Falling Down the Energy Ladder

by Viv Forbes
with help from volunteer reviewers.

And

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http://carbon-sense.com/wp-content/uploads/2016/06/energy-ladder.pdf

When man first appeared on Earth he had no implements, no clothes, no farms, no mineral fuels, no machines and no electricity – his only tools were his brains, hands and muscles.

Everything that enables humans to live comfortably in a world where nature is indifferent to our survival has been discovered, invented, mined or manufactured over thousands of years by our inquisitive and innovative ancestors.

The history of civilisation is essentially the story of man's progressive access to more efficient, more abundant and more reliable energy sources - from ancestral human muscles to modern nuclear power. It is also the story of how to store that energy and deliver it with minimal losses to where it is most needed.

There are seven big steps on the human energy ladder –

1. Stone age energy – human energy, fire, stone tools and geothermal energy
2. Energy from farmed animals and plants
3. Solar Power - wind and water
4. Gunpowder and explosives
5. Coal, steel, the steam engine and electricity
6. Oil/gas and the internal combustion engine
7. Nuclear power

Stone Age Energy

Every person on Earth today is descended from a survivor of the recurring Pleistocene Ice Ages. They survived only because they were able to extract energy from a cold, dry, barren environment.

Initially human energy was used to harvest the solar energy concentrated in animals hunted and plants gathered. Some societies multiplied their limited human energy by capturing and using slaves.

Ancient man's first and greatest step up the energy ladder was discovering how to harness and use fire for warmth, cooking, hunting, metal working and warfare. This ability to ignite and control fire is the one thing that clearly separates humans from every other species.

For centuries the main fire-energy fuels were organic natural resources such as wood, charcoal, peat, grass, animal dung and fats/oils extracted from animals and plants. As human population increased, these energy sources became scarce as the land and seas around towns and villages were stripped of their natural carbon fuels.

Moreover, when great ice sheets covered much of the northern hemisphere, trees and firewood were scarce. Also at this time, the large northern hemisphere land surface was absorbing less solar energy because of variations in Earth's orbit, tilt and reflectivity. Keeping warm was very difficult.

But there is usually more volcanic activity at the turning points of major climate cycles. Some lucky cave men discovered geothermal energy - they could bathe and cook in volcanic springs and hot mud, getting pleasure from the warmth, and health benefits from the trace elements present. Geothermal energy also allowed Stone Age people to harvest evaporites containing essential minerals like sulphur and salts of sodium, calcium, magnesium, copper and boron.

Early humans also discovered that stone-age sticks and stones could help them apply their muscle energy more effectively – with more force or at a greater distance.

They used sticks for waddies, digging tools, spears, boomerangs, clubs and later bows and arrows; and stones for clubs, grinders, axes, knives and spear and arrow points. These tools increased their hunting ability, providing food, furs and feathers to generate and conserve body energy.

STONE AGE GREEN ENERGY

The Development of Farming

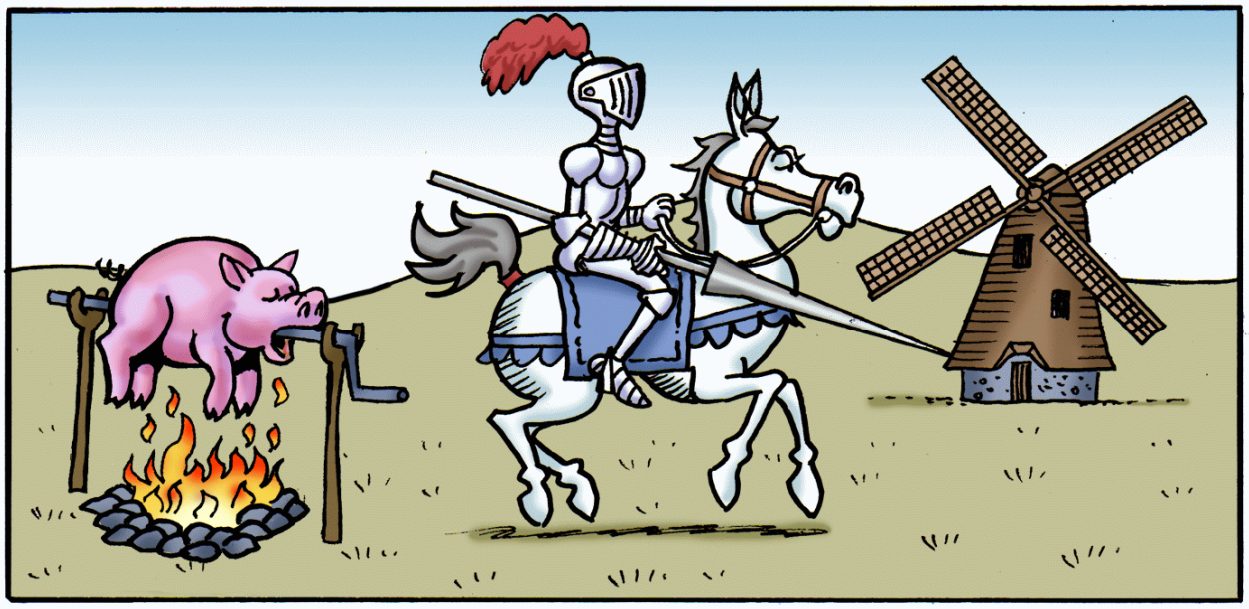
The second step on the energy ladder was built when some smart hunter/gatherers discovered how to access more reliable energy by domesticating animals and plants. This lead to more permanent settlements where sheep, cattle, goats and pigs provided a steady supply of carbon-based food energy, and dogs, horses, donkeys and camels multiplied human energy for transport, hunting and warfare. Farmers also nurtured fruiting trees and grasses such as einkorn, wheat, rice, barley, oats, corn and sugar cane. These provided more dependable and abundant food energy for humans and their animals.

