Zero Carbon Particulate Emissions

Coal Power's Solution to the Looming Energy Crisis

CO_2 is not the cause of global warming

Japan Offspring Fund (NPO)
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Due to the novel Corona virus pandemic which began in early 2020, economic activity stagnated and anthropogenic emissions of CO_2 subsequently decreased by 5.6%. In spite of this, atmospheric concentrations of CO_2 have increased and average temperatures have risen. It is now clear that even with a reduction in anthropogenic CO_2 emissions, the planet is still warming.
The real cause of global warming is air pollution caused by the black dust of carbon emitted when coal is burned.
It is common knowledge in physics that black substances are much more quickly warmed by sunlight than transparent gases.
To stop global warming, it is necessary to take measures by attaching the equipment to coal-fired power plants that can prevent the release of even the finest dust.

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Chapter 1

Continued global warming despite decreased CO_2 emission levels

On 25 October 2021, the World Meteorological Organization (WMO) published its *Annual Report on Greenhouse Gases*. It stated that "due to regulations related to the global epidemic of novel coronavirus infections, emissions of CO_2 from fossil fuel sources decreased by about 5.6% in 2020".

Executive summary

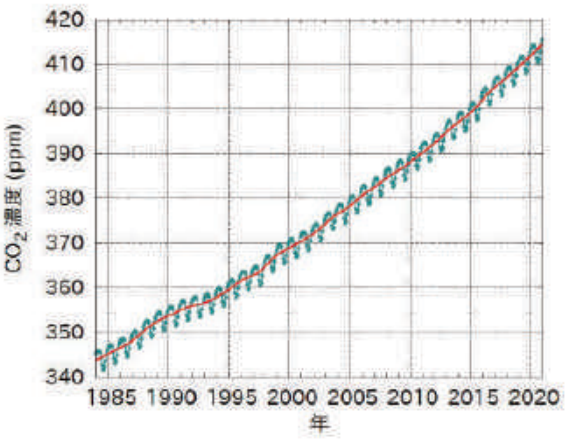
The latest analysis of observations from the WMO GAW in situ observational network shows that globally averaged surface mole fractions(1) for CO_2, methane (CH_4) and nitrous oxide (N_2O) reached new highs in 2020, with CO_2 at 413.2 ± 0.2 ppm(2), CH4 at 1889 ± 2 ppb(3) and N_2O at 333.2 ± 0.1 ppb.

These values constitute, respectively, 149%, 262% and 123% of pre-industrial (before 1750) levels. The increase in CO_2 from 2019 to 2020 was slightly lower than that observed from 2018 to 2019, but higher than the average annual growth rate over the last decade. This is despite the approximately 5.6% drop in fossil fuel CO_2 emissions in 2020 due to restrictions related to the coronavirus disease (COVID-19) pandemic.

For CH_4, the increase from 2019 to 2020 was higher than that observed from 2018 to 2019 and also higher than the average annual growth rate over the last decade. For N_2O, the increase from 2019 to 2020 was higher than that observed from 2018 to 2019 and also higher than the average annual growth rate over the past 10 years.

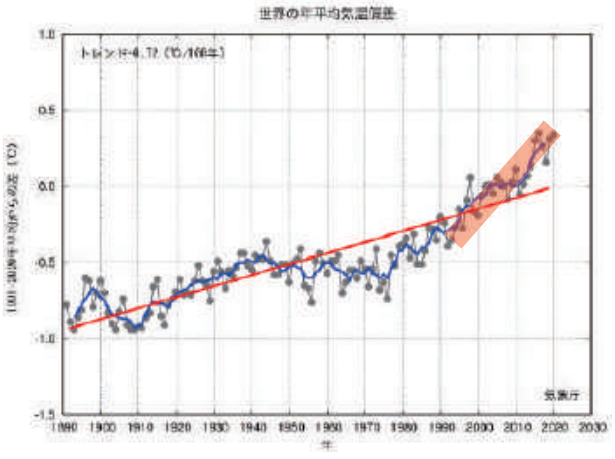
The National Oceanic and Atmospheric Administration (NOAA) Annual Greenhouse Gas Index (AGGI) [8] shows that from 1990 to 2020, radiative forcing by longlived greenhouse gases (LLGHGs) increased by 47%, with CO_2 accounting for about 80% of this increase.

