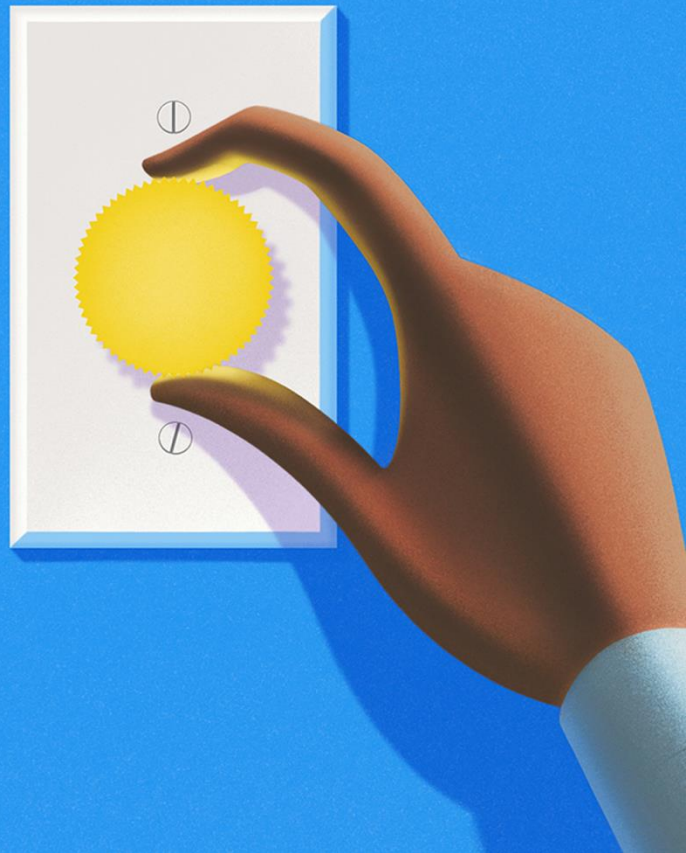
SRM360

Sunlight Reflection Methods, Explained.



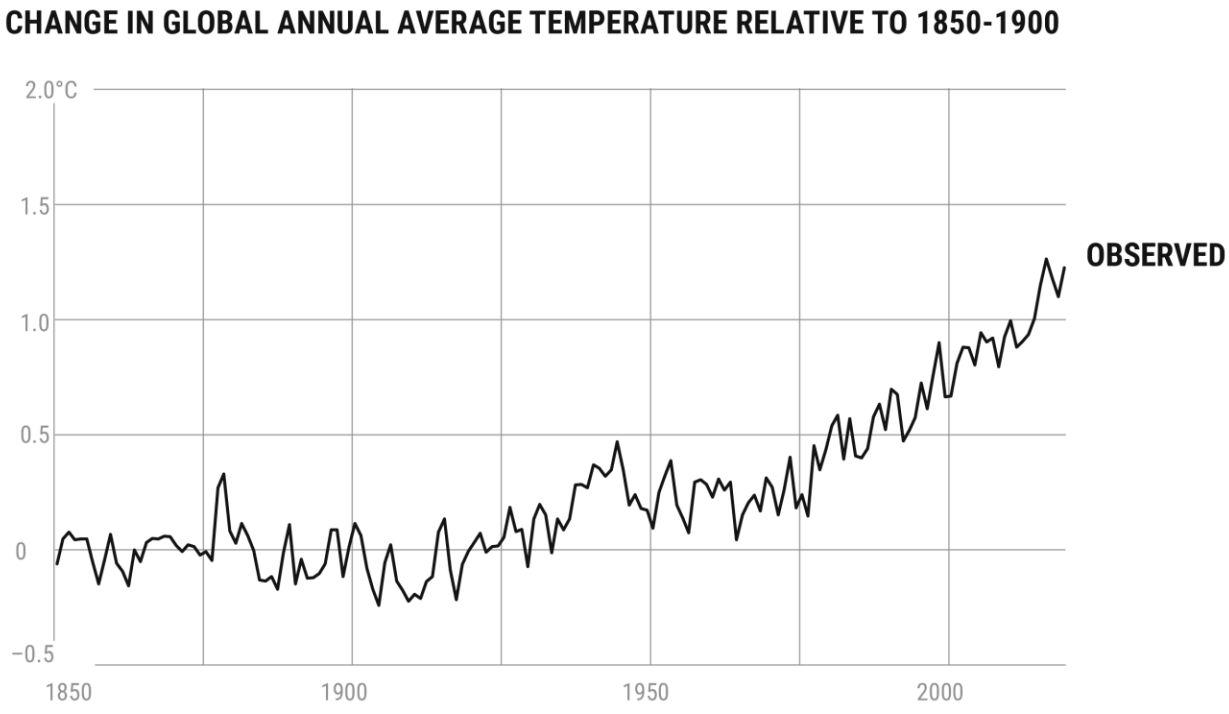
Jan 2026


What is SRM?
SRM360

Could reflecting sunlight be an essential part of the fight against climate change?

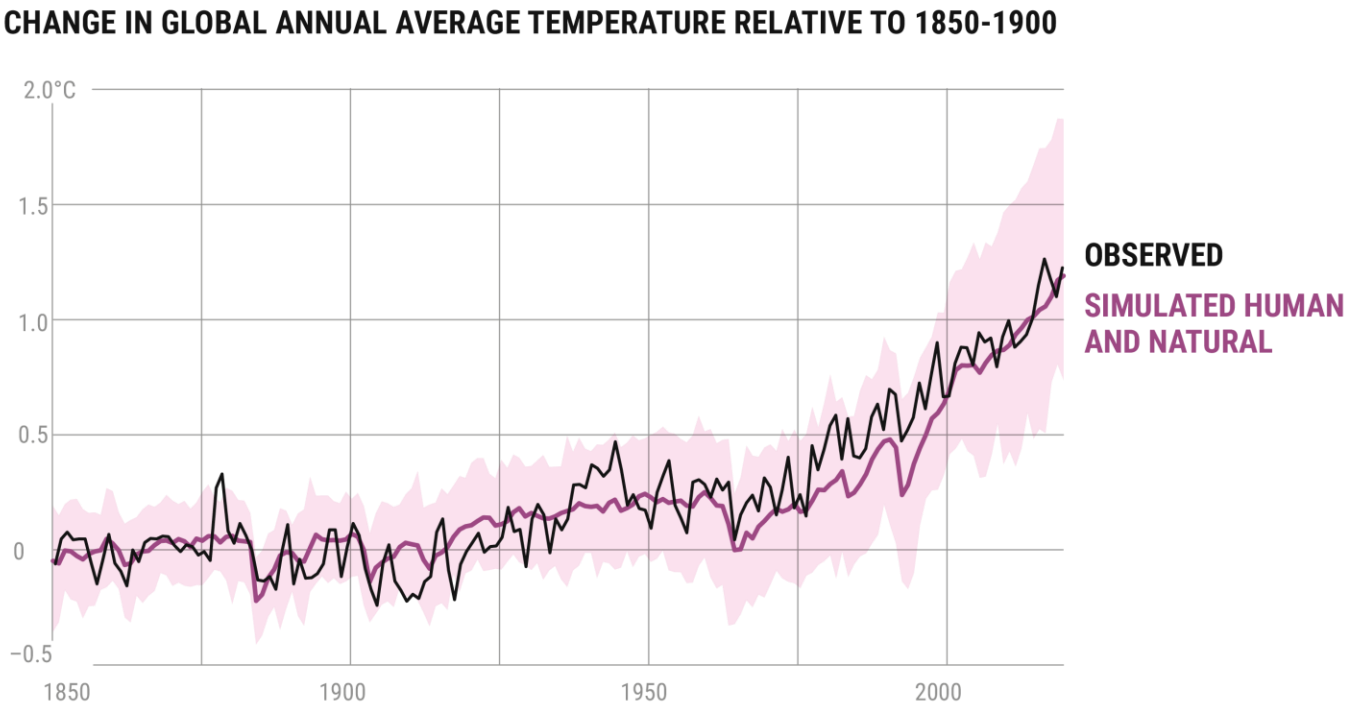
Dr. Pete Irvine
Research Assistant Professor, UChicago
Editorial Director, SRM360.org

