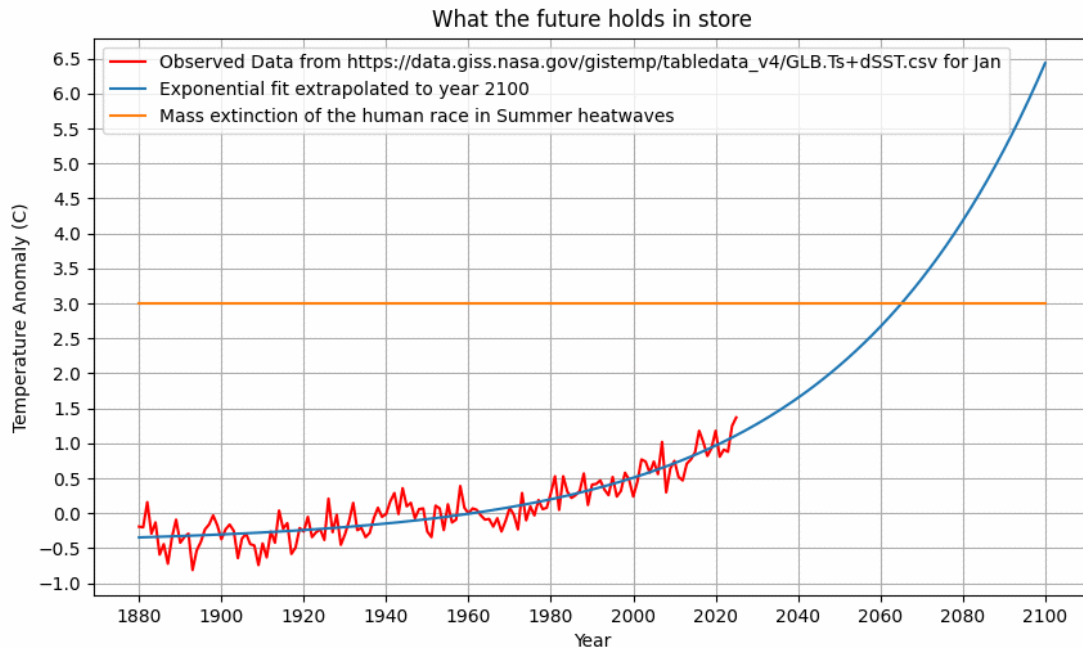


Energy Transition

The Problem

In about 40 years the human race is headed for extinction. People will die by the billions. The cause:- heatstroke during extreme Summer heatwaves, resulting from global warming, failing air-conditioners, and starvation.



As can be seen in this graph, by about **2065**, if nothing is done to prevent it, the global warming anomaly will have reached 3 degrees, resulting in the occasional extreme Summer temperature of **60 C** or more. You might think that if it's only occasional it won't be such a problem. However when it does happen **the majority of the population will die, because the temperature of the human body is about 37 C**. When it gets hotter than this, heat from one's environment starts to flow into the cooler human body, causing catastrophic organ failure, if the temperature difference is large, and prolonged enough. The larger the temperature difference the shorter the exposure time required to cause death.

Once you are dead, you don't come back to life, despite various TV shows, so the fact that it was only a temporary extreme won't help. You will still be dead.

Even before then, millions are going to die. Currently we only have an anomaly of about 1.5 C, and already tens of thousands are dying in Summer heat waves. Mostly the elderly or infirm, but if the temperature reaches 60 C, everyone will be affected, young and old alike. Furthermore, many of our crops, and almost all of our livestock and fish will also perish, leading to mass starvation amongst the few that survive the heat.

The upward curving lines in the graph are an expression of exponential growth. This is what happens when the result of a process exacerbates or feeds the process itself, creating a vicious circle.

One of the various processes currently underway that is causing this is the melting of the polar ice caps. Ice is much more reflective of Sunlight than open water, so when it melts and vast areas become water instead of ice, the amount of Sunlight reflected immediately back into space

decreases, and the water warms up. The warmer water then melts more ice, completing the vicious circle.

