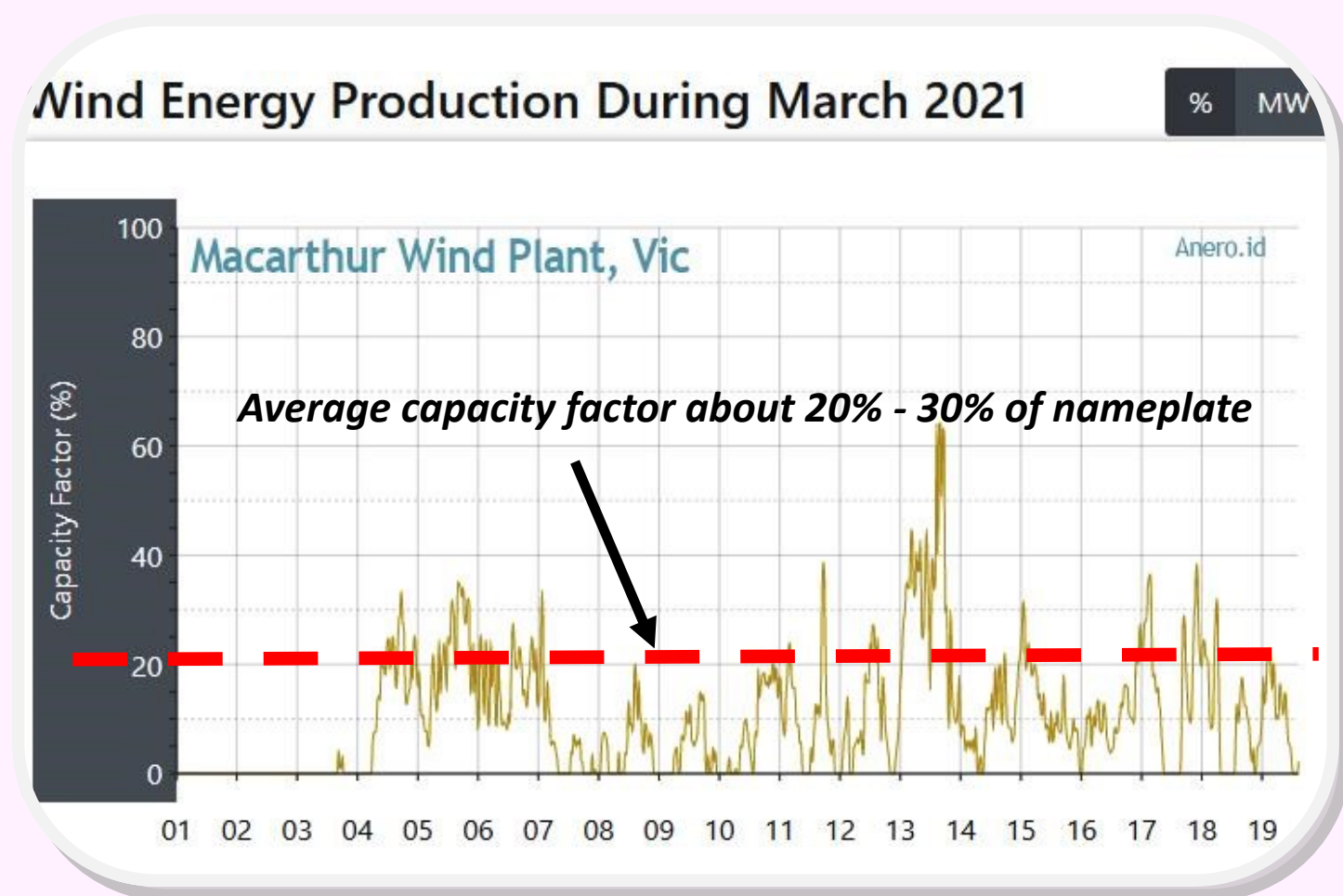


## Energy Density concepts

(continued—PART 5)