The planet is warming and we're to blame



Source: IPCC

The planet is warming and we're to blame



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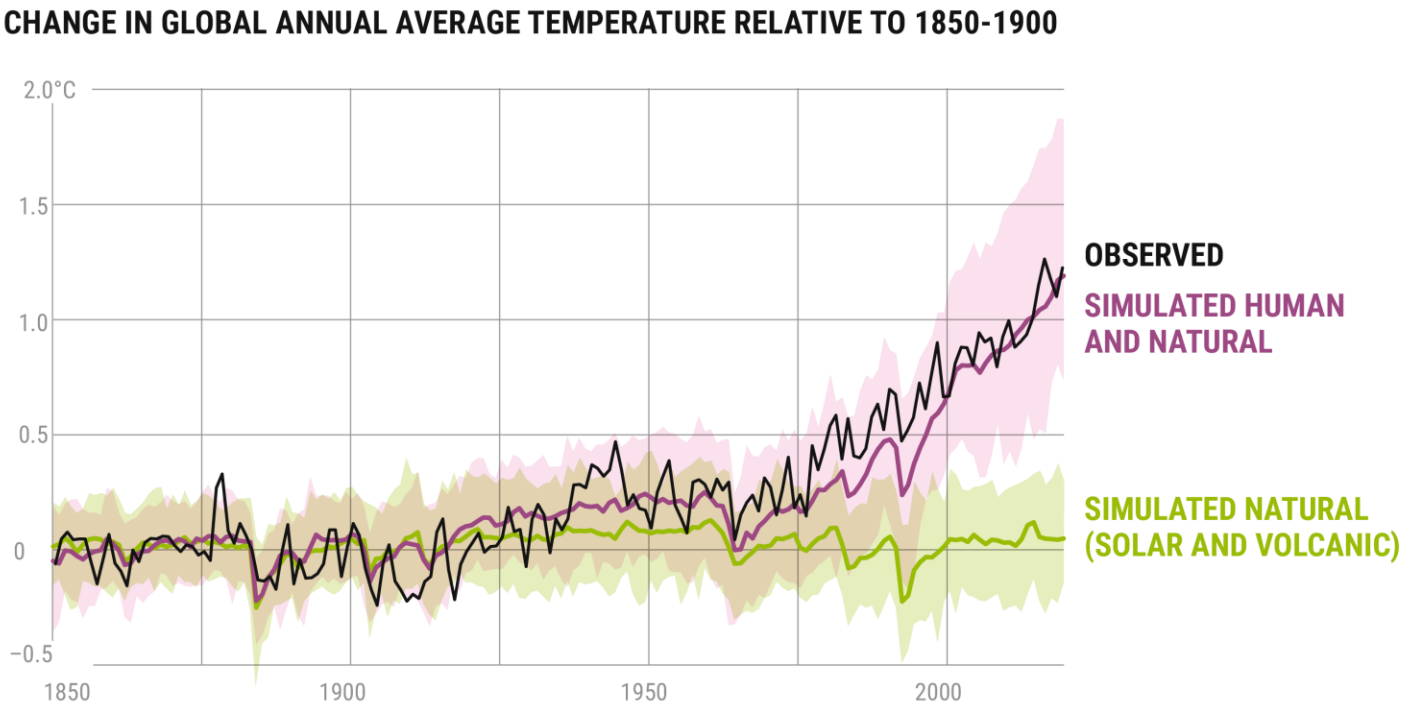
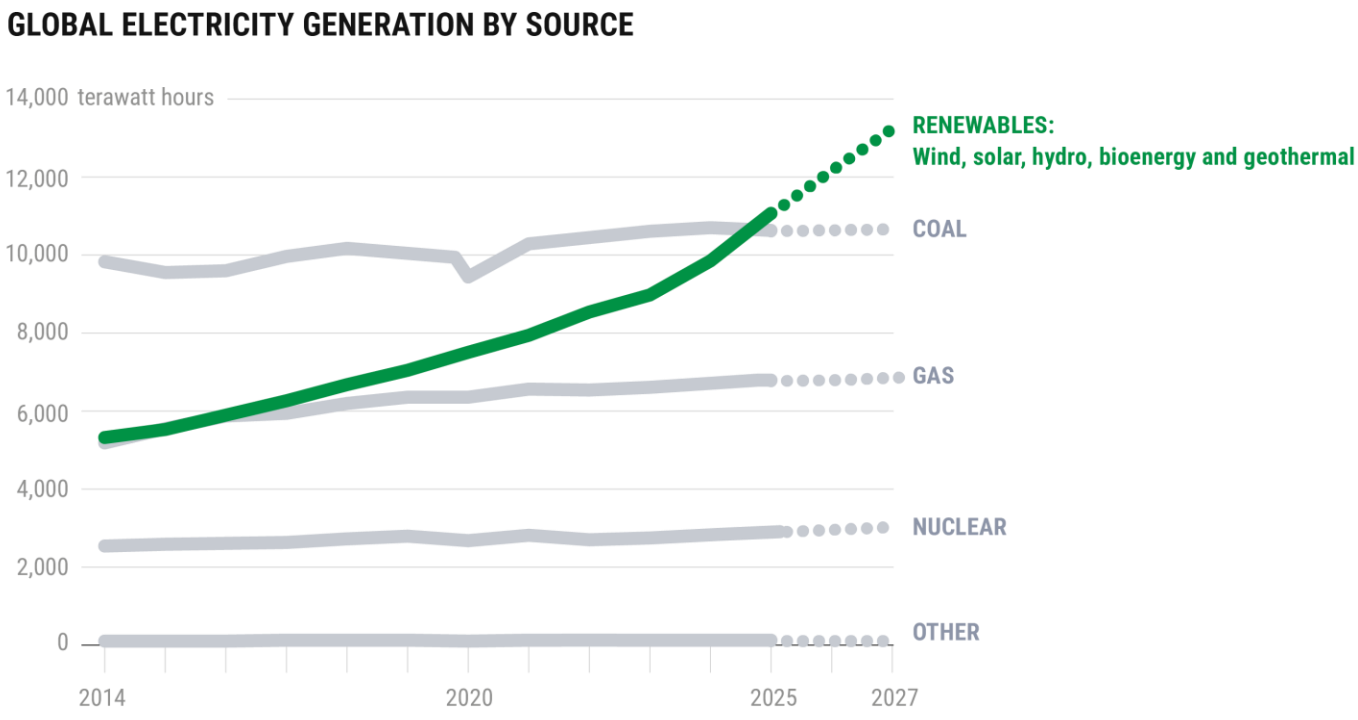


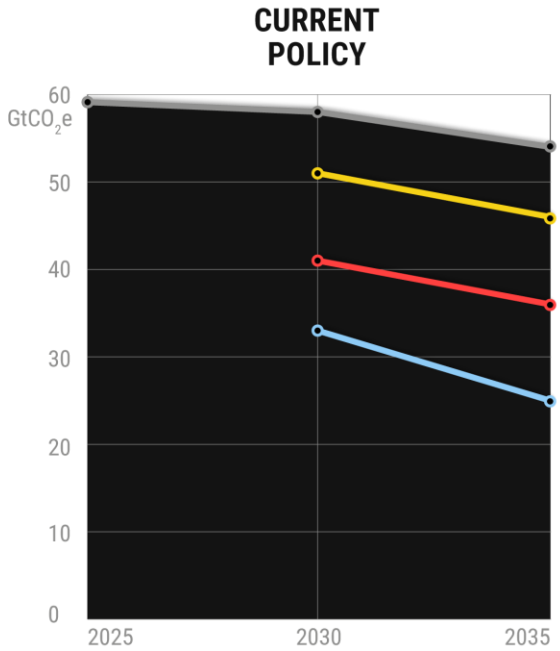
Source: IPCC

Progress is being made...



Source: IEA

… but not fast enough



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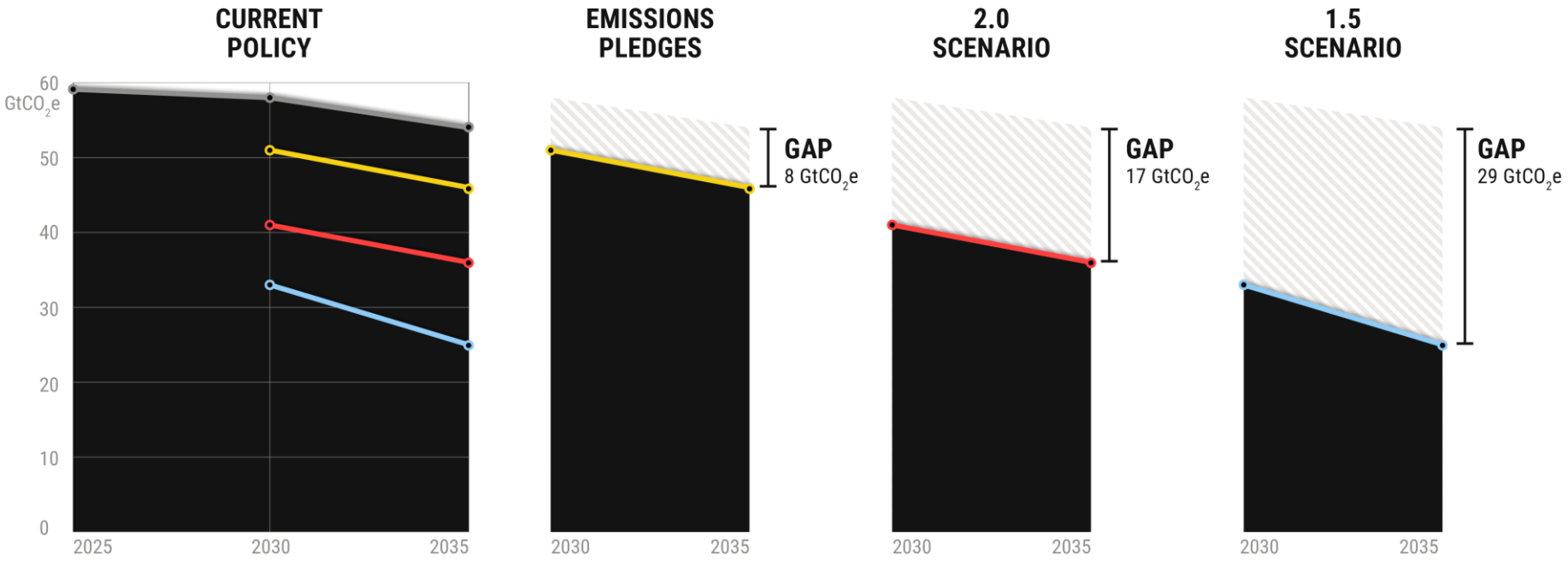
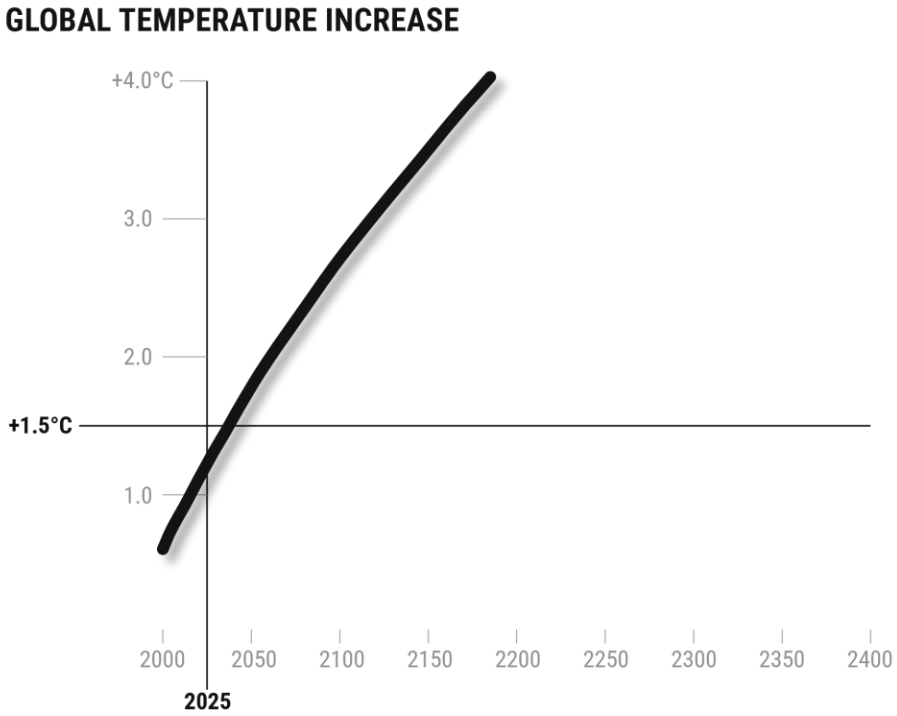