Figure 1: Increase in CO_2 concentration



data from WMO "Greenhouse Gas Annual Report"

Figure 2: Global Average Temperature Increase



data from JMA publication

The annual report stated that the year 2020 would see the highest CO_2 concentration in recorded history (Figure 1) and a further increase in global average temperature (Figure 2).

The fact that the atmospheric concentration of CO_2 has increased while anthropogenic CO_2 emissions have decreased means that there are non-anthropogenic sources of CO_2 emissions.

In 2021 as well, because of continued effects from the Coronavirus pandemic and global economic stagnation, CO_2 emissions are expected to remain low.

Nevertheless, abnormally high temperatures have been recorded in many parts of the world and global warming continues, indicating that even if anthropogenic emissions of CO_2 are reduced, warming will continue.

In October 2021, the 26th Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) was held in Glasgow, UK, to discuss strategies to stop global warming and the reduction of CO_2.

However, there was no discussion of what is actually happening: that global warming is increasing even though CO_2 emissions are decreasing.

And the world is going in the wrong direction.

Chapter 2

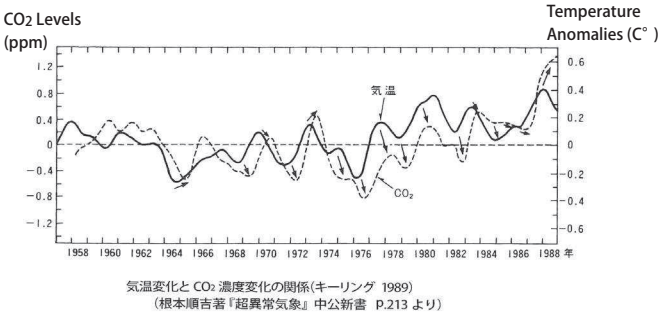
Disputed theories on the role of CO_2 in global warming

There are many theories about the causes of global warming. Notably however, the official United Nations theory naming CO_2 as the main culprit behind global warming has long been questioned by many experts.
In the book *Global Warming 'CO2 Culprit Theory' is the Big Lie of the Century* (by Shigenori Maruyama, Shunichi Kairasaki, Hiroyuki Kawashima, David Archibald and others), published in February 2020 and written by 10 subject matter experts, it is stated that "more than 90% of earth scientists do not believe that anthropogenic CO_2 is the cause of global warming."

Warmer temperatures lead to increased CO_2

My teacher, the physicist Dr. Atsushi Tsuchida, argues that the rise in global temperatures is instead the cause, and the increase in CO_2 is the result.
In his book *The CO2 Global Warming Theory is Wrong,* published in 2006, he gives three reasons for this:
The first is Keeling's diagram in the book *Super Extreme Weather*, published in 1994 by Junkichi Nemoto, an expert on extreme weather conditions. As shown in Figure 3, the observed data clearly shows that when global temperatures rise, the concentration of CO_2 increases with a lag of several years.