**By any measure, renewable energy is simply the low-rent , unreliable option**

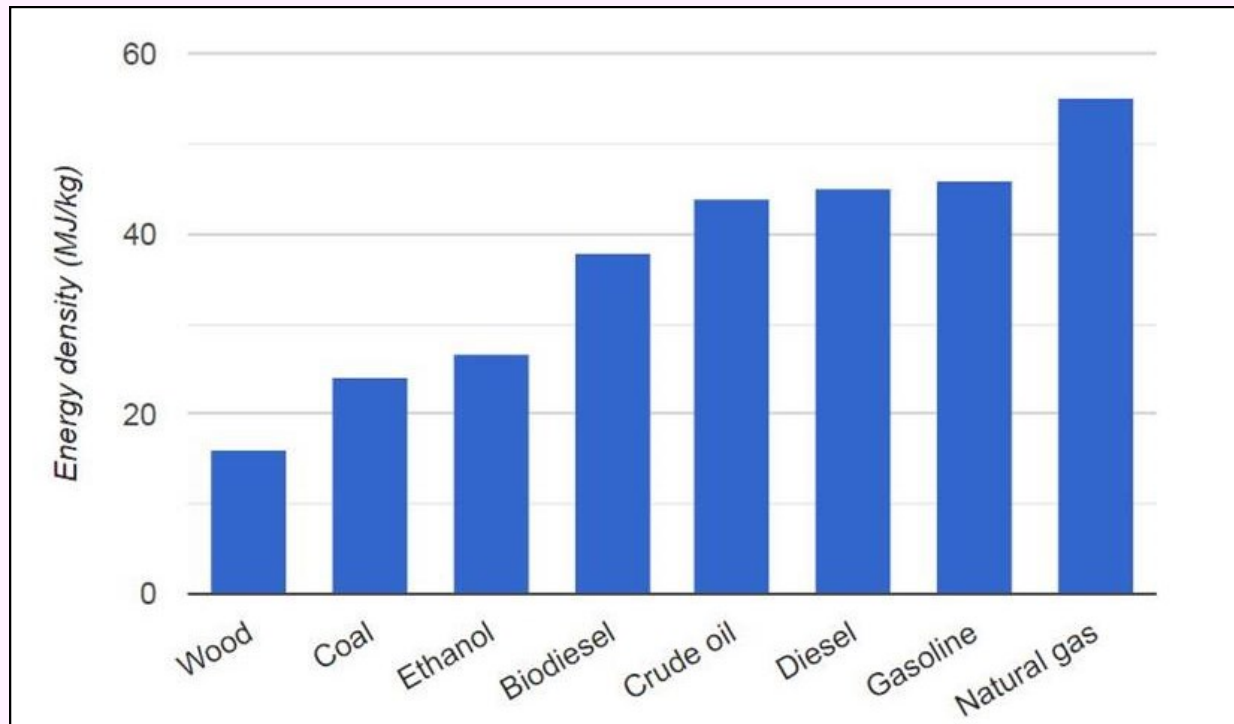


***You cannot run a modern economy requiring baseload, reliable power 24 hours per day using WIND***

# Renewable Energy & Climate Alarmism

## Lies, Myths and Legends

**When it comes to Energy Density, wind, solar and battery are at the FAG END of the scale**



**Matter-dense  
fuels**

**Energy-dense  
fuels**



**Renewables (wood,  
solar, biofuels, wind)**

**Coal**

**Oil**

**Natural Gas**

**Uranium**



**FAG end**

**BEST end**



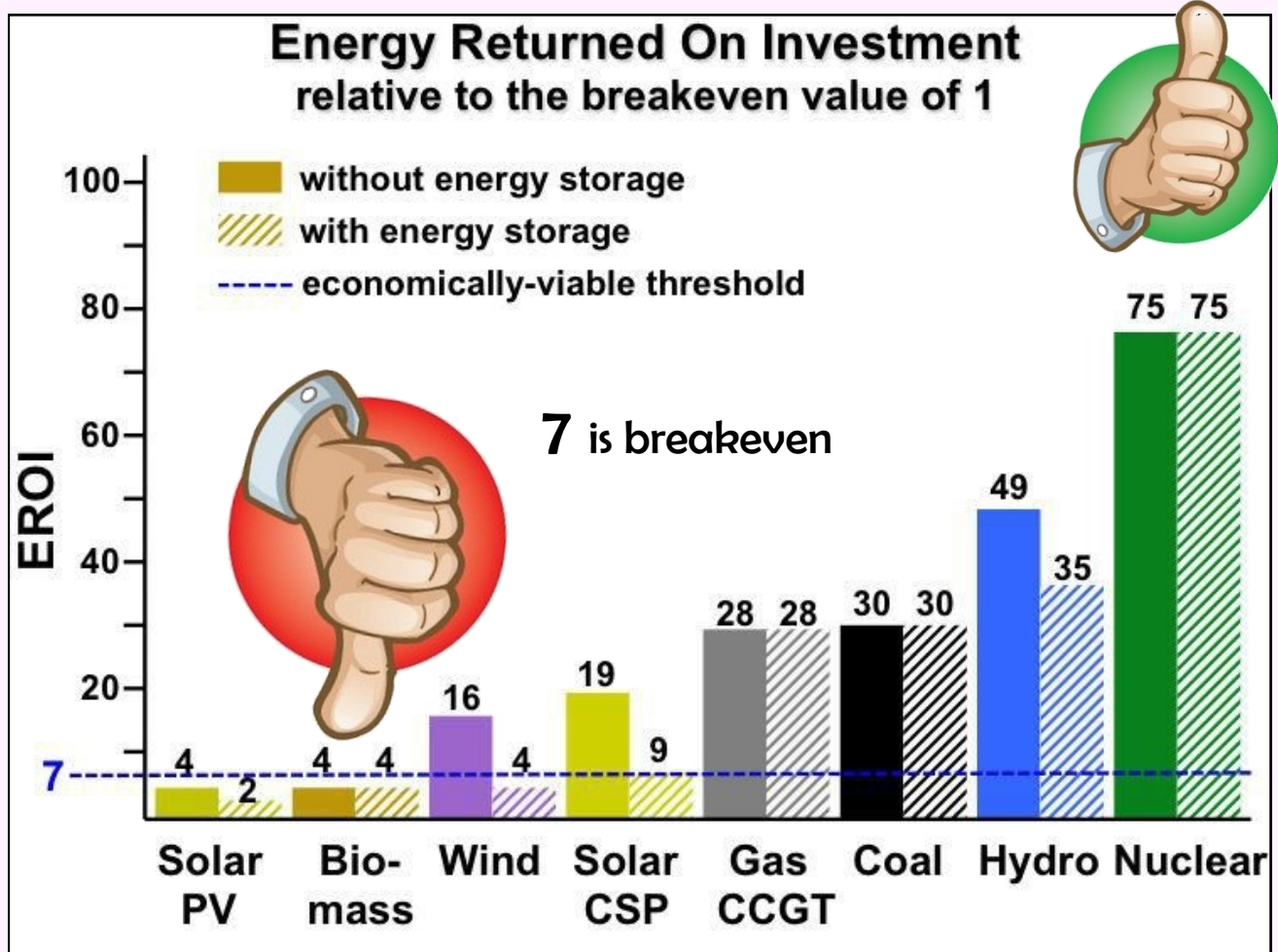
# Renewable Energy & Climate Alarmism

## Lies, Myths and Legends

### Energy Density (continued)

Li ion Battery		0.3 MJ/kg	Renewable energy
Fuel Type ↕	Reaction Type ↕	Energy Density (MJ/kg) ↕	Typical uses ↕
Wood	Chemical	16	
Coal	Chemical	24	Power plants, Electricity generation
Ethanol	Chemical	26.8	Gasoline mixture, Alcohol, Chemical products
Biodiesel	Chemical	38 [8]	automotive engine
Crude oil	Chemical	44	Refinery, Petroleum products
Diesel	Chemical	45	Diesel engines
Gasoline	Chemical	46	Gasoline engines
Natural gas	Chemical	55	Household heating, Electricity generation
Uranium-235	Nuclear	3 900 000	Nuclear reactor electricity generation