Climate policy options

Climate policy options

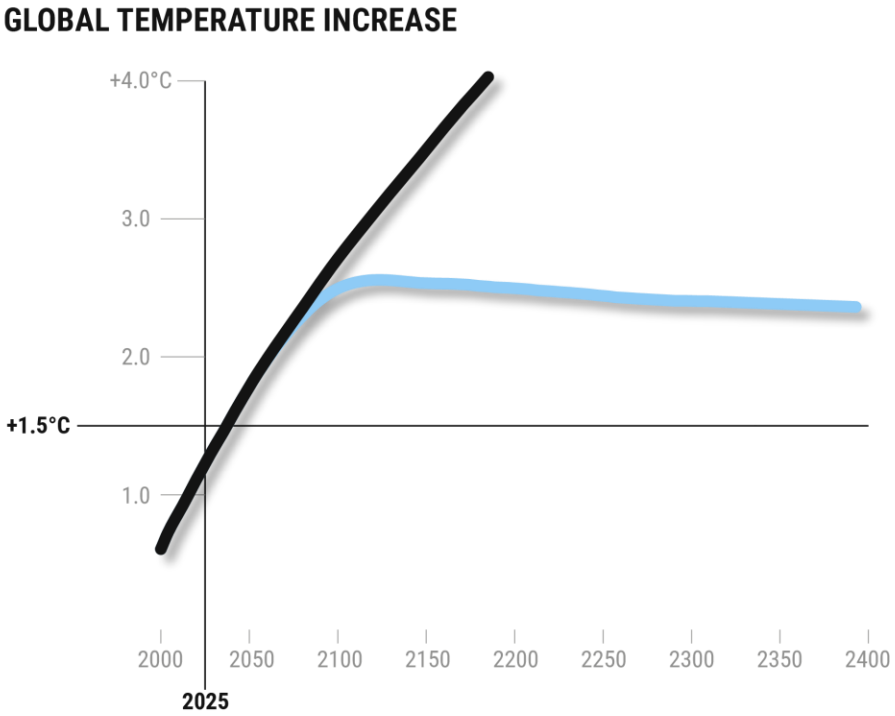


NO EMISSIONS CUTS

Temperatures would continue to rise.

Source: Based on Boselius et al. (2025), Oxford Open Climate Change

Climate policy options



NO EMISSIONS CUTS

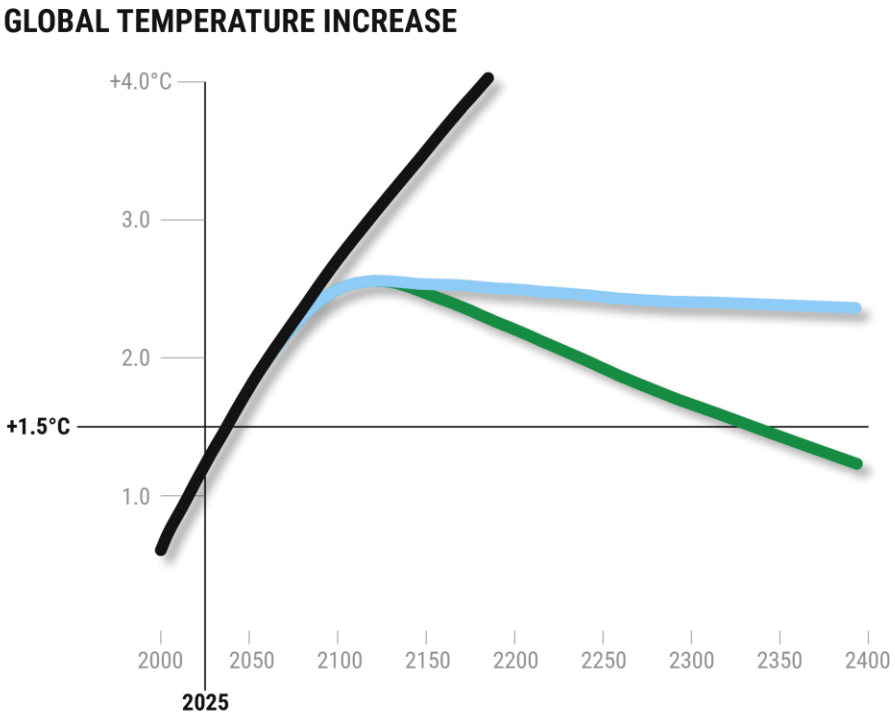
Temperatures would continue to rise.

ELIMINATE EMISSIONS

This would stop global warming, but not reverse it.

Source: Based on Boselius et al. (2025), Oxford Open Climate Change

Climate policy options



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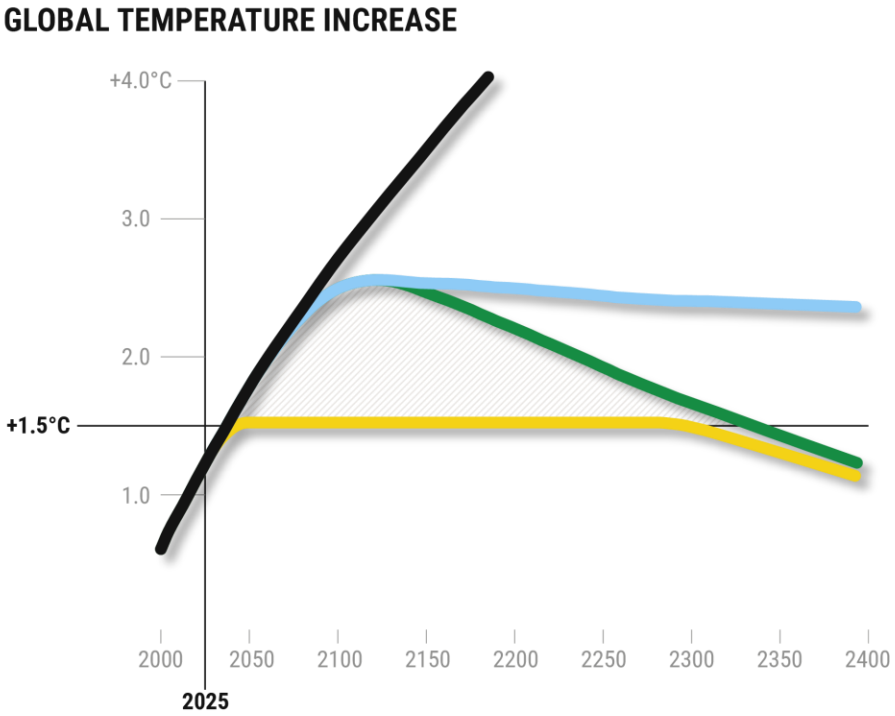
REMOVE CARBON

Carbon dioxide removal could then slowly lower temperatures.

Source: Based on Boselius et al. (2025), Oxford Open Climate Change

Climate policy options



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Carbon dioxide removal could then slowly lower temperatures.