Solutions

There are a number of possible solutions, but all are based on the need to reduce/eliminate the use of fossil fuels as an energy source. Even so, it's going to be extremely difficult to do more than simply delay the inevitable. To that end we need the equivalent of a World wide "Manhattan Project".

Possible alternative energy sources:-

- 1) [Renewables](#)
- 2) [Nuclear Fission](#)
- 3) [LENR](#)
- 4) [Hot Fusion](#)
- 5) [Hydrinos](#)
- 6) [Accelerated decay of radio-isotopes.](#)
- 7) [matter → anti-matter conversion \(the "holy grail"\)](#)

As a planet, we should be working on all of these concurrently, and in fact we already are, just not hard enough.

Renewables

This is the easiest to do, because it is already in production and contributing to our current energy mix. There are actually many different renewable energy sources, varying from Solar to [OTEC](#), but I really only want to concentrate on one of them here, Solar. That is because it is likely to make the greatest contribution, and is also the **most likely** to be developed in the **least efficient** and **most expensive** way available. It is with this in mind, that I offer the following, in the hope of persuading those in power to “see the light”.

There are basically two ways to incorporate Solar energy into the mix.

1. Few large scale utility driven projects.
2. Many small scale local projects.

The first approach usually involves creating large scale solar farms in out of the way places, then adding the power produced to the national grid via new transmission facilities. This is expensive because all those new transmission lines need to be constructed, combined with energy storage in the form of unnecessarily expensive Lithium ion battery parks. It also takes a long time, and one may be assured of the fact that the utilities will have their hand out for Government contributions to the cost.

The second approach is faster to implement, and avoids the construction of any new transmission facilities and battery parks. Furthermore it *need* cost Government nothing, though some incentives would doubtless speed up the process. All that would really be required of Government is the setting of guidelines through regulations, mandates, and standards.

About half of the stand alone dwellings in Australia currently have no Solar installed. Along with commercial building roof space, that’s a lot of perfectly good roof space going to waste. Furthermore, (almost) no shopping centre car parks have solar panel roofing. More space going to waste. Both of these potential types of sites are local to where energy is used, and all are already connected to the grid. This avoids the need to construct additional transmission facilities.

Now the matter of storage. Given that it is the Governments intention to phase out fossil fuelled vehicles, which implies a lot more EVs, the battery capacity of those EVs is going to be enormous, and by itself would probably be enough to function as an adequate reserve for all the Solar power generated. Add to this the fact that those vehicles would then essentially be driving on Solar power, and you have cheap, efficient and local use of resources, without the need to construct expensive battery parks. The vehicle batteries essentially do double duty, so you get “two for the price of one”.

Furthermore, the Government doesn’t need to hand out a cent, because the vehicles are paid for by their owners. As an added bonus, the battery storage that the vehicles represent, is local to where the energy is consumed, so no great demand is placed upon the grid. In fact, grid stress is *relieved*, because solar power that might have overloaded the grid during the day, is instead stored in vehicle batteries to then be used during what is usually the peak grid demand period, thus also reducing stress on the grid during peak hours. To make this possible, two things are needed:-

1. Vehicles capable of bidirectional charging.
2. Bidirectional charging units that are compatible either with the grid directly or with associated Solar inverters, where they allow use of the vehicle battery in place of, or as well as, fixed battery storage.

There are at the moment precious few EVs that are capable of true bidirectional charging, i.e. V2H/V2G. There are also very few matching charging units available, and to the best of my knowledge no hybrid inverters capable of connecting directly with an EV.

This could be remedied by Government **mandating** that new EVs imported into Australia at some point in the near future must be V2H/V2G capable. With this mandate in clear view, industry would quickly adapt, and make it possible. It's not as if the technology doesn't already exist, they just need to know that that's the only way they are going to sell EVs in Australia, and ideally, around the World. Such a mandate would cost the Government nothing, and would steer the country in the right direction, as well as setting an example for the rest of the World to follow.