Table 1: The energy density(MJ/kg) of a variety of different fuels.[9] Wiki

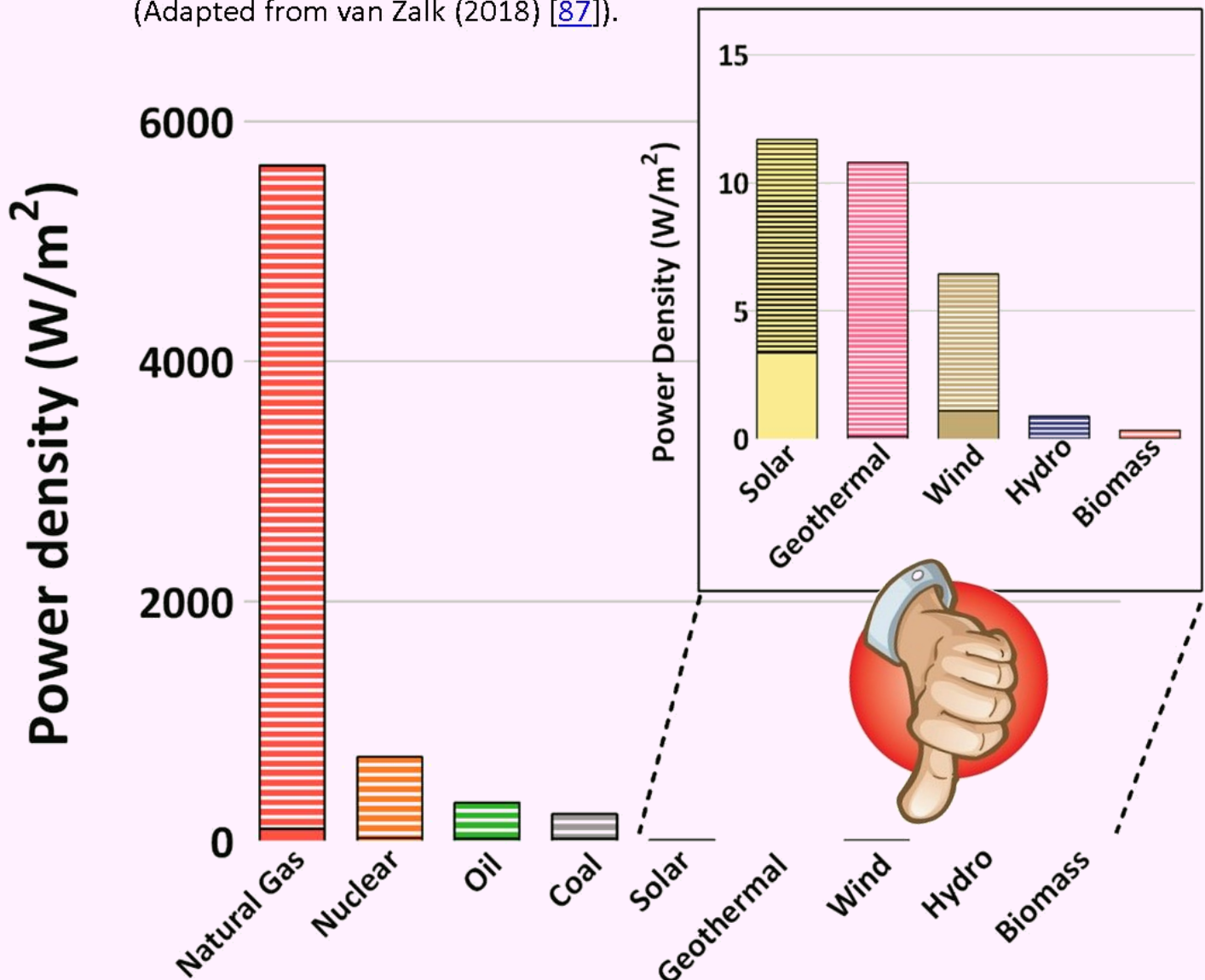




# Power Density

## is related to energy density

**Figure 8.** Power densities for most of the main electricity generation sources. Hatched areas indicate values between minimum and maximum estimates. (Adapted from van Zalk (2018) [87]).