REFLECT SUNLIGHT

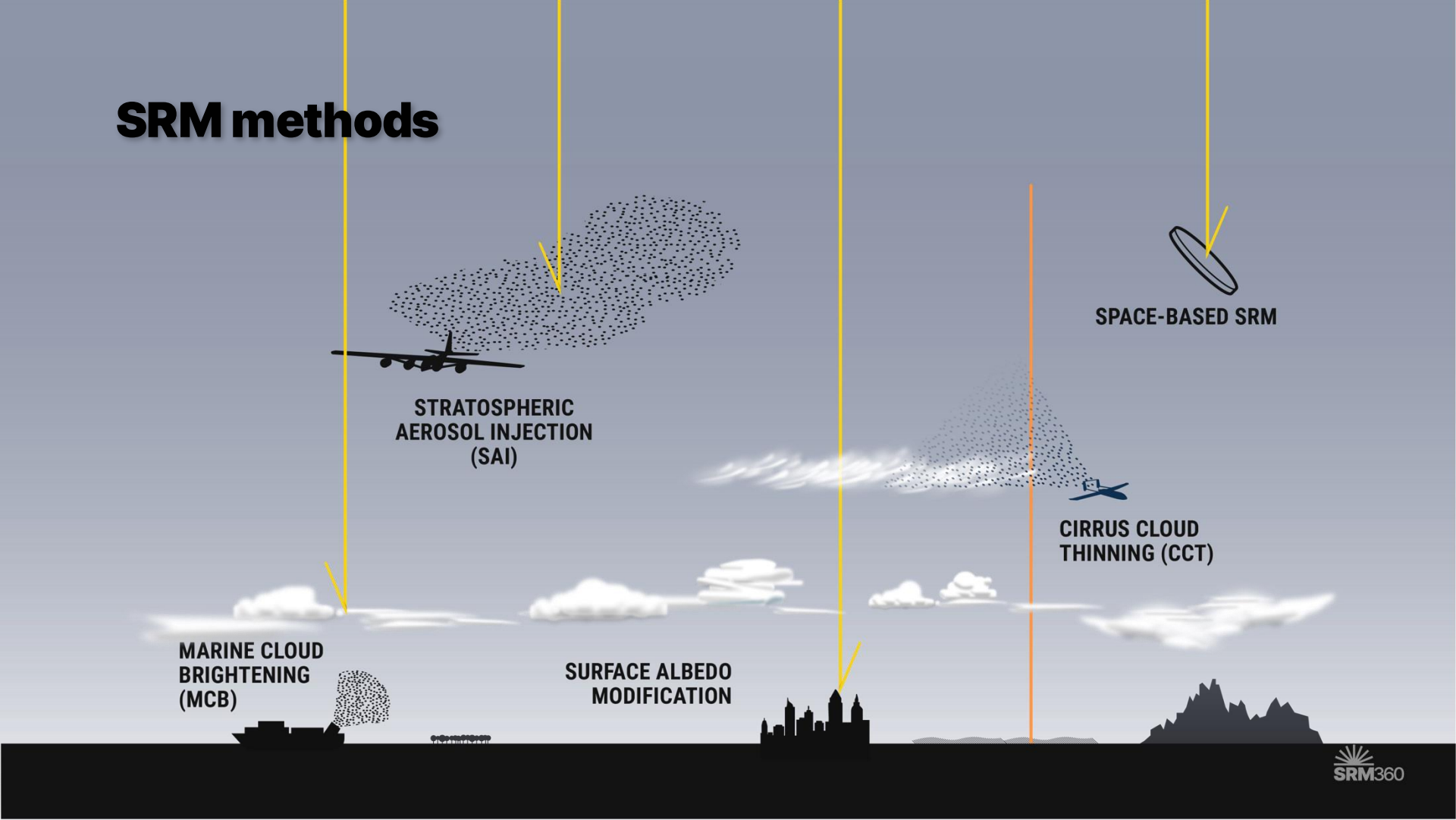
SRM could offset global warming while emissions fall and carbon is removed.

Sunlight Reflection Methods (SRM)

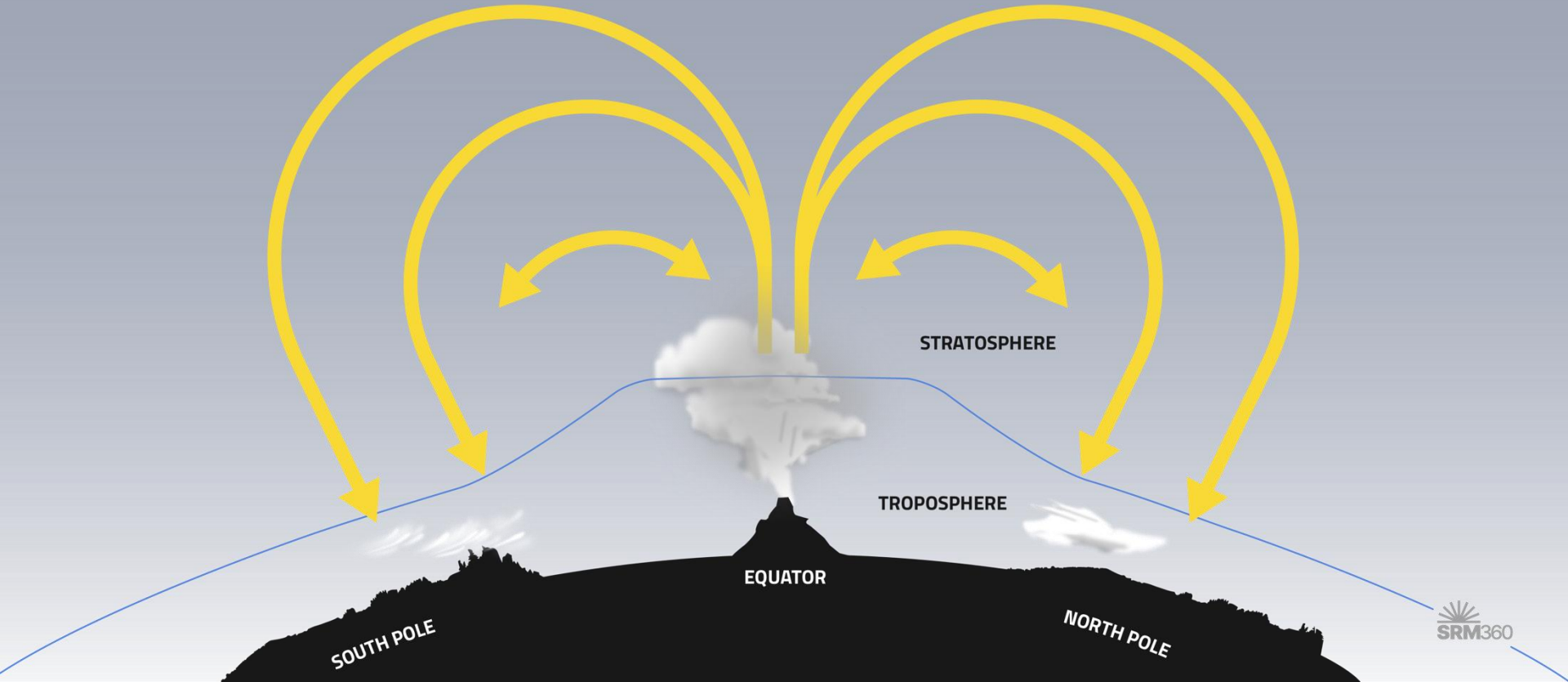
Also known as:

Solar Geoengineering

Solar Radiation Modification


SRM methods
STRATOSPHERIC AEROSOL INJECTION (SAI)
SPACE-BASED SRM
CIRRUS CLOUD THINNING (CCT)
MARINE CLOUD BRIGHTENING (MCB)
SURFACE ALBEDO MODIFICATION
SRM360

Major volcanic eruptions can cool the Earth



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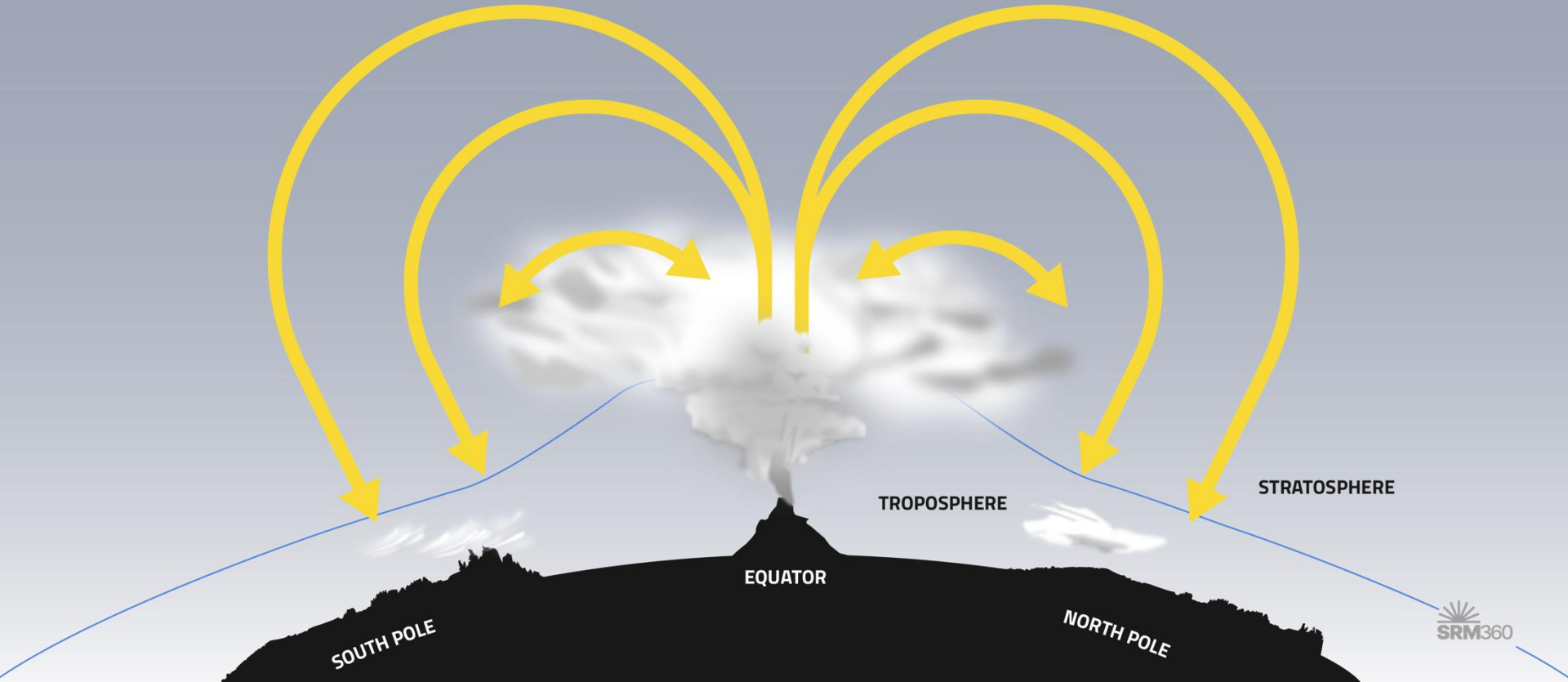