Figure 3: CO_2 levels and Temperature Change

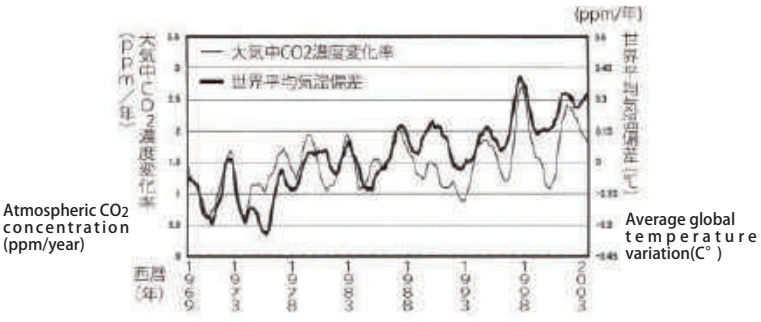


気温変化と CO_2 濃度変化の関係(キーリング 1989)
(根本順吉著『超異常気象』中公新書 P.213 より)

(Keeling, 1989 and Nemoto, 1994)

The second rationale is provided by Dr. Kuniaki Kondo and Dr. Tsuchida, who collaborated to produce Figure 5, tracking the increase or decrease in atmospheric CO_2 concentration and the average global temperature variations over 34 years, from 1969 to 2003.
As temperature increases, after a slight delay, atmospheric CO_2 rises as well. Conversely, as temperature decreases, atmospheric CO_2 drops, with a similar delay.
Dr. Tsutsumi explains this as follows: "In the same way that gas bubbles escape when a carbonated beverage is heated, when global temperatures rise, ocean temperatures also rise and CO_2 is released from seawater into the atmosphere. When the temperature drops, ocean temperatures drop and seawater can retain more dissolved CO_2, resulting in a decrease in atmospheric CO_2 levels."

Figure 5: CO_2 concentration and temperature variation (C°)

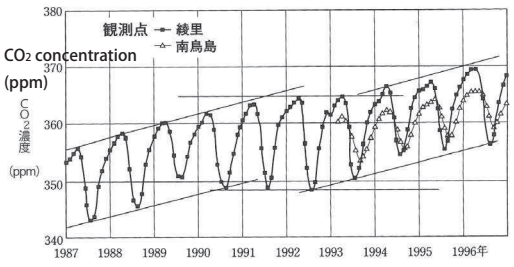


Some of the dissolved CO_2 is continuously captured as calcium carbonate in coral formations and shells, eventually precipitating and becoming trapped on the ocean floor. Because of this, even if anthropogenic CO_2 emissions continue to increase, CO_2 concentrations in seawater may not.

Aftereffects of the eruption of Mt. Pinatubo

The third element of evidence is shown in Figure 4, which shows the changes in atmospheric CO_2 concentration before and after the eruption of the Mt. Pinatubo volcano in the Philippines in June, 1991.
Atmospheric concentration of CO_2, which had been rising steadily, remained level for two years after the eruption. According to Tsuchida's theory, this was due to the large amount of smoke and ash from the volcano blocking sunlight, which lowered the temperature of the seawater and prevented CO_2 from escaping.
In addition to these three observations, I would like to add a fourth rationale for the increase in atmospheric CO_2 and the increase in global warming in 2020, despite decreased anthropogenic CO_2 emissions. This is presented in Chapter 3.

Figure 4: CO_2 concentration and Mt. Pinatubo eruption



図表 2 - 4 CO_2 濃度とピナツボ火山の噴火(樋田 敦『新石油文明論』P.41)

1987 年から 97 年までの日本の綾里(岩手県)と南鳥島(東京都)における CO_2 濃度の測定値である。91 年から 93 年まで濃度は増えていないことが分かる。

Chapter 3

The role of coal combustion emissions in global warming

Particulate emissions as causal factor in global warming

If the cause of global warming is not an increase in CO_2, then what is the real cause?
The plume of smoke and ash that covered the earth after the eruption of Mt. Pinatubo is mainly composed of volcanic ash dust and sulfur dioxide. The dust is a light brown color and the sulphur dioxide crystals are a shiny yellow. These particles reflect sunlight, thus making the earth cooler.
Many of history's greatest cold spells have followed major volcanic eruptions, so it is proven that dust in the air above the earth has an effect on the earth's temperature.
The black carbon dust (soot) from burning coal absorbs the energy of incoming sunlight and therefore has a warming effect on the earth. Excessive particulate emissions thus cause the planet to become warmer.