Regarding chargers, it makes a lot of sense to have the charging capability built into the hybrid Solar inverter itself, obviating the need for a separate charger altogether, and thus saving considerably, even though the inverter would become a bit more expensive. This also automatically implements V2H/V2G, since the ability to exchange power with the grid already exists in solar inverters, and always has done.

Of course there are still chargers needed for dwellings that don't have solar, though with a bit of luck and some common sense, these will become ever scarcer, especially as the word spreads through the population of the savings to be had, by combining solar panels on the roof with EVs in the garage. Note that this option is even more cost effective than the Governments recent fixed battery initiative, and look how popular that is.

An objection to this scenario is likely to be that people tend to be at work when the Sun is shining.

There are solutions to this as well.

1. The "two car" solution.
In this scenario, a family has two EVs, which are alternated between staying at home to charge through the day, and driving to work on the alternate days. Many Australian families are two or more car families anyway, and the "stay at home" car can still be used for short excursions like last minute shopping etc
2. The "night-work" solution. In this scenario, the working hours are shifted, such that the car stays home during the day to charge, and is then driven to work at night. This may not be a very popular option.
3. The "charge at work" option. If the work place has solar panels installed, then the vehicle can be recharged while parked at work. In a pinch it could be recharged from the grid while solar panels on rooftops elsewhere are pumping extra power into the grid, ensuring off peak rates, and concurrently providing backup storage to the grid. In fact some Government regulation could help to ensure that this process was almost revenue neutral to the owner of the vehicle if the driver lived in a home with solar panels on the roof.

Nuclear Fission

The pros and cons of this are well known, so I won't go into it here.

LENR (Low Energy Nuclear Reactions)

Despite hundreds of experiments that have been done in this field, no major breakthrough has yet been achieved. More work needs to be done. This is potentially a widely applicable clean energy source that could provide energy for billions of years. See lenr-canr.org

Hot Fusion

There are various devices in operation all around the World, none of which AFAIK have yet to reach even engineering break even, let alone commercial break even. The most expensive, and IMO the least promising, of these, is ITER.

One of the more promising private ventures IMO is [Helion Energy, Inc.](http://HelionEnergy.com)

Hot fusion, if successful, could supply us with energy for millions of years, or even longer, depending on the method and fuel used.

Hydrinos

This is a “super-chemical” energy source that could potentially supply us with energy for billions of years, due to the fact that in theory it can obtain hundreds of times more energy from a Hydrogen atom than would be required to produce that Hydrogen atom from sea water through electrolysis. It was discovered/invented by Dr. Randell Mills of brilliantlightpower.com, and he has been developing it ever since he first published his book in 1986.

Accelerated decay of radio-isotopes

Almost no work has been done in this area, yet it has the potential to not only supply us with a significant amount of clean energy, but also a way to permanently dispose of radioactive waste from fission reactors that has accumulated over the years in “short term” storage around the World, by converting radio-isotopes into stable nuclei. Apart from actually accelerating the decay of radio-isotopes, an alternative method of rendering nuclear waste safe, is to cause a proton to fuse with the radioactive nucleus. This is probably the type of reaction that is happening in LENR. It renders radioactive nuclei from a fission reactor safe, because the fission reaction itself tends to create daughter nuclei that are “neutron heavy”, and thus unstable. By adding a proton the balance, between neutrons and protons in the nucleus of the atom, is restored in most cases, resulting in a stable nucleus, while also releasing useful energy.

The holy grail of energy production

Matter to anti-matter conversion, followed by annihilating the anti-matter by combining it with ordinary matter is the holy grail because it would supply all our energy needs until the death of the universe in trillions of years time. This sounds exaggerated, but it is not. The most abundant element in the Universe is Hydrogen, and it is this which is converted into anti-matter, then annihilated with even more Hydrogen. Thus as long as there is Hydrogen, we would have energy. IOW as long as the Universe lasts. (If this turns out to be wrong, you can you will have the last laugh in trillions of years time.)

This conversion process has effectively already been done on a small scale by [Prof. Emeritus Leif Holmlid](#) from the University of Gothenburg. The process is being developed by lazerah.com.