
THUNDERSTORM GENERATOR
$CO_2 \rightarrow O_2$


ERSTORM GENE
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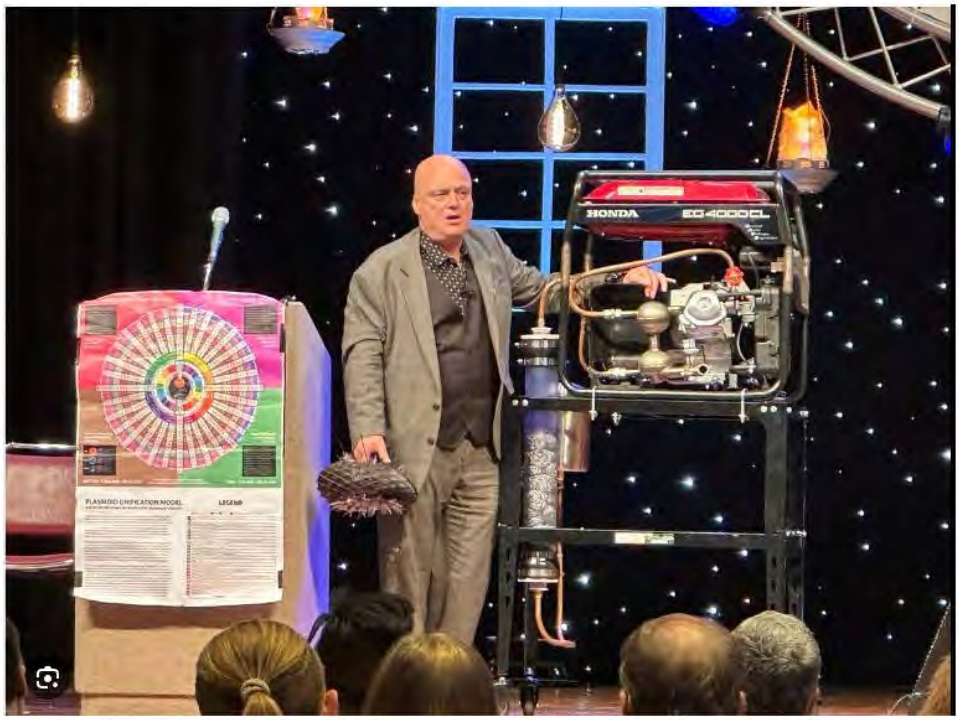
ERSTORM GENE


NDERSTORM GENERATO
60% FUEL REDUCTION
UP TO 98% EMISSIONS REDUCTION
ILLION-DOLLAR INDUSTRIAL OPPORTUNITY


THUNDERSTORM GENERATOR

Achieving and Exceeding Australia's Greenhouse Targets



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Introduction

This paper is to inform the reader about a groundbreaking development in energy technology that could significantly impact Australia's power generation landscape. Imagine an emission-control device that enables coal to be burned for power generation with minimal to no carbon dioxide or other greenhouse gas emissions. This innovation presents a transformative opportunity, offering several advantages over nuclear power generation.

Advantages of Low-Emission Coal Technology:

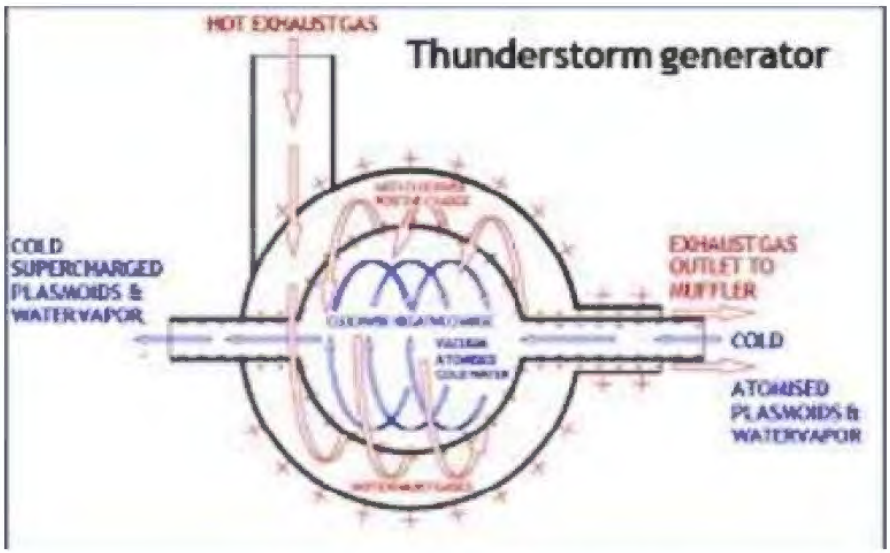
1. **Utilisation of Existing Infrastructure:** Australia has a well-established network of coal-fired power stations and related infrastructure. Implementing low-emission technology allows us to retrofit existing plants, reducing the need for substantial capital investment in new facilities. This approach leverages current assets, leading to cost savings and efficient resource use.
2. **Economic Efficiency:** Transitioning to low-emission coal technology can be more cost-effective than investing in new nuclear power plants. Nuclear facilities require significant upfront capital for construction and long-term investments in waste management and decommissioning. In contrast, upgrading existing coal plants with emission-reducing technology can achieve substantial environmental benefits at a lower financial cost.

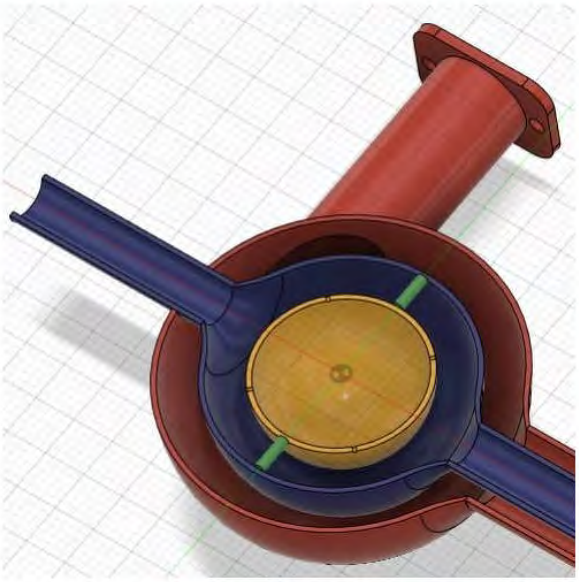
3. **Energy Security and Reliability:** Coal-fired power stations have historically provided a stable and reliable energy supply. By adopting low-emission technology, we can maintain this reliability while significantly reducing environmental impact. This ensures a consistent energy supply, crucial for supporting Australia's economic activities and daily life.
4. **Public Acceptance and Safety:** Nuclear power, while low in carbon emissions, often faces public concern regarding safety, radioactive waste management, and potential environmental hazards. Implementing low-emission coal technology circumvents these issues, as it builds upon familiar and established energy generation methods without introducing new safety risks associated with nuclear power.
5. **Job Preservation and Creation:** The coal industry is a significant employer in Australia. By retrofitting existing plants with low-emission technology, we can preserve jobs in the coal sector and create new opportunities in the emerging field of clean coal technology. This approach supports a just transition for workers and communities dependent on coal-related employment.

The Technology

Emission control technologies are often used in generators and other combustion engine systems to help reduce the harmful effects of emissions. These devices aim to convert or neutralise harmful emissions into less harmful substances before they are released into the atmosphere.

The Thunderstorm Generator Emission Technology substantially reduces the harmful emissions from the exhaust gases of internal combustion engines. The harmful emissions and in particular Carbon Dioxide CO_2 and Carbon Monoxide CO, are reduced as a consequence of being converted to Oxygen O_2 and Water. The Thunderstorm Generator has been developed over a number of years and has been tested many times and at many locations often in front of critical scientific audiences.