China accounts for more than half of the world's coal consumption

In the past, one could see black coal smoke coming out of industrial chimneys throughout China.
Many factories burned coal, and the country built a series of coal-fired power stations that emitted substantial quantities of black soot and smoke.
Today, China consumes more than half the world's coal; India, in second place, consumes about a quarter of China's use. (Table 1)
If you posit that China, due to its increased coal emissions is the main culprit behind the abnormal global warming that started around 1995, you can explain global warming without contradiction.

Carbon dust (soot) emissions from industrial sites in China

Table 1: Global coal consumption, and year over year increase (decrease)

	2019		
	Country 国　名	Usage 消費量	対前年伸び率 Prev Year change
China	中　国	3,243.0	0.2%
India	インド	846.7	-1.8%
USA	米　国	468.7	-14.7%
S. Africa	南アフリカ	171.5	-5.8%
Indonesia	インドネシア	161.3	16.6%
Japan	日　本	139.2	0.6%
Korea (S)	韓　国	93.7	-7.0%
Vietnam	ベトナム	88.5	31.2%
Russia	ロシア	76.2	-17.4%
Kazakhstan	カザフスタン	73.6	-1.3%
Taiwan	台　湾	57.6	-5.0%
Poland	ポーランド	56.6	-8.8%
Australia	豪　州	54.1	-3.4%
All others	その他	586.0	-5.5%
World Total	世界計	5,948.3	-1.5%

「世界の石炭事情 -2020 年度」（独立行政法人石油天然ガス・金属鉱物資源機構）より

Older coal-fired power plant in China following implementation of stricter emissions controls

Modern coal-fired power plant in China

Older coal-fired power plant in Germany

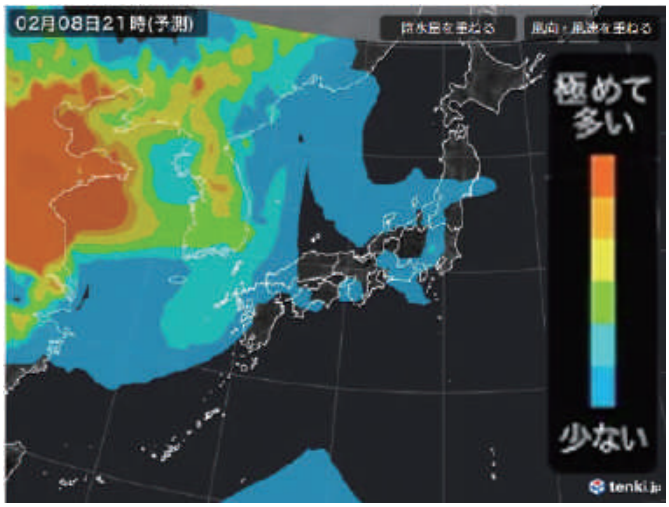
PM2.5 'extremely high' even during Winter Olympics

China began regulation to decrease air pollution in 2006, and has continued working to reduce emissions, so there is no longer excessive black soot particulate pollution. But if you look closely, you can see a darker, gray tinge on the now dominant white industrial smoke.

This is the same situation with emissions from coal-fired power plants in Germany, because they also contain tiny black carbon soot particles.

Because the air in Chinese urban centers remains polluted, the Chinese government took measures to prevent the burning of coal near Beijing in the run up to the 2021 Winter Olympics.

Look at the "PM2.5 forecast information" (Japan Meteorological Association) five days after the start of the Olympics. Even though the amount of coal burning was reduced, China still has an "extremely high" level of PM2.5, which is particulates with a diameter of 0.0025 mm.