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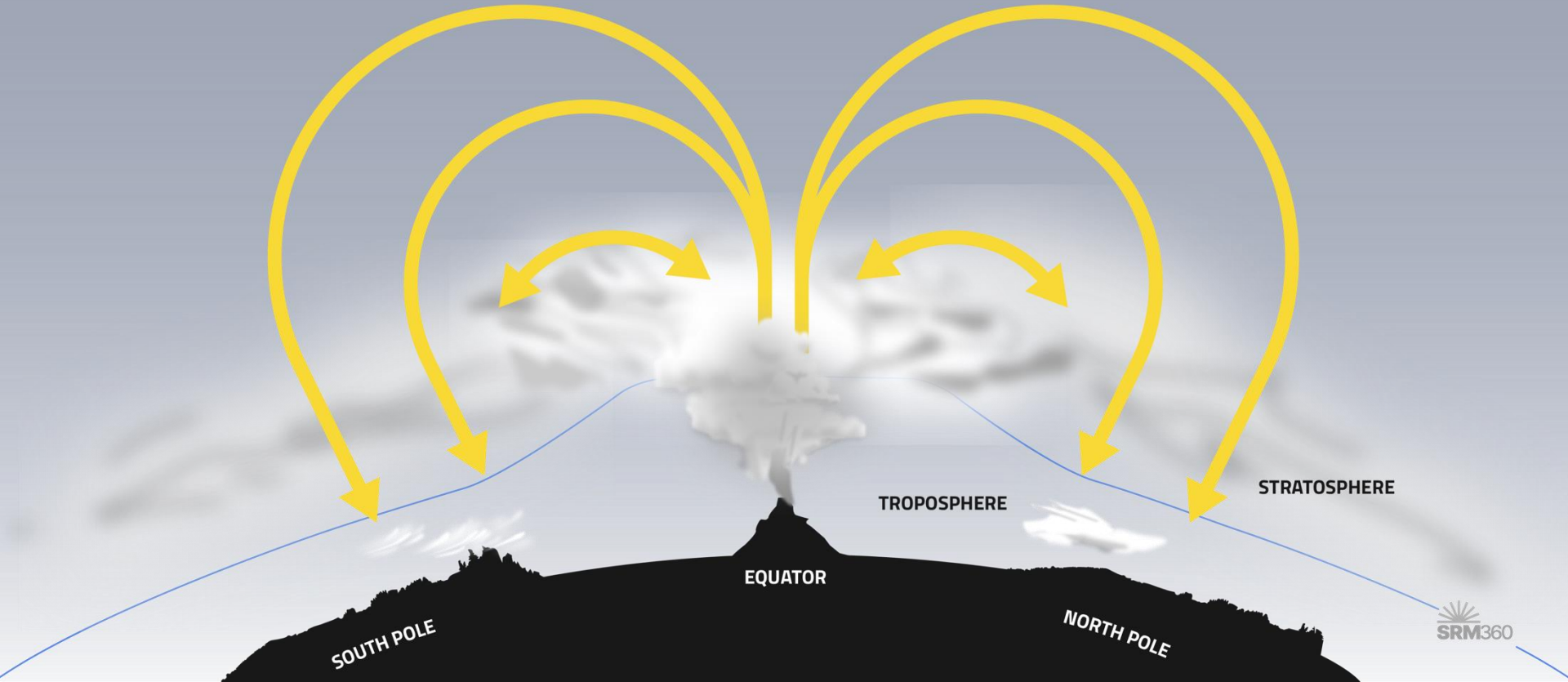
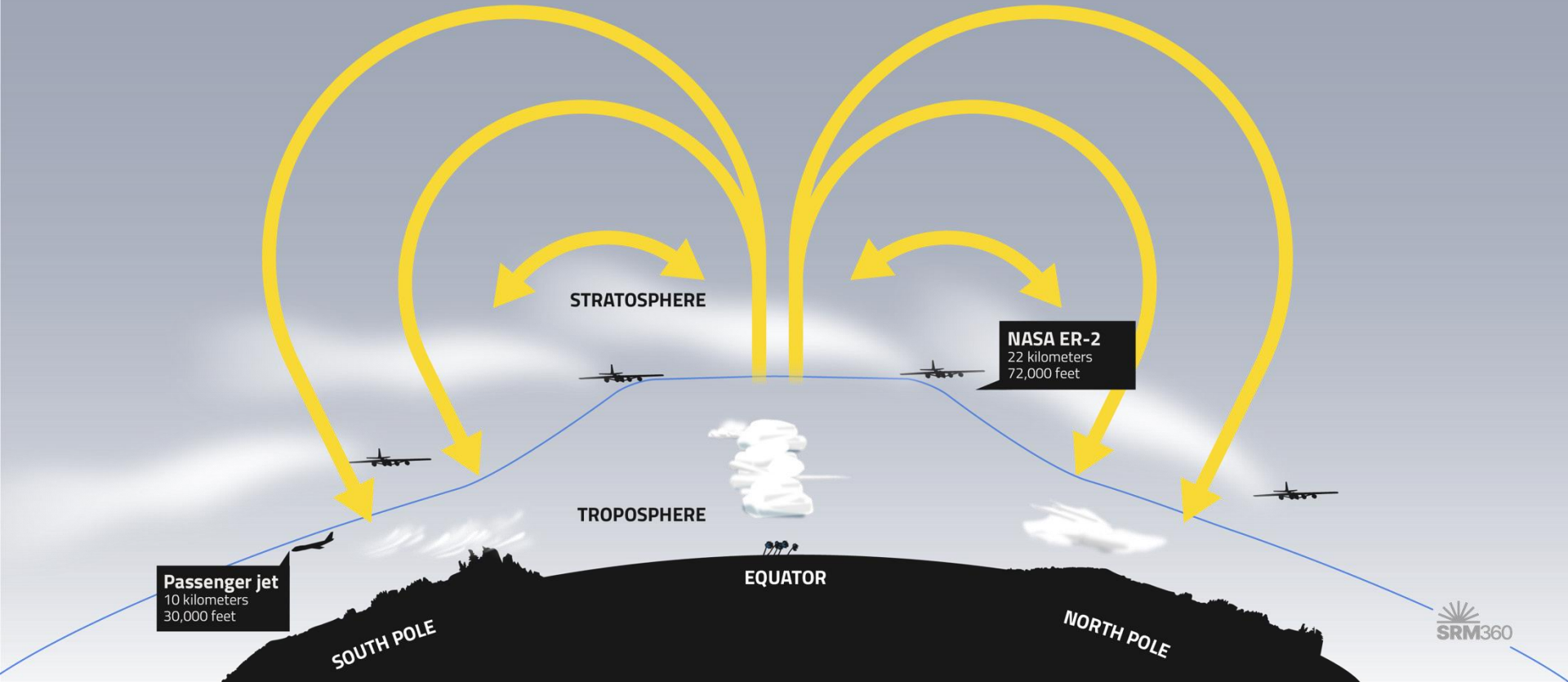


And we could too...



SAI is feasible

SAI LOFTER CONFIGURATION CONCEPTUAL DESIGN

172 FT

118 FT

BOEING 737-8

117 FT

129 FT

For 1 C cooling

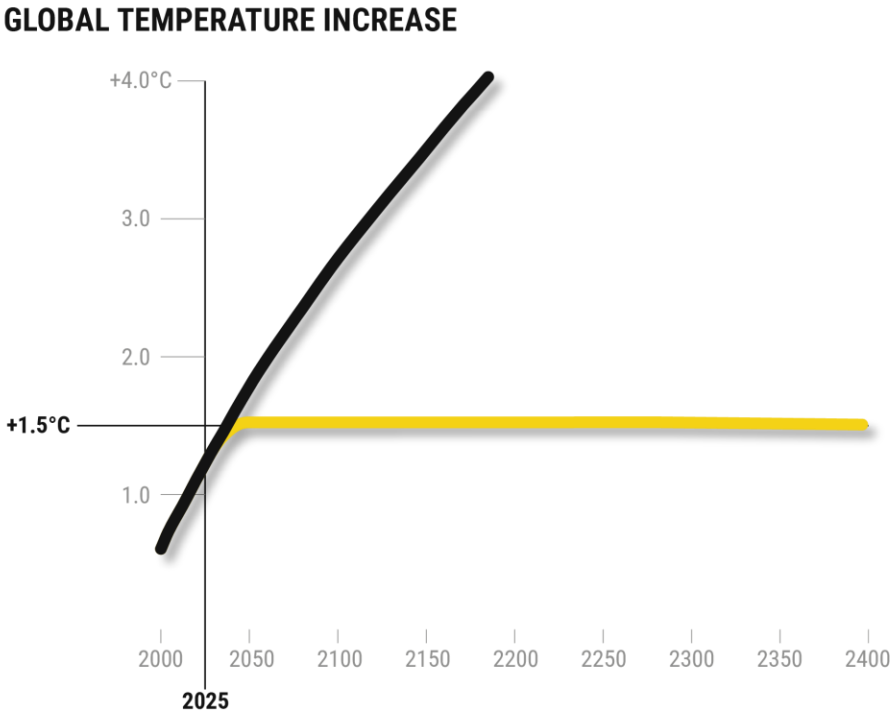
10 Million tons per year = ~$20B/yr

- 25 tons per flight
- Hundreds of flights per day
- Tens of aircraft
- Several airbases

Source: Bingamann et al.