Certified results from a recent test carried out by Element a leading global provider of Testing, Inspection, and Certification (TIC) services are summarised below:

THUNDERSTORM GENERATOR
ELEMENT'S GOVERNMENT CERTIFIED TESTING
LAND LOGICAL DARTFORD
28TH JUNE 2024

		Without Technology	With Technology	% Change
Sulfur Dioxide	mg/m^3	4.80	0.73	- 84.8%
Ammonia	mg/m^3	0.66	0.14	- 78.8%
Hydrogen	%v/v	1.20	0.05	- 95.8%
Total VOCs (as Carbon)	mg/m^3	882.00	0.50	- 99.9%
Oxides of Nitrogen	mg/m^3	185.00	173.00	- 6.5%
Carbon Monoxide	mg/m^3	12,010.00	350.00	- 97.1%
Oxygen	%v/v	0.15	10.40	+ 6833.3%
Water Vapour	%v/v	4.20	2.40	- 42.85%

The above chart shows a summary result of two tests (before and after) on a Thunderstorm Generator fitted to a Honda 5500 CL portable petrol generator. Further testing carried out in Florida is shown below:

Clearwater Florida Base Test

Fuel Consumption / Emissions Reduction Test (60 Hertz)

6/24/2024 - 15:36 pm

		BASELINE	TSG	% DIFFERENCE
Carbon Dioxide	CO_2 %	11.6	0.05	-99.56
Carbon Monoxide	CO %	4.5	0.09	-98.00
Oxygen	O_2 %	1.38	20.17	+1361.59
Hydrocarbon	HC ppm	111	25	-77.47
Nitrogen Oxides	NOx ppm	103	5	-95.14
Fuel Run 10ml	TIME secs	221	264	+19.45

BASELINE CONTROL TEST Under 2400w Load

WITH THUNDERSTORM GENERATOR Under 2400w Load

If the same emission levels shown in the above summaries of the certified test results for the Thunderstorm Generator emission technology were translated to those generators used for to power generation in Australia's **coal fired power plants** that is a reduction in **carbon dioxide (CO_2)** emissions of **99.65%**, **carbon monoxide (CO)** emissions by **98%**, and **sulphur dioxide (SO_2)** emissions by **84.8%** in, the environmental, health, and societal benefits would be even more profound.

They would actually result in a significant **reduction in emissions from coal-fired power generation**, allowing Australia would achieve a total **greenhouse gas emission level 43% below 2005 levels**. This represents a **substantial over achievement** of Australia's current **2030 emission reduction target** and would put Australia in a favourable position to meet its **Paris Agreement** goals and potentially contribute even further to global **climate action**. So let's look at the details:

The Impacts and Benefits

1. Reduction of CO_2 Emissions from Coal-Fired Power Plants (99.56%)

Coal-fired power plants are among the largest contributors to **global CO_2 emissions**. A **99.56% reduction** in CO_2 emissions would have significant impacts on the environment and climate change:

Global Warming Impact:

- **Massive Reduction in Carbon Footprint**: With **99.56%** fewer CO_2 emissions, coal-fired plants would almost eliminate their contribution to global **greenhouse gas emissions**. This would lead to a **drastic reduction in the carbon footprint** of the coal power sector, which is responsible for a significant portion of electricity-related emissions globally.
- **Slowing Global Warming**: Such a reduction in CO_2 emissions would significantly slow the rise of global temperatures, helping keep temperature increases below **1.5°C** to **2°C** above pre-industrial levels. This would result in fewer extreme climate events, such as floods, droughts, and wildfires, and reduce the pace of **sea-level rise** and **ecosystem disruptions**.

Contribution to Net-Zero Targets:

- **Accelerating Progress Toward Net-Zero**: A **99.56% reduction** in CO_2 emissions would bring coal-fired power plants very close to **zero emissions** and help meet global **net-zero emissions** targets by **2050**. This would contribute significantly to national and international climate commitments, helping countries stay on track with their de-carbonisation plans.