Extreme concentration

Low concentration

Microscopic dust particles encircling the earth

As PM2.5 particulates are carried on the wind from South Korea to Japan, the quantities diminish. This is because larger particles fall more easily and smaller ones stay airborne.
The time it takes for particles with a diameter of 0.0001 mm to fall to the ground is more than 1,000 times longer than those with a diameter of 0.01 mm.
If the distance travelled by the dust particles increases by a factor of 1,000, the total surface area becomes 1,000,000 times larger.
This is why these microscopic black dust particles that are still being emitted continue absorbing sunlight over a huge area, leading to increased global warming.

Japan's coal-fired power plants produce transparent exhaust

Exhaust from coal-fired power plants in Japan contains no visible particulate matter. (Image 1)
Any whitish "smoke" you may see from a factory chimney would be water vapor, and the edges of the white vapor are transparent.
Japan passed the Air Pollution Control Law in 1968, which regulates not only coal-fired power generation but also emissions from factories, and has strengthened the regulations continuously ever since. That is why the Japanese have not seen black coal smoke for some 50 years.
In spite of these improvements, the Japanese government was awarded the "Fossil of the Day Award" by environmental groups at COP26 for opposing the phasing out of coal-fired power generation.
But it is incorrect to equate all coal-fired power, with its usual particulate-heavy exhaust, with Japanese coal-fired power, whose exhaust is transparent. Exhaust from modern power plants in Japan contains no carbon particulates, so does not contribute to global warming.

Image 1: Coal-fired power plant in Japan, showing no visible particulate emissions

Emissions from Japanese-built power plants overseas are not as clean

Japan's domestic coal-fired power stations do not contribute to global warming because they emit less than one one-hundred-millionth of the particulates of China's coal-fired power stations of twenty years ago, and less than one one-thousandth of that of China's coal-fired power stations today.
But a problem remains. The cleanest emissions are from coal-fired power plants built within Japan.
Coal-fired power plants built by Japan firms in other countries, however, produce significantly greater emissions, even though they meet or exceed the environmental standards of those countries.
The Japanese government, power industry and plant construction industry members should strive to reduce the emissions from coal-fired power plants built in foreign countries to the same level as in Japan.

Coal-fired power stations should be cleaned up, not scrapped

Many countries are phasing out coal-fired power stations, but they don't have to. We just need to remove all carbon particulates from the exhaust.
Coal is crucial for many different industries, so it is important to regulate emissions to eliminate carbon particulates.
Japan can and should provide technology to China and other countries around the world to promote improvements.
Such technical improvements can greatly enhance the quality of life of people suffering from respiratory diseases who live in the vicinity of power stations and factories, and the use of coal will not contribute to global warming.

Chapter 4

Renewable energy technology also contributing to global warming

Raising awareness of environmental organizations

To achieve meaningful change, we need to convince environmental organizations that promote renewable energy technologies to change their outlook and activities, and realize that even as we have reduced CO_2, global warming has continued. Despite this, however, they will not easily change their stance.
So it is important to explain that (1) even if renewable energy sources do not produce CO_2 in operation, they produce excessive CO_2 in other ways, (2) continued renewable energy promotion can lead ultimately to increased CO_2 emissions, (3) manufacturing and raw material extraction for renewable energy technology requires the burning of coal, producing more carbon dust, which promotes global warming, and (4) we are using vital resources unnecessarily and depriving future generations of resource reserves.

Chapter 4.1: Solar power industry CO_2 emissions

Generating electricity with solar energy comparatively inefficient

Humankind has always lived with and benefited from the sun. To keep warm, we burned wood.
However, since the Industrial Revolution, coal has been the main source of heat for industry, followed later by oil and natural gas.
In terms of resource expenditure, attempting to obtain electricity for industry from such a variable and inefficient source as sunlight is not optimal.
To install a photovoltaic system, a lot of oil is used to clear the land, build a concrete foundation, install a steel or aluminum base, and then transport the solar panel system to the installation site.
A lot of coal and oil is also used in the manufacture of these materials. Concrete is made by burning limestone with coal. Iron is made by burning coal to melt iron ore. Large amounts of electricity are used in the production of aluminum.
In semiconductor production, oil is used to dig the silicon crystals out of the ground, and electricity is used to remove impurities from the crystals and process them.
So, before a solar power facility is up and running, a tremendous amount of CO_2 and associated carbon emissions are released into the atmosphere.