Could SAI help reduce climate risks?

SAI is not an alternative to cutting emissions



Source: Based on Boselius et al. (2025), Oxford Open Climate Change

NO EMISSIONS CUTS

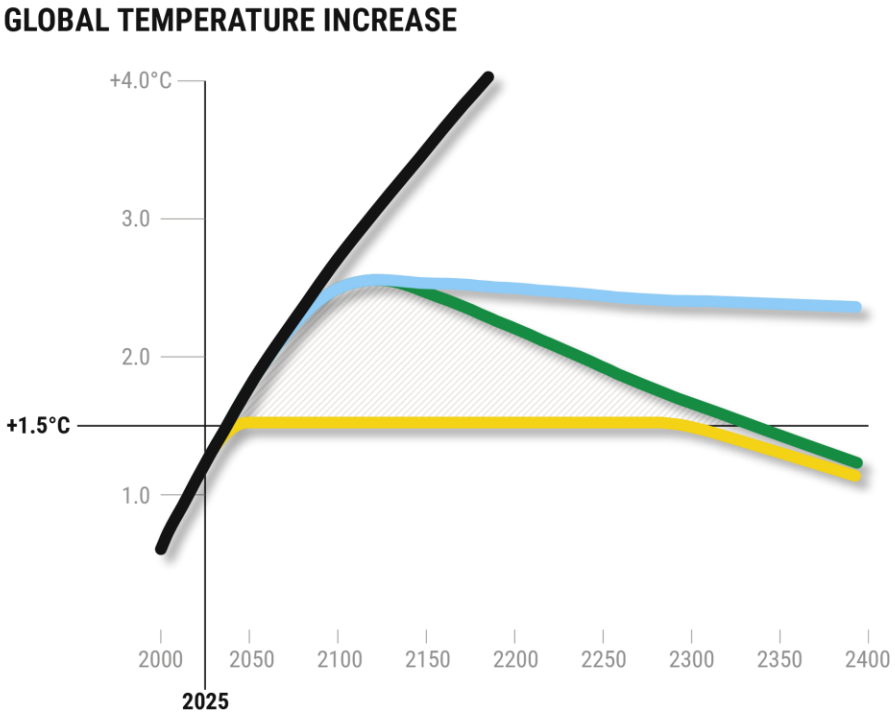
Temperatures would continue to rise.

REFLECT SUNLIGHT

Temperatures could be held constant, but...

- CO_2 persists indefinitely
- Ocean acidification worsens
- Side-effects would grow

SAI is not an alternative to cutting emissions



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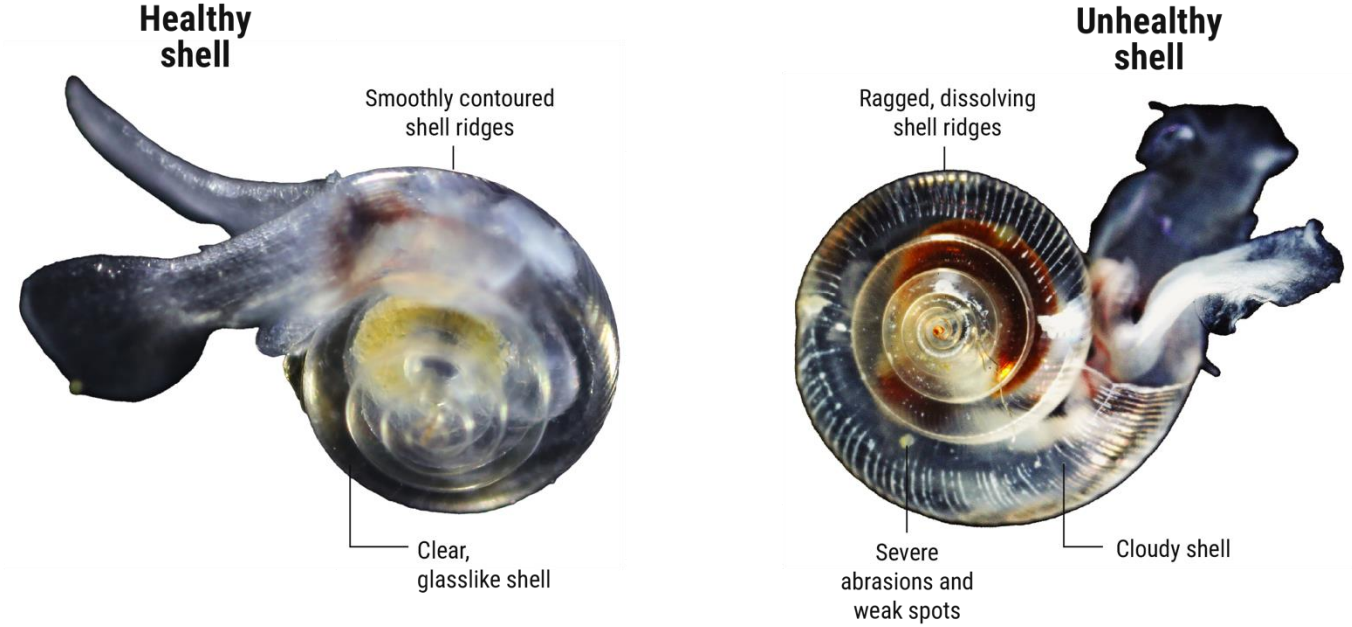
Carbon dioxide removal could then slowly lower temperatures.

REFLECT SUNLIGHT
SRM could offset global warming while emissions fall and carbon is removed.

Source: Based on Boselius et al. (2025), Oxford Open Climate Change

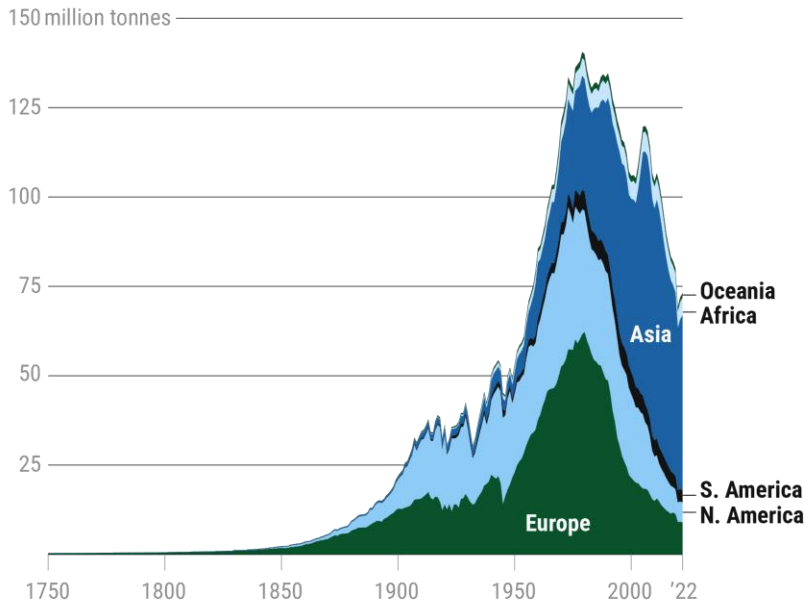
SAI would not address ocean acidification

EFFECTS OF ACIDIC WATERS ON THE SHELLS OF PTEROPODS, TINY MARINE MOLLUSKS:



Source and images: NOAA

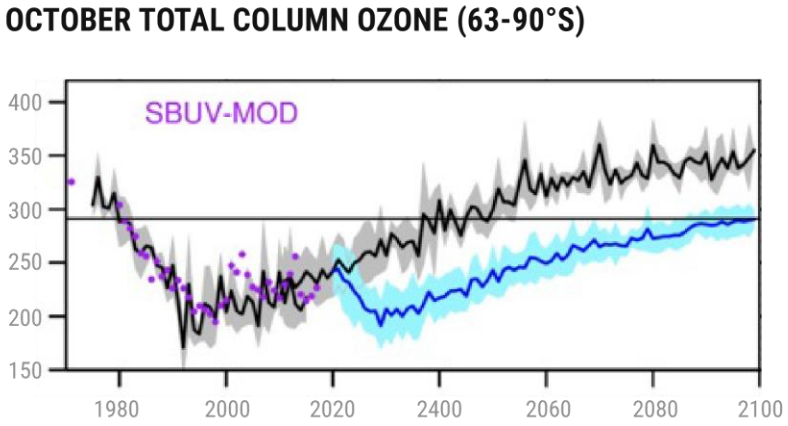
SAI would add to the acid rain problem

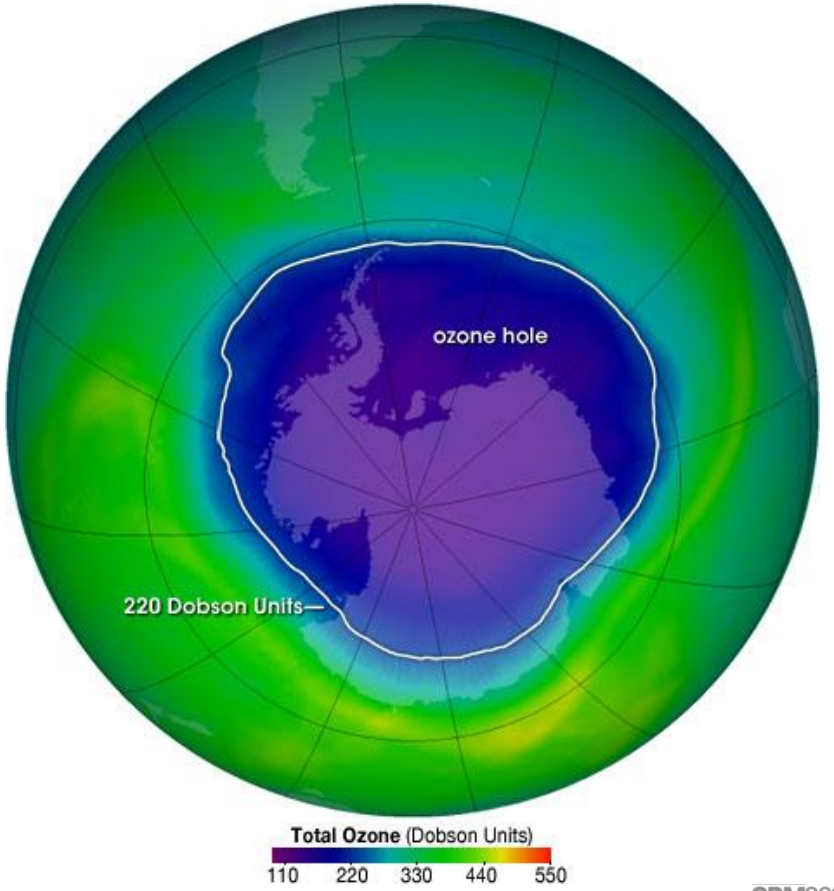


Source: Hoesly et al. (2024) - Community Emissions Data System (CEDS) via Our World in Data

Trees affected by acid rain

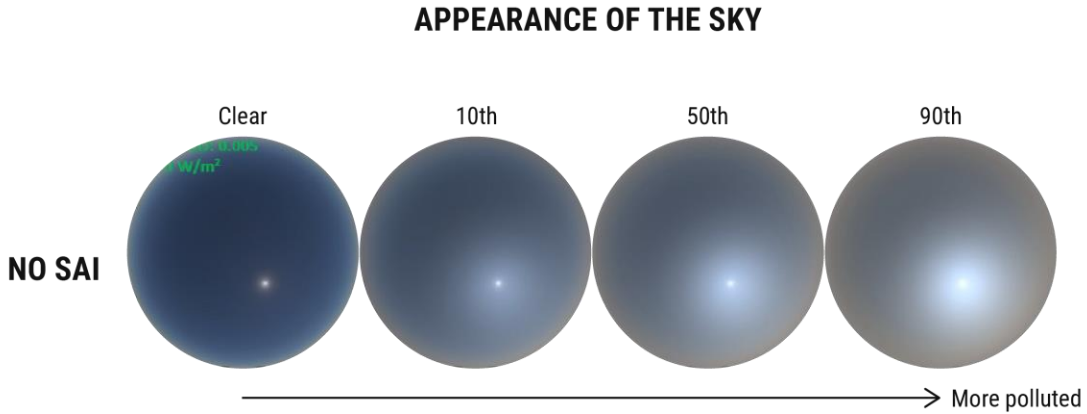
SAI would delay the recovery of the ozone hole by decades





Appearance of the sky

Air pollution has a large effect on the appearance of the sky



Source: Ansar Lemon et al 2025 Environmental Research Letters

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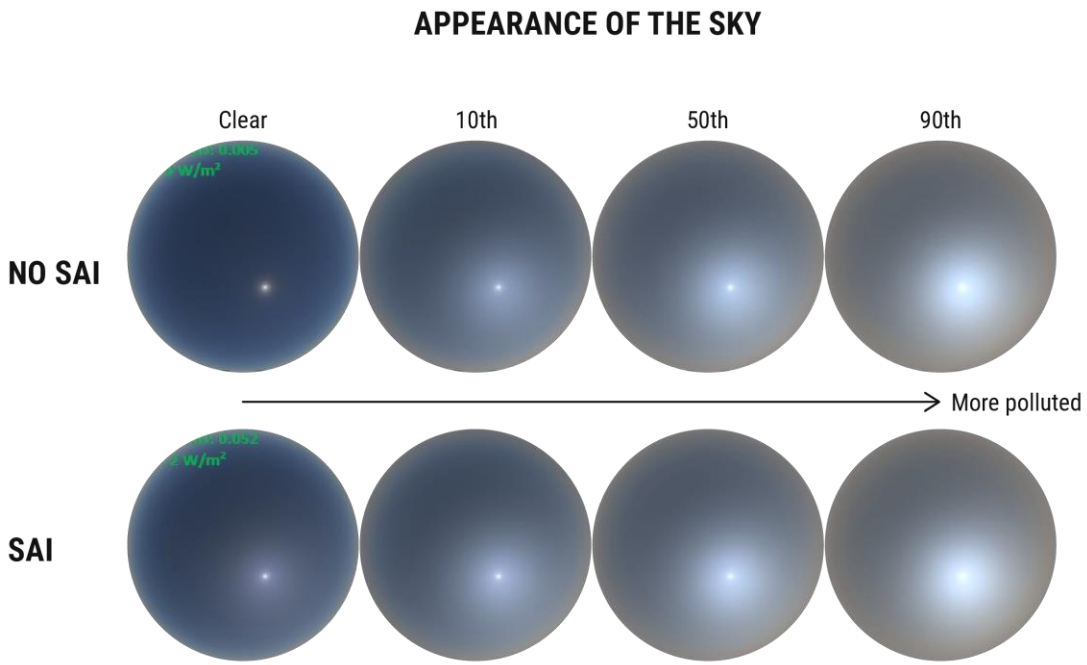
Appearance of the sky

Air pollution has a large effect on the appearance of the sky

In perfectly clear conditions, effect of SAI would be noticeable
In most urban areas it would be very difficult to spot



Source: Ansar Lemon et al 2025 Environmental Research Letters

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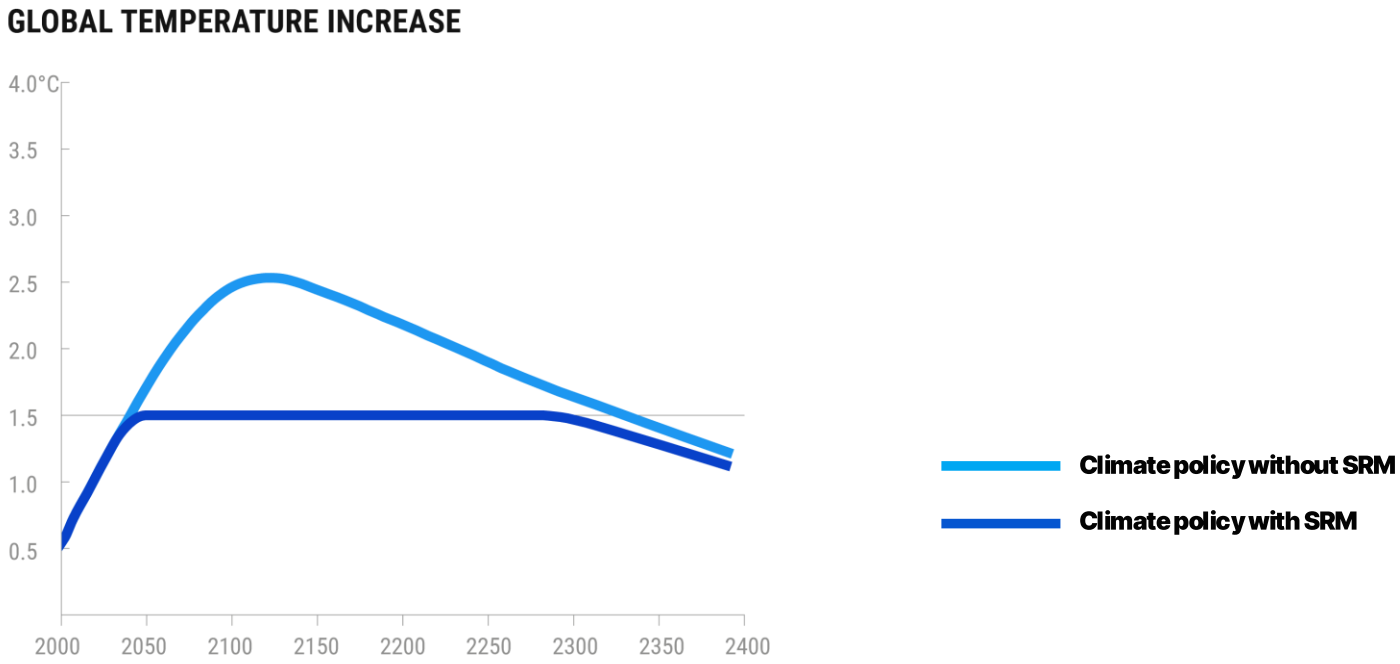
Potential SRM benefits		Potential SRM risks
	FOOD 	
By reducing warming, SRM might boost crop yields overall		Changes in rainfall due to SRM could reduce crop yields in some regions.
	WATER 	
SRM would change rainfall patterns, improving water security in some regions. By reducing warming, SRM might boost crop yields overall		Those changed rainfall patterns might cause worsening water security in other regions.
	HEALTH 	
SRM would reduce extreme heat and its health impacts, reduce shifts in the spread of diseases overall		SRM could delay the recovery of the ozone hole and add to air pollution, posing health risks.