2. Reduction of CO Emissions from Coal-Fired Power Plants (98%)

Carbon monoxide (CO) is a dangerous pollutant produced from incomplete combustion in coal plants. Reducing CO emissions by **98%** would have the following impacts:

Health Benefits:

- **Improved Respiratory Health**: CO interferes with the body's ability to carry oxygen to tissues and organs. By reducing CO emissions by **98%**, the associated health risks, such as dizziness, headaches, and long-term cardiovascular and neurological issues, would be greatly diminished for workers and surrounding communities.
- **Reduced Health Costs**: The dramatic reduction in CO emissions would lead to lower rates of **pollution-related illnesses** like **heart disease**, **asthma**, and **chronic obstructive pulmonary disease (COPD)**. This would ease the pressure on healthcare systems and lead to reduced medical costs and fewer hospital admissions.

Environmental Impact:

- **Cleaner Air**: CO is a contributor to the formation of **ground-level ozone (smog)**, which negatively affects air quality. A **98% reduction** in CO emissions would lead to a significant reduction in smog, improving air quality and reducing harm to ecosystems and plant life.

3. Reduction of SO_2 Emissions from Coal-Fired Power Plants (84.8%)

Sulphur dioxide (SO_2) is a harmful byproduct of burning coal and is a major contributor to **acid rain** and **particulate matter** (PM) pollution. Reducing SO_2 emissions by **84.8%** would have several important benefits:

Environmental Impact:

- **Reduced Acid Rain**: SO_2 is one of the main components of **acid rain**, which can damage **soil**, **waterways**, and **plant life**. By reducing SO_2 emissions by **84.8%**, the amount of acid rain in affected regions would significantly decrease, leading to healthier ecosystems and a reduction in soil and water acidity.
- **Protection of Ecosystems**: Acid rain can harm forests, aquatic life, and biodiversity by lowering the pH of rivers and lakes and damaging vegetation. A reduction in SO_2 emissions would help **restore ecosystems**, ensuring they thrive and maintain their vital functions.

Health Benefits:

- **Reduced Respiratory Issues**: SO_2 is a known irritant to the respiratory system. It can exacerbate **asthma**, **bronchitis**, and other respiratory conditions. Reducing SO_2 emissions by **84.8%** would **improve air quality** and lower the incidence of **respiratory diseases** in communities near coal-fired plants.
- **Fewer Premature Deaths**: SO_2 and its byproducts, like **particulate matter**, are linked to **premature deaths** from heart disease, lung disease, and stroke. Reducing SO_2 emissions would result in **fewer premature deaths**, improving the overall health of affected populations.

Broader Environmental Effects:

- **Reduced Formation of Fine Particulate Matter (PM2.5)**: SO_2 contributes to the formation of fine particulate matter (PM2.5), which is harmful to human health and the environment. By reducing SO_2 emissions, the amount of **PM2.5 pollution** would decrease, resulting in cleaner air and a lower burden of diseases like **heart attacks**, **stroke**, and **lung cancer**.
- **Less Damage to Infrastructure**: SO_2 can also contribute to the **corrosion** of buildings and infrastructure. By reducing SO_2 emissions, the longevity of **historical monuments** and other infrastructure would improve, saving costs on maintenance and repairs.

The Numbers

We can estimate the potential actual **reduction in greenhouse gas emissions** if Australia's current **coal-fired power stations** were to be transitioned to a **99.65% reduction in carbon dioxide (CO_2)**, **98% reduction in carbon monoxide (CO)**, and a **84.8% reduction in sulphur dioxide (SO_2)**. using assumptions based on the **current emissions data** and **the contribution of coal-fired power plants** in Australia.

Here's how we can estimate the reduction in **CO_2 emissions**, which will be the most significant greenhouse gas reduction, and the impact on overall emissions in Australia.