Farmers were soon producing surpluses, which lead to the development of farmers' markets, which are energy conservation mechanisms. Initially farmers bartered with tool-makers and hunters, but the difficulty of matching the needs of buyers and sellers and the wish to store values from good seasons for use in bad seasons, led to the development of special stores of value/energy that came to be called money – shells, gems and eventually precious metals such as gold and silver were found to supply the best money.

Solar Power

About this time humans ascended the third step on their energy ladder – the ability to harness wind/hydro/solar power for sailing ships, windmills, water-wheels, grain mills and drying food.

The low energy density and unpredictability of these weather-dependent energy sources was obvious, even to our ancestors. Sailing ships and windmills could be becalmed for days and then have their sails torn down by violent storms. So the ancient wind-powered societies became keen weather-watchers. They read the signals of winds and clouds, waves and tides and carefully recorded the cycles of the weather and the solar system. Some who follow their methods produce better weather and climate forecasts than today's computer models



MEDIEVAL GREEN ENERGY

Gunpowder and Explosive Energy

The fourth big step was the invention of gunpowder by the Chinese, which gave humans the first glimpse of the enormous power of concentrated chemical energy.

The initial "black powder" was made by grinding and mixing naturally occurring charcoal, sulphur and saltpetre. Modern explosives such as dynamite and TNT were manufactured using acids and glycerine. There were many industrial accidents before safe methods of manufacture and transport were invented.

The energy concentrated in explosives led to their widespread use for hunting, armaments, civil engineering and entertainment. Modern mining and quarrying is totally dependent on the use of explosive energy.

Coal, Steel, Steam Engines and Electricity

The fifth energy step was gigantic, with three elements – coal, the steam engine and electricity.

Coal has been used for centuries for cooking, home heating and black-smithing (when Captain Cook sailed up the Australian coast in 1770, he had a supply of coal in the hold of his wind-powered ship, “The Endeavour”.)

The real energy revolution was born in the 1760’s when James Watt developed a more efficient coal-powered steam engine. Then in 1829, Robert Stephenson developed a practical steam-powered rail locomotive. Suddenly coal-powered steam engines were moving trains and ships, pumping water and powering factories, traction engines and road vehicles. Early steam engines were driven by coal, but other hydro-carbons, wood, concentrated solar energy or nuclear power can be used.

Some coals convert to coke when heated in the absence of air. This was used as a cleaner fuel in homes as well as becoming an essential raw material to produce the iron and steel that built our modern world.