Solar power offline at night

Another shortcoming of photovoltaics is that they cannot generate electricity at night.
Even if you have solar panels on your rooftop, storage batteries are still necessary to capture the electricity so that you can use it at night.
A lot of oil is also used to extract the raw materials used to make the batteries, resulting in turn in increased CO_2 and carbon emissions.
Solar power, which produces electricity only during the day, is not only inefficient, but also entails a double investment in equipment.
In densely populated industrialized countries, it is more efficient to use primarily thermal power from oil, coal or natural gas, while solar power simply wastes resources and increases the price of electricity. In less densely populated areas, it makes economic sense to install solar PV and battery storage, but to promote solar and photovoltaic as a solution uniformly around the world is misguided policy.

China has a 70% share of the solar panel market

China has been the world's largest producer of solar panels for more than ten years, and now accounts for more than 70% of the world manufacturing share.
Expanding solar installations inevitably entails burning coal for the production of solar panels in China, spreading large amounts of carbon dust and contributing to global warming.
Environmental groups need to review the end-to-end life cycle of photovoltaic deployments, from the extraction of the raw materials to installation and end-of-life, and realize the mistake inherent in promoting it as a blanket solution.

Chapter 4.2: Wind power industry CO_2 emissions

Electricity cannot be generated unless the wind blows

While wind power offers more potential energy than solar power, it has many similar drawbacks to solar power.
The first is that it does not produce electricity unless the wind is blowing. This is why Europe needed to expand regional power distribution grids to export electricity from areas where wind is plentiful. However, the copper needed to manufacture power transmission lines is refined using coke made from coal, which releases CO_2 and carbon dust, and contributes to global warming.
In spite of a well-developed power grid, there was not much wind in 2021, so Europe experienced chaos due to power shortages, and electricity prices soared.

Wind turbines taken offline in heavy winds

A second disadvantage is that wind turbines have to be shut down when the wind is too strong.
Wind power is suited primarily to regions where tropical cyclones like typhoons do not strike.
Recently, wind turbines have been installed in latitudes south of Japan, but even when the turbines are shut down, there are still cases of them toppling in high winds.
This has prompted the construction of sturdier generators, but these are heavier, less efficient and more expensive. This in turn produces more CO_2 and more carbon dust from coal combustion, and contributes to global warming.

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Chapter 5

Decarbonization through nuclear power?

Nuclear power as "Green Energy"

On 2 February 2022, the European Commission published its final proposal to recognize nuclear power as a "green" investment because it does not emit CO_2 and therefore helps to reduce global warming. It aims to pass the legislation within four months, but will be blocked if 20 of the 27 member states oppose it.
Germany and Austria are opposed to this policy, saying that an accident would cause serious damage. Current public concern with global warming is being used as motivation to revive plans for dangerous nuclear power plants, and the Commission's undertaking of this proposal is both dishonest and ill-informed.

Chernobyl nuclear plant in Ukraine

Fukushima nuclear plant in Japan

Nuclear power plants use enormous amounts of steel and concrete

Because nuclear power plants must be built to withstand tremendous stress to prevent accidents, large amounts of steel and other metals and concrete are used in their construction. In the manufacture of these materials, large amounts of coal, oil and other combustibles are used, producing large amounts of CO_2 and carbon dust.
The reactors and containment vessels are made of special iron composites which are manufactured using more coal and oil than usual, so it emits more CO_2 and carbon dust than normal iron, which again in turn contributes to increased global warming.