Step 1: Understand Australia's Current Coal-Fired Power Station Emissions

Coal-fired power plants are responsible for a substantial portion of Australia's **greenhouse gas emissions**. According to the **Clean Energy Council** and government data:

- In **2023**, coal-fired power generation accounted for about 46**% of Australia's electricity generation**.
- Australia's **total greenhouse gas emissions** in **2019** were about **534 million tonnes of CO_2-equivalent (Mt CO_2-e)**.

Step 2: The Carbon Emissions from Coal-Fired Power Plants

To quantify the potential reduction, we need to determine the contribution of **coal-fired power plants** to the national CO_2 emissions. Please see the table at Appendix 2

Contribution of Coal-Fired Power Plants to Total CO_2 Emissions:

168.06 Mt CO_2-e from coal-fired power generation.

Step 3: Apply the CO_2 Reduction (99.56%)

If coal-fired power stations could reduce **CO_2 emissions by 99.56%**, the emissions from these plants would drop drastically.

CO_2 Reduction from Coal-Fired Power Plants:

- **99.56% reduction in CO_2 emissions** from 168.06 **Mt CO_2-e** would result in:
    - **168.06 Mt CO_2-e × 0.9956 = 166.74 Mt CO_2-e reduction**.

Step 4: Apply the Reduction to CO and SO_2 Emissions

While the primary focus here is **CO_2 emissions**, **carbon monoxide (CO)** and **sulfur dioxide (SO_2)** emissions would also see significant reductions, with **98% reduction in CO** and **84.8% reduction in SO_2**. These reductions would further **improve air quality**, **health outcomes**, and **reduce environmental damage**.

1. **Carbon Monoxide (CO) Reduction (98%)**:
    - **Coal-fired power plants** emit a certain amount of CO, but it's much lower than CO_2. If **98% of CO emissions** were reduced, this would greatly improve local air quality, but CO's impact on **global warming** is far less significant than CO_2.
2. **Sulphur Dioxide (SO_2) Reduction (84.8%)**:

- **SO_2 emissions** from coal-fired plants contribute to **acid rain** and **air pollution** but are not directly involved in **global warming**. The **84.8% reduction** would significantly reduce harmful local pollution and its ecological effects, such as soil and water contamination.

Step 5: Estimate Total Greenhouse Gas Reduction Impact on Australia

1. **CO_2**:
    - The **99.56% reduction** in CO_2 emissions from coal plants would lead to a **reduction of 166.74 Mt CO_2-e** annually from coal power generation.
2. **Impact on Australia's National Emissions**:
    - Australia's total emissions in **2019** were **534 Mt CO_2-e**.
    - With **166.74 Mt CO_2-e** removed from coal power generation, the country's total emissions could be reduced to:
        - **534 Mt CO_2-e - 166.74 Mt CO_2-e = 367.26 Mt CO_2-e**.
    - This would represent an **approximate reduction of 31.2%** in Australia's total emissions from just the reduction from coal power stations power alone.

Summary of Results:

- **Total CO_2 emissions reduction from coal power generation**: **166.74 Mt CO_2-e** annually.
- **Percentage reduction in national emissions**: **31.1%** (based on 2019 levels).
- **Remaining national emissions: 367.26 Mt CO_2-e (from all sectors).**

Koyto

Now, let's break this down and calculate the **quantitative effect** on Australia's greenhouse gas **emission targets** for Koyto using the **reduction** in emissions from the **coal power sector**.

Step 1. Understanding Australia's Emission Targets

Australia's **2030 climate target** is to reduce its **greenhouse gas emissions** by **26-28%** below **2005 levels**. Let's assume that Australia adopts the **28% reduction** target for the sake of this calculation.

Australia's 2005 Emissions:

- In **2005**, Australia's total greenhouse gas emissions were approximately **588 Mt CO_2-e** (million tonnes of CO_2 equivalent).