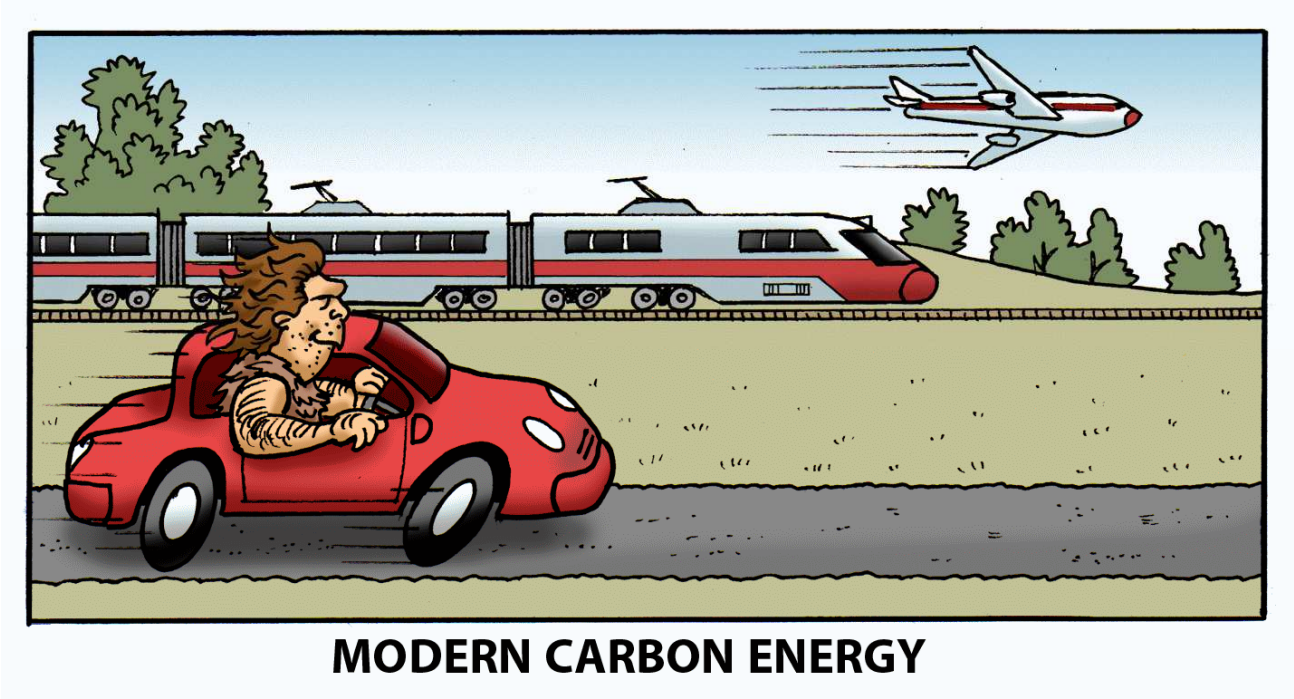
Electricity generated by steam engines powered by coal was the magic tool for making clean energy available cheaply to city dwellers. Coal also provided the raw material for coal gas, which could be stored and supplied easily by pipe for heating and lighting.

Suddenly these two clean silent fuels, coal gas and coal-fired electricity, made redundant all the whale oil lamps, candles, kerosene lanterns, wood burning stoves and coal burning boilers and open fires that were truly polluting the air in homes and cities with smoke, ash, dust, sulphur, soot and at times, the deadly carbon monoxide. All of these real pollutants are removed in modern coal-fired power stations whose clean controlled emissions are mainly nitrogen, water vapour and carbon dioxide, all non-visible, non-toxic, plant-friendly natural gases of life.

Oil and the Internal Combustion Engine

The sixth step on the energy ladder also transformed our world - the discovery and extraction of oil and gas and the invention of the internal combustion engine. The mighty coal-fired steam engine still dominates electricity generation, but the compact and powerful internal combustion engine won the battle to power mobile machines. Suddenly cities that were choking with horse manure found relief in petrol-driven cars, buses and trucks. Being easier to store and transport, oil also replaced coal in ships and was soon powering the mighty British navy, and later still, powered civil and military air fleets.

Steam cars and electric cars got a good work-out over 100 years ago, but neither could compete with the oil-powered internal combustion engine.



These two engines, the coal-powered steam engine and the oil/gas-powered internal combustion engine created the modern world and still provide most of our warmth, light, food, water, mobility and industrial power.

The energy density and abundance of these two hydro-carbon fuels gave an enormous boost to human access to energy, and massively relieved the pressure on natural “green” fuels from forests, whales, bees and animal fats.

The transformation of transport was remarkable. Just 3-4 generations ago, a team of up to twenty bullocks took days or weeks to haul a wagon-load of wool bales, forest logs or bagged wheat to markets, and the bullocks needed fresh supplies of feed and water every night.

In 1896, Henry Lawson described it well in two stanzas from his great Australian poem “The Teams”:

A cloud of dust on the long white road,
And the teams go creeping on
Inch by inch with the weary load;
And by the power of the green-hide goad
The distant goal is won.