A crime against future generations

Radioactive waste from nuclear power plants cannot be disposed of in the environment, so special storage facilities must be built.
There are two types of radioactive waste, low level and high level, with different storage and handling requirements. In the case of low-level waste, it is usually stored in drums in a storage facility until the radioactivity dissipates. The construction of this facility entails the production of large amounts of CO_2 and carbon dust.
In the case of high-level radioactive waste, most countries are at a loss as to where to build the facilities. Finland is constructing a final disposal site called Onkalo, where radioactive waste from four nuclear power plants will be buried 400 meters underground.
A five-kilometer tunnel will be dug to the proposed site, where a large cavern will be excavated and 6,500 tons of nuclear waste will be transported to the site in strong containers, sealed and stored for 100,000 years. This will eliminate the radioactivity, but a huge amount of metal, concrete and oil is used to build such a facility.
If countries with nuclear power plants start to build storage facilities for high-level radioactive waste, they will produce huge amounts of CO_2 and carbon dust, which will continue the acceleration of global warming.

Chapter 6 Electric vehicle contribution to CO_2 emissions

CO_2 emissions from power stations

On 14 July 2021, the European Commission announced that the allowable CO_2 emission standards for cars would be cut to zero by 2035 in order to reduce greenhouse gases. In the EU, only electric cars will be allowed to be sold after 13 years.

While it is tempting to buy an electric car with no emissions, the electricity to charge it comes from thermal power stations, which emit large amounts of CO_2. Put simply, the European Commission's actions simply shift CO_2 emissions from cars to thermal power stations.

Oil and coal required to produce rechargeable batteries

Electric cars are equipped with large rechargeable batteries.

Oil and coal are used to mine the lithium and nickel required to make these batteries, as well as to refine and smelt them, producing large amounts of CO_2 and associated carbon particulates that contribute to global warming.

In the future, rechargeable battery factories will be built all over the world, incurring the release of huge amounts of CO_2.

As batteries age, their performance degrades, so they are replaced with new ones and the old ones are recycled. This recycling process also uses oil or coal as an energy source, which produces CO_2 in a secondary, invisible way.

Energy loss and inefficiencies

The difference between an internal combustion engine vehicle and an electric one is whether it is powered by burning oil to power the engine, or by burning oil to produce electricity, which is then used to charge batteries to power the vehicle on electricity. Electric vehicles have to convert energy more often, so they incur a significant economic overhead.

Banning gasoline-powered vehicles and enforcing zero CO_2 emission standards by only allowing electric cars is a policy that wastes resources, increases prices, and warms the planet, simply shifting CO_2 and carbon dust emissions to where they won't be as evident.

Microscopic carbon dust particles, the main culprit behind global warming, can be easily reduced to zero by installing electrostatic precipitators. It is important to reduce air pollution by tightening regulations across the board on emissions from vehicles, gas and coal thermal power stations, and industrial sites.

Chapter 7 Individual conservation efforts can help combat global warming

Around the world, the United Nations, countries and corporations all proclaim, "Let's reduce CO_2 to stop global warming." In reality, however, by promoting the use of renewable energy, nuclear power, and electric vehicles, they are in effect increasing CO_2 emissions and wasting resources, raising costs, and increasing the production of carbon particulates that accelerate global warming.

If we expand inefficient industries and ravage existing high-quality resource stores, future generations will blame ours for the depletion of earth's natural resources. The whole world is committing crimes against our descendants, and we must change this as soon as possible.

However it is not easy to move a country in the right direction, and it is not possible for ordinary individuals to change the world.

But there is something we can do as individuals: it is simply conservation.

You don't have to give up living a safe, comfortable and prosperous life. Rather than forcing ourselves to endure, we can conserve resources in ways that fit with our personal lifestyles, reduce CO_2 and carbon emissions, and leave a better planet for our descendants.

Let's all strive to conserve resources and live in a way that ensures an abundant future for our children and grandchildren.