***Believe it: There is NO CLIMATE EMERGENCY***  
***Believe it: 'Zero Emissions' = ECONOMIC SUICIDE***

# Renewable Energy & Climate Alarmism

## Lies, Myths and Legends

### Power Density data

Power Source	Power Density (W/m <sup>2</sup> )	
	Low	High
Natural Gas	200	2000
Coal	100	1000
Solar (PV)	4	9
Solar (CSP)	4	10
Wind	0.5	1.5
Biomass	0.5	0.6



“Power density alone establishes wind as unworthy of the diversion of significant amounts of national wealth, human resources, especially within our governments, and time, all of which could be more productively used. “

<https://www.masterresource.org/smil-vaclav/smil-density-comparisons-v/>, 2010  
(Vaclav Smil)

***Believe it: There is NO CLIMATE EMERGENCY***

***Believe it: 'Zero Emissions' = ECONOMIC SUICIDE***

# Renewable Energy & Climate Alarmism

## Lies, Myths and Legends

### Power Density data

## Meet Vaclav Smil

Václav Smil: born 9 December 1943) is a Czech-Canadian scientist and policy analyst. He is Distinguished Professor Emeritus in the Faculty of Environment at the University of Manitoba in Winnipeg, Manitoba, Canada.

His interdisciplinary research interests encompass a broad area of energy, environmental, food, population, economic, historical and public policy studies. He likes gas.



Professor Smil produced the Power density table shown on our previous page. He said that in 2010, but today attracts the support of Bill Gates, the Microsoft founder who wants to spread fine white clay through the atmosphere to stop 'global warming'. We think Gates is a science nong.

Smil eats meat once a week, and doesn't own a mobile phone. To do so, he says, just takes away time from reading. Smil is given to quotable quotes:-

*"Energy is the only universal currency: one of its many forms must be transformed to another in order for stars to shine, planets to rotate, plants to grow, and civilizations to evolve."*

***Believe it: There is NO CLIMATE EMERGENCY***

***Believe it: 'Zero Emissions' = ECONOMIC SUICIDE***



# Renewable Energy & Climate Alarmism

## Lies, Myths and Legends

### More Power Density data from Dr Smil

***Here is another quote from Dr Smil.***

*“The power density of fossil fuel and nuclear electricity plants is the same order of magnitude of the total power for an average tornado. The power density of wind is closer to that of a horse.”*