But the rains are heavy on roads like these;
And, fronting his lonely home,
For weeks together the settler sees
The teams bogged down to the axle-trees,
Or ploughing the sodden loam

The Teams

(this photo is held by Viv Forbes (whose father started his working life as a bullock driver hauling logs from Mount Lindsay in Northern NSW). This photo was taken by a pioneer clergy-man in the Boonah area)

Cattle and sheep to feed the cities were moved by drovers who spent weeks or even months on the road. Today one diesel-powered road train or semi-trailer on a bitumen road can carry its own fuel and water plus a load of livestock to the distant cities in a day or so. See some carbon powered cattle transport in Australia: *http://www.mbandf.com/parallel-world/australian-road-trains*

Refrigerated trucks do even better – swiftly carrying dressed sides of meat from the abattoir direct to butcher shops.

Here's how sugar beets were delivered to the rail head of the Great Western Sugar Co, in Fort Collins, Colorado, before Henry Ford helped out. *Credit: Colorado State University and WUWT:*

https://dspace.library.colostate.edu/bitstream/handle/10217/41089/_UHSP_Photo_119_tif_jp2000.jpg;jsessionid=fl4avogb4m3z5pz62ws5ea1?sequence=1

Nuclear Power

Earth runs on nuclear power, from the sun and from geothermal heat. The seventh step in the human quest for additional energy was discovering how to harness atomic energy for generating electricity, fuelling naval vessels, in medical procedures and creating even more powerful explosive devices.

If the "zero emissions" evangelists were fair dinkum, they would support emissions-free nuclear power, but it seems that they oppose every energy option that is feasible.

Government and Energy

As mankind was ascending the seven steps of the energy ladder from the stone-age to the nuclear age, governments were also expanding their scope, power and cost.

Most tribes had tribal leaders and warriors who defended small hunting territories and enforced local tribal customs and laws. However, when farming developed, leaders or powerful land-owners discovered that other farmers and their fixed assets could easily have their energy taxed to pay for their own “protection”. This encouraged the development of central governments with their officials, tax collectors, police and soldiers. To defend their generally increasing appetite for tax revenue, governments needed a continual supply of real or imagined dangers to justify their taxes. And they learnt how to clip and debase the currency diverting value secretly to their own ends.

From this point on, government power has increased with each real or invented community crisis – from village control, to district, state, federal and continental governments. The latest such “crisis” concerns “global warming” or “the climate crisis”, which is being milked endlessly to promote global carbon taxes and global government.

Nothing stands still on planet Earth. Since the dawn of time, Earth has seen continual geological and climatic change – shifting continents, rising and falling sea levels, volcanos and tsunamis, droughts and floods, migrations and extinctions, hurricanes and heat waves, ice ages and warm eras. Man has not controlled or caused any of them.

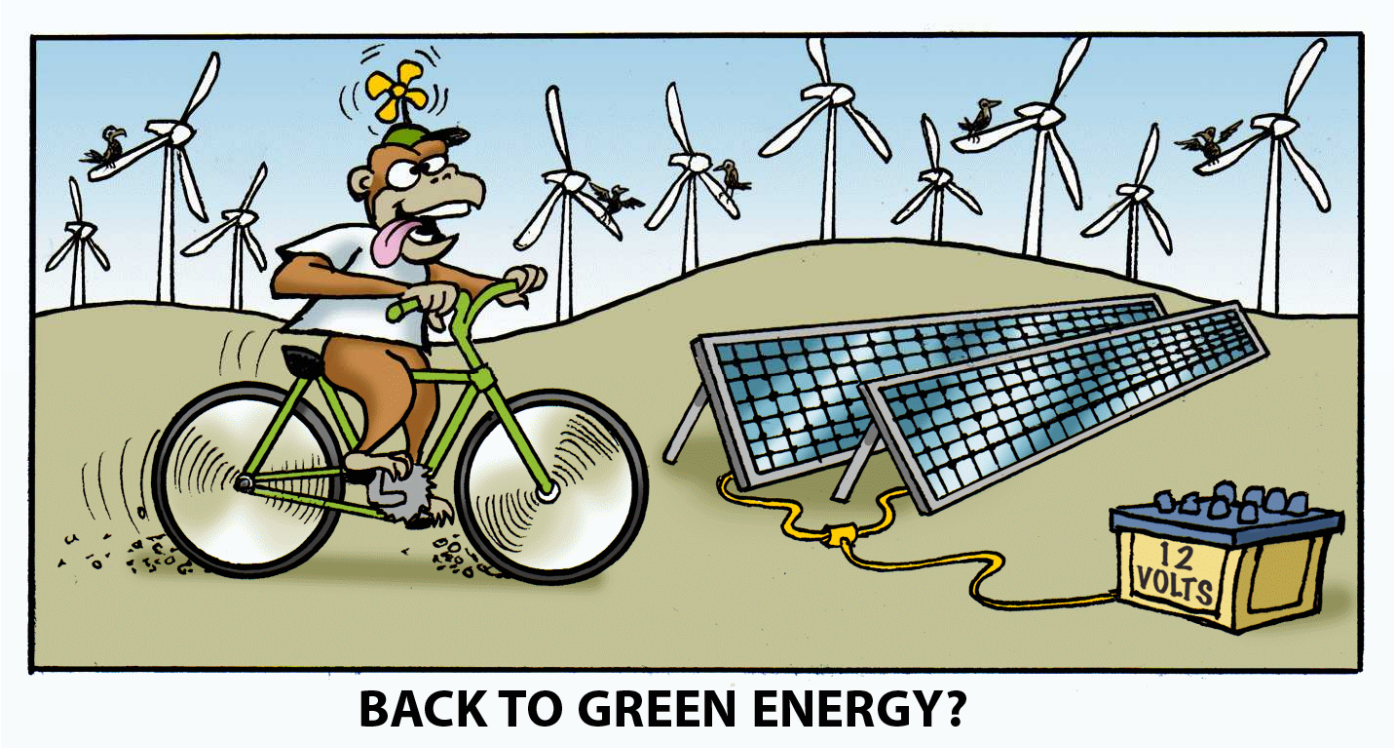
Humans flourished in the warm eras and suffered in the cold dry eras. Climate will continue changing, but one thing is certain - access to abundant, reliable energy is the key to surviving future climate challenges.