Australia's Original 2030 Target (28% Reduction):

- **28% reduction from 2005 levels** = **588 Mt CO_2-e × 0.28 = 164.64 Mt CO_2-e** reduction.
- So, by 2030, Australia needs to reduce emissions to **588 Mt CO_2-e - 164.64 Mt CO_2-e = 423.36 Mt CO_2-e**.

Step 2. Emissions Reductions from the Coal Fired Power Plants

Going on the projected reduction from **coal-fired power generation** calculated previously as **166.74 Mt CO_2-e** based on 2019 emissions data, the **reduction** in emissions from this sector would represent a **reduction of 31.2%** in Australia's total emissions from just the reduction from coal power stations power alone.

Step 3: Total Emission Reduction Impact on National Emissions

Reiterating the total impact on Australia's **national greenhouse gas emissions** by factoring in the projected reduction from **coal-fired power generation** using this new technology

- **Original total emissions** (from 2019): **534 Mt CO_2-e**.
- **Reduction from coal power**: **166.74 Mt CO_2-e**.
- **New total emissions**: **534 Mt CO_2-e - 166.74 Mt CO_2-e = 367.26 Mt CO_2-e.**

So, after the reductions in emissions from coal-fired power generation, Australia's national emissions would drop to approximately **367.26 Mt CO_2-e**.

Step 4: Comparison to 2030 Target

Let's compare the new emissions after the reduction in the coal sector to Australia's original 2030 target based on 2023 figures:

- **2030 target emissions**: **423.36 Mt CO_2-e** (based on a 28% reduction from 2005 levels).
- **New total emissions after coal reduction**: **367.26 Mt CO_2-e**.
- **Quantitative effect**: **367.26 Mt CO_2-e - 423.36 Mt CO_2-e** = **56.1 Mt CO_2-e** below the 2030 target.

- This means that, by factoring in the projected reduction from coal-fired power generation using this new technology, Australia would have in 2019 exceeded its **2030 target** by a margin of **56.1 Mt CO_2-e**.

Step 5: Comparison to Australia's updated 2030 Target

We can also compare the new emissions after the reduction in the coal sector to Australia's updated 2030 target based on 2023 figures:

- **2030 target emissions**: **335.16 Mt CO_2-e** (based on a 43% reduction from 2005 levels).
- **Original total emissions** (from 2023): **432.0 Mt CO_2-e**.
- **Reduction from coal power**: **166.74 Mt CO_2-e**.
- **New total emissions**: **432.9 Mt CO_2-e - 166.74 Mt CO_2-e = 266.16 Mt CO_2-e.**
- **New total emissions after coal reduction**: **367.26 Mt CO_2-e**.
- **Quantitative effect**: **266.16 Mt CO_2-e** – **335.16 Mt CO_2-e** = **69 Mt CO_2-e** below the 2030 target.

Emissions		Coal Fired Power Stations[1]	Other Sources	Total	Kyoto Target 2030[2]	Australia Target 2030[3]
Actual 2019	No Intervention	168.06	365.94	534.00	423.36	335.16
Projected[4] 2019	Intervention with TSG	1.32	365.94	367.26	423.36	335.16
Actual 2023	No Intervention	168.06	264.84	432.90	423.36	335.16
Projected[4] 2023	Intervention with TSG	1.32	264.84	266.16	423.36	335.16

Note: 1. Emissions are for active Power Stations in 2024 -see Appendix 2
Note: 2. Original Kyoto Target is 26-28% below 2005 levels
Note: 3. Australia's updated Target is 43% below 2005 levels as outlined in NDC
Note: 4. If The Thunder Storm Generator (TSG) had been used that year

Summary:

By implementing a reduction in emissions from coal-fired power generation using the **Thunderstorm Generator Emission technology** Australia would achieve (based on the recent 2023 figures) a total **greenhouse gas emission level of 266.16 Mt CO_2-e**, which is **69 Mt CO_2-e lower** than the **2030 emission target of 335.16 Mt CO_2-e** (43% below 2005 levels). This represents a **substantial over achievement** of Australia's currently ambitious **2030 emission reduction target** and would put Australia in a favourable position to meet its **Paris Agreement** goals and allow Australia to not only meet its 2030 targets but also significantly advance its journey toward **net-zero emissions by 2050** as we will have time to address other sectors such as **transport and freight.**

Moreover we could use existing infrastructure and not have to close existing power stations because of their emissions contributions to greenhouse gas emissions. **This would preserve the jobs and livelihoods of many coal workers and benefit many small communities around Australia** while at the same time contributing significantly to the improvement of **local air quality**, the reduction of **health issues caused by pollution**, and help move Australia toward cleaner, renewable energy sources.

Additional

1. Increased Efficiency

The Thunder Storm generator technology increases the operation efficiency of a hydrocarbon burning engine (that is when fitted to a Honda 5500 CL portable petrol generator) in tests by 19.45%. It is expected that when used coal fired power generation that the operation efficiency would be even greater.

Clearwater Florida Base Test

Fuel Consumption / Emissions Reduction Test (60 Hertz)

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		BASELINE	TSG	% DIFFERENCE
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Fuel Run 10ml	TIME secs	221	264	+19.45

BASELINE CONTROL TEST Under 2400w Load

WITH THUNDERSTORM GENERATOR Under 2400w Load

2. Costs

Power plants can meet new environmental regulations and carbon reduction targets by using CO_2 scrubbers with 90% carbon reduction being the aim. However the cost of implementing CO_2 scrubbers in Australia's existing operational Coal Fired Power Stations (which do not have scrubbers currently) is significant. The capital cost of implementing a CO_2 scrubbers can range from $50 to $100 Million for a typical coal-fired-plant. The ongoing operating and maintenance cost can be from $1 to $5 per ton of Co_2 captured. Giving a total cost of $30 to $50 per ton of captured CO_2 in power generation this can vary widely depending on the technology used, the size of the power plant, and other factors.

Currently the cost implementing and maintaining the Thunder Storm Generator emission technology is unknown but is known to be much less involved and thus will be significantly cheaper than the implementation of CO_2 scrubbers.

However the big cost of CO_2 scrubbers is the significant amount of energy they require to operate, which can impact the overall efficiency of a power plant. The energy usage can vary depending on the specific technology and scale of the scrubber system, but in general there is an e**nergy penalty or decrease** of about **20-30%**. This means that the power plant needs to consume an additional 20-30% of its generated electricity to run the scrubber system whereas with the Thunder Storm Generator emission technology **increases** the energy output by roughly **20%**.

3. Comparison with Nuclear Power Generation:

With the advent of the Thunder Storm Generator technology nuclear power no longer offers any competitive advantage as far as operational emissions are concerned. Given the significantly higher capital costs ($17,000 per kilowatt (kW) compared to Coal's between $1,000 per kilowatt (kW) and $4,000 per kilowatt (kW)), the extended construction timelines (15 years verses Coals 4-6 years), and the need to overcome existing regulatory hurdles make nuclear both impractical and unworkable when compared to coal-fired power stations in Australia which offer an economically more efficient, timely, safe and publicly acceptable solution without even considering the issue of the disposal of nuclear waste.

In summary while nuclear power offers low greenhouse gas emissions, it presents challenges such as high capital costs, long construction timelines, and complex waste disposal issues. Additionally, public apprehension about nuclear safety can lead to resistance and delays in project implementation. In contrast, low-emission coal technology provides a more immediate and publicly acceptable solution to reducing emissions while utilising existing infrastructure and maintaining energy reliability.

Conclusion

The Thunderstorm Generator Emission Technology which enables coal to be burned with minimal greenhouse gas emissions represents a significant advancement in energy technology. By embracing this innovation, Australia can achieve its environmental objectives, uphold energy security, and support economic stability. This low-emission technology reestablishes Coal as the most viable and advantageous alternative to nuclear power generation in our nation's energy strategy particularly given our short to medium term needs.