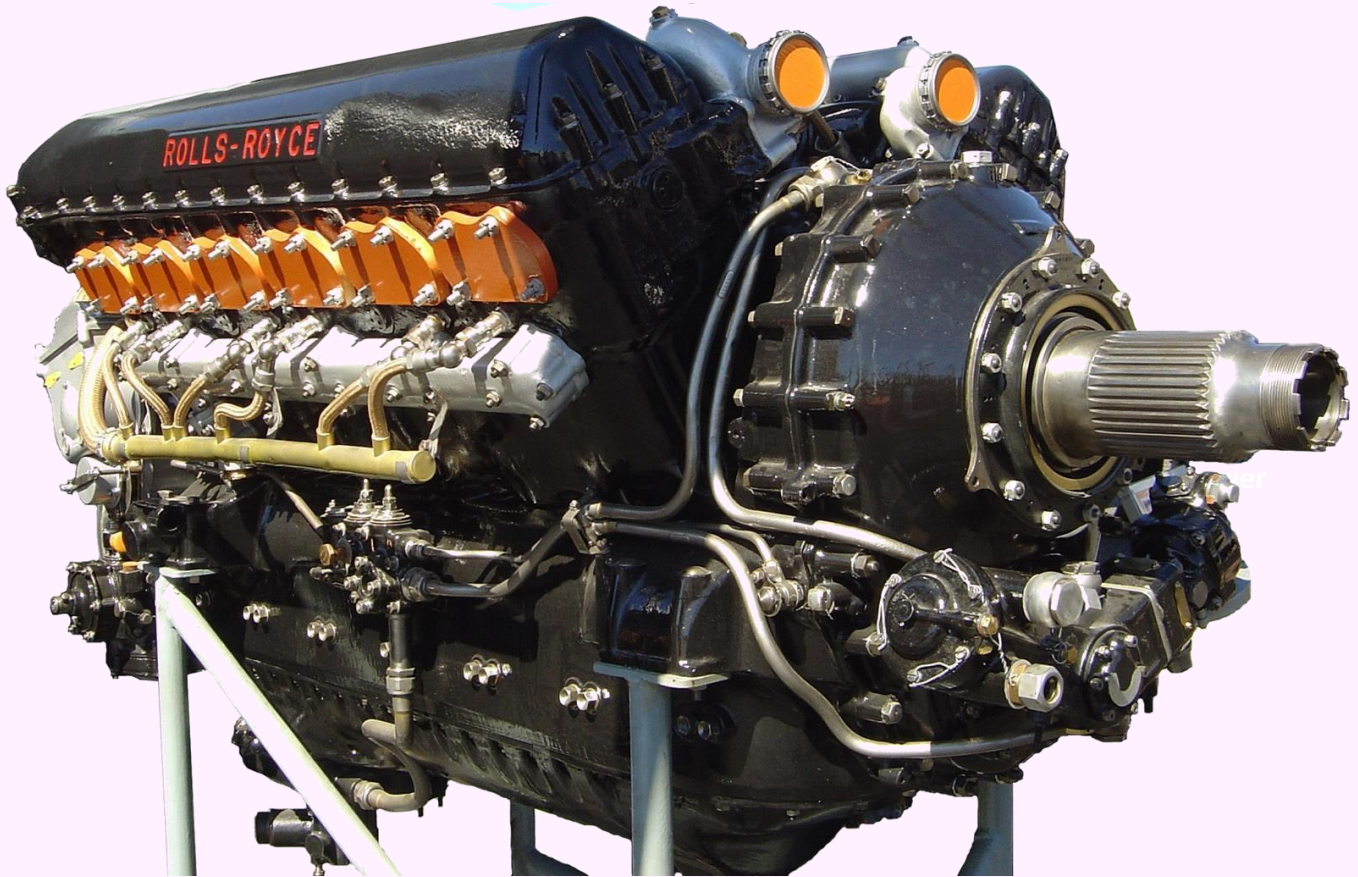
**Wind and solar power—about the same Power Density as a HORSE. . .**



# Renewable Energy & Climate Alarmism

## Lies, Myths and Legends

### A Power Density note from Rolls-Royce



This is the famous MERLIN engine developed by Rolls Royce over a period, and which finally was installed in the Spitfire fighter; it developed about 1700HP, and is credited with winning the Battle of Britain July to October 1940; it was also installed in the Lancaster heavy bomber which helped win the war by the bombing of targets in Germany. ***The story of MERLIN is told by Graham Hoyland in his recent book published 2021.***

***Hoyland wrote on p.54: “As a consummate engineer and maker of electric motors, Henry Royce nevertheless realised the advantage of internal combustion engines: petrol has an energy density 60 times that of a lead-acid battery, and at least 8 times better than modern batteries.”***



## More Energy Density wisdom from Graham Hoyland



We show here a ham and cheese sandwich, priced at \$4.00 , beside an image of a modern Lithium battery priced at about \$500. On page 54 of Hoyland's book about the Merlin engine, we read the following. . . .

petrol tank. And even a ham and cheese sandwich, weight for weight, is around 30 times more energy-dense than the best lithium battery.

***That is why the Hornsdale Tesla battery in South Australia that cost about \$100 million can power all of the state for about 3 minutes, and also gets \$50 million in subsidies from government . .***

<https://joannenova.com.au/2017/12/south-australia-heads-back-100-years-to-diesel-with-battery-back-up>