Today’s massive global human population owes its existence, prosperity and comfort to our economical and reliable energy supplies, particularly the hydrocarbon fuels – oil, coal, and gas. The world supports more people than ever before, with fewer famines; but those with access to abundant reliable energy supplies have stabilised their populations and contribute most to caring for nature, culture and the poor. The carbon dioxide recycled by the usage of hydrocarbon fuels is greening the world and adding to food supplies as native and farmed plants flourish in the warm, moist, carbon-rich atmosphere.

Back Down the Energy Ladder?

This long history of energy progress is now under threat from strong forces using any environmental alarm to deny human access to efficient energy. Using every sensational scare that can be whipped up, they tax, oppose, hamper or restrict farming, forestry, fishing, grazing, irrigation, mining, exploration, hydro-carbon fuels, steam engines, combustion engines and nuclear power. The “zero-emissions” zealots want to force us backwards down the energy ladder to the days of human, animal and solar power. They oppose the main thing that sets us apart from all other species – the controlled use of fire from explosives, coal, oil, gas or nuclear power.

They have yet to explain how our massive fleet of planes, trains, tractors, harvesters, trucks, road trains, container-ships and submarines will be powered and lubricated by windmills, treadmills, windlasses, solar energy, distilled whiskey and water wheels.



Western nations, driven by a global agenda of climate alarmism, are destroying their profitable industries with carbon taxes; and their promotion of expensive, intermittent green energy is pushing us back down the energy ladder; and our competitors in Asia are climbing the energy ladder as quickly as they can. At the same time, the enormous waste of public money on government promotion of the climate industry has created a global fiscal mess.

Unless reversed, this wasteful de-energising policy will drive much of the world's population back to the poverty and famines which often prevailed in the past. Some see the inevitable de-population this would cause as a desirable goal.

Green energy zealots want to push everyone off the energy ladder which has given us the modern world.

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All cartoons were created by Steve Hunter. They may be reproduced providing the artist and the Carbon Sense Coalition are acknowledged.

Disclosure: Viv Forbes is a science graduate, geologist, mineral economist, farmer and Chairman of the Carbon Sense Coalition. He has spent a lifetime in formal and informal study of climate, weather and the science and economics of natural hydro-carbons. He has a vested interest in getting cheap and reliable electricity for farmers, industries and consumers, and in protecting natural grasslands and their soils and grazing animals. He also owns shares in a small Australian company which exports coal to steel mills and power stations in Asia; that market will grow if we destroy our industries in Australia with silly energy policies.

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https://wattsupwiththat.com/2016/06/02/falling-down-the-energy-ladder/

Energy Policy – the de-industrialising lessons from Europe:
http://manhattancontrarian.com/blog/2016/5/9/energy-policy-can-anybody-around-here-do-basic-arithmetic
https://www.manhattan-institute.org/sites/default/files/IB-RB-0516.pdf