Appendix 1. Environmental and Societal Benefits

1. Air Pollution Control:

- **Cleaner Air Quality**: Coal-fired power plants are major sources of **air pollutants**, including CO_2, CO, SO_2, **nitrogen oxides (NOx)**, and **particulate matter**. A combined **99.65% reduction in CO_2**, **98% reduction in CO**, and **84.8% reduction in SO_2** would drastically improve local air quality, resulting in **healthier populations** and **fewer pollution-related illnesses**. This would also reduce **healthcare costs** and enhance overall well-being.
- **Healthier Communities**: The reduction in harmful air pollutants would mean lower rates of asthma, respiratory diseases, and cardiovascular problems. Communities living near coal plants would experience fewer **health emergencies** and enjoy better overall **public health outcomes**.

2. Climate Change Mitigation:

- **Substantial CO_2 Reduction**: The **99.65% reduction in CO_2** emissions would be a huge step toward slowing global warming. Coal-fired plants, as major contributors to CO_2 emissions, would contribute much less to the **greenhouse effect**, helping to prevent extreme global temperature increases and the associated impacts like rising sea levels and extreme weather events.
- **A Greener, Cooler Planet**: With less CO_2, the global climate would stabilise, leading to healthier ecosystems and lower risks of biodiversity loss. This would create a more resilient environment that can adapt to climate change.

3. Energy Transition and Technological Innovation:

- **Boosting Renewable Energy Transition**: A dramatic reduction in emissions from coal plants could make it easier for countries to transition to **renewable energy sources** such as wind, solar, and hydro-power. This transition would create a cleaner energy future, reducing dependence on fossil fuels in a time frame that would allow a transition that would be acceptable to all parties in the climate change conversation.
- **Promoting Clean Technology**: The technological advancements needed to achieve these reductions (such as **carbon capture** and **clean combustion technologies**) would accelerate the development of future **green energy technologies**, making the world more sustainable and efficient.

4. Economic and Political Benefits:

- **Economic Gains from Reduced Health Costs**: The reduction in air pollution and associated health benefits would result in significant **economic savings** in healthcare and medical costs. By preventing pollution-related diseases, this would ease the burden on national healthcare systems and lower the overall costs for individuals and governments.
- **Political Leverage and Global Leadership**: Countries and companies that achieve these significant reductions would demonstrate **climate leadership**. They would be able to take a more active role in international climate negotiations and influence policy, pushing for stronger global commitments to **combat climate change** and reduce air pollution.

Appendix 2. Current Australian Cold Fired Power Station Emissions

AUSTRALIAN COAL FIRED POWER STATION				
Power Station	State	Emissions	Capacity	Scrubber Cost[1]
		(MT Co2 / yr)	(MW)	($Million/Year)
Eraring	NSW	13.90	2,880	556
Bayswater	NSW	19.80	1,680	792
Mount Piper	NSW/VIC	9.08	1,400	363.2
Vales Point	NSW	10.44	1,320	417.6
Callide	QLD/NSW	12.50	1,720	500
Tarong	QLD	8.50	1,400	340
Stanwell	QLD	13.00	1,445	520
Gladstone	QLD	11.80	1,680	472
Rocky Point	QLD	0.16	242	6.4
Kogan Creek	QLD	4.33	750	173.2
Millmerran	QLD	8.50	852	340
Loy Yang A	VIC	15.00	2,200	600
Loy Yang B	VIC	13.00	1,050	520
Yallourn	VIC	15.00	1,480	600
Bluewaters	WA	2.50	434	100
Muja	WA	4.50	854	180
Collie	WA	2.30	340	92
Worsley	WA	3.75	107	150
		168.06	**21,834**	**6,722**

Note: 1. The average cost of $40 per ton which includes capital & operational Costs