Potential srm benefits		Potential srm risks
	ECOSYSTEMS	
Lower temperatures would reduce coral bleaching. Reduced climate change would mean fewer extinctions overall, but potentially more extinctions in some regions		SRM would not address ocean acidification which would still threaten coral reefs. Reduced climate change could potentially mean more extinctions in some regions.
	EXTREME WEATHER	
Many weather extremes would be less intense, including reduced extreme rainfall overall.		Droughts may be more intense in some regions with SRM.
	ECONOMY	
Reduced climate change could mean reduced economic impacts with SRM.		Reduced water availability in some regions could have economic consequences.
	SECURITY	
Less intense climate extremes could reduce the risk of violent conflict.		There could be conflict over the use of SRM.

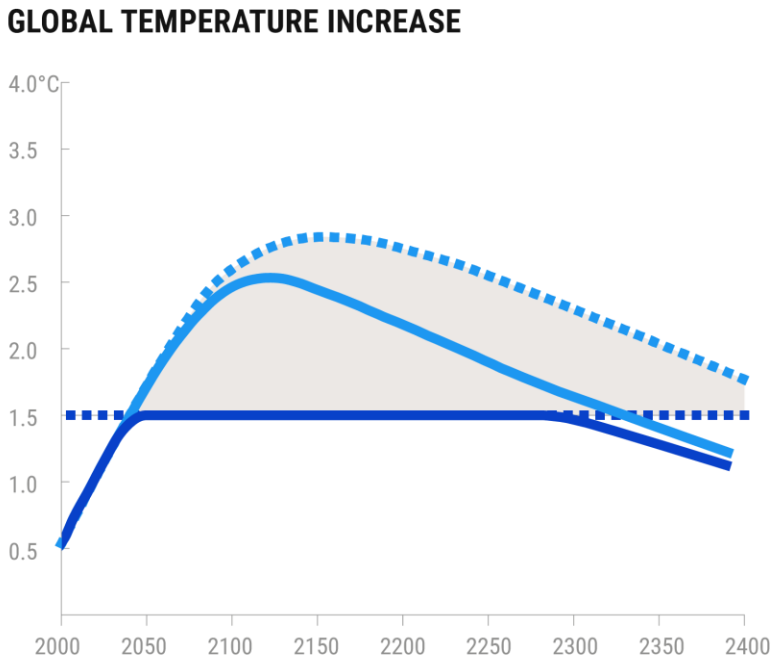
What if SRM were done badly?

Could SRM undermine emissions cuts?



Source: Based on Boselius et al. (2025), Oxford Open Climate Change

Could SRM undermine emissions cuts?



If SRM delays progress

Delaying emissions cuts would increase the amount of cooling needed from SRM.

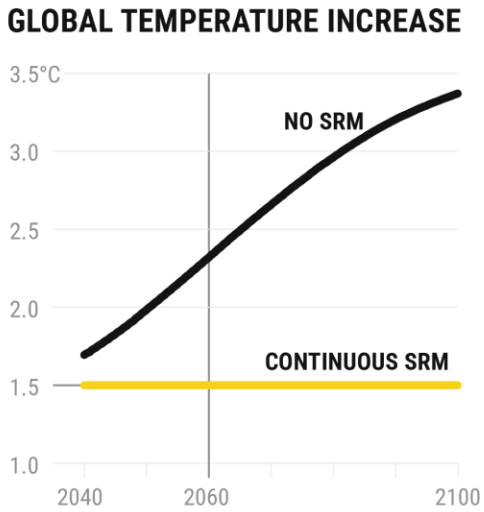
Delays would also commit future generations to SRM (or global warming) for longer.

Climate policy without SRM

Climate policy with SRM

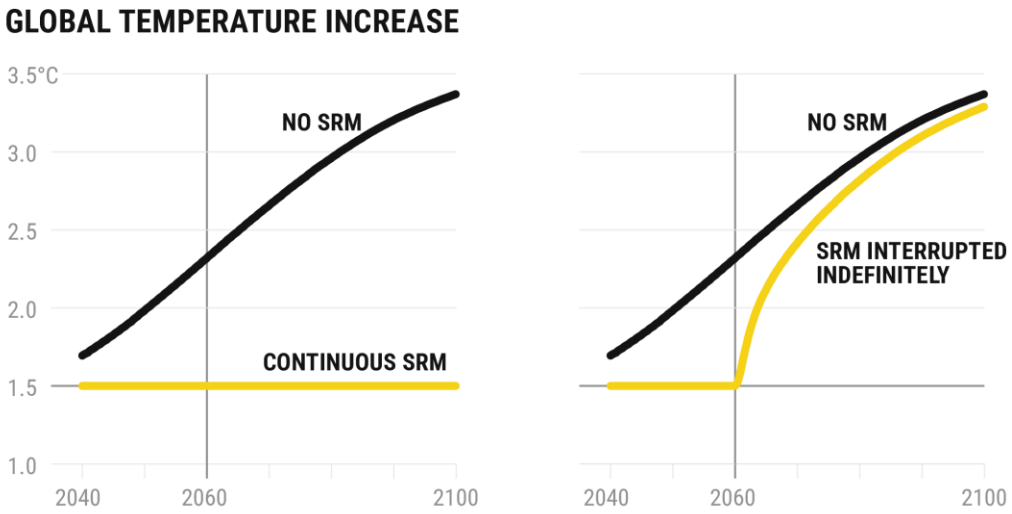
Source: Based on Boselius et al. (2025), Oxford Open Climate Change

Termination shock



Source: Based on results from Farley et al. (2024), Environmental Research Climate

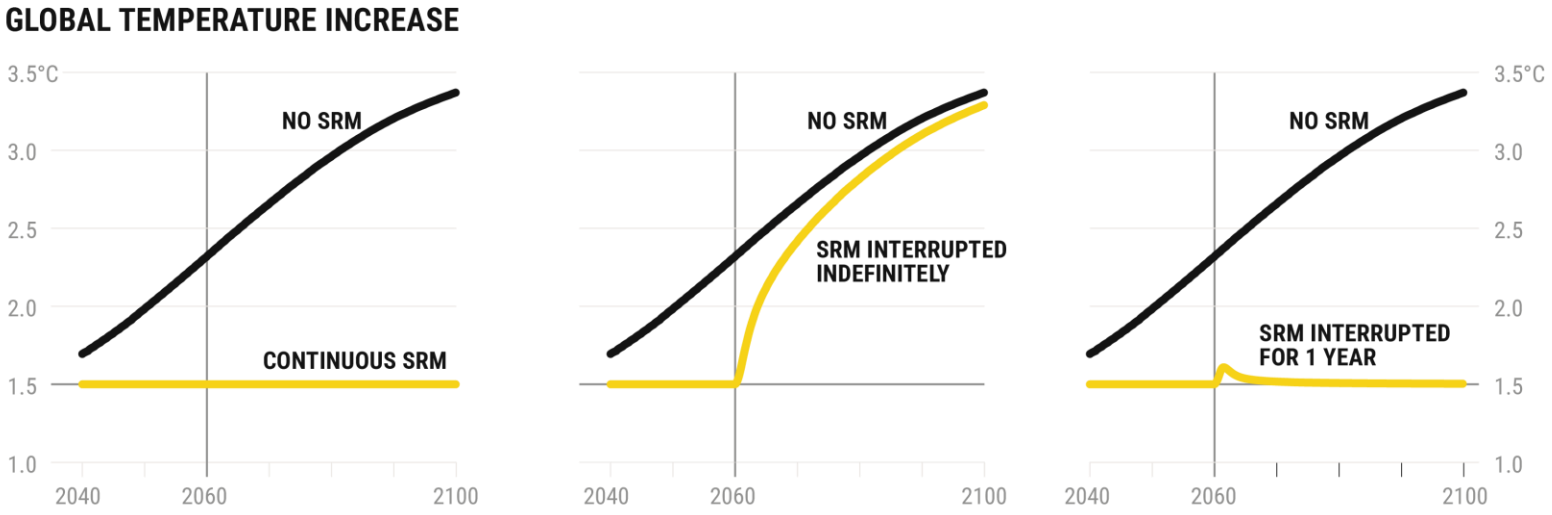
Termination shock



If SRM deployment suddenly and permanently stopped, temperatures would rapidly rise.

Source: Based on results from Farley et al. (2024), Environmental Research Climate

Termination shock



If SRM deployment suddenly and permanently stopped, temperatures would rapidly rise.

But, if the deployment were restarted within a few months, this rapid warming could be avoided.

Source: Based on results from Farley et al. (2024), Environmental Research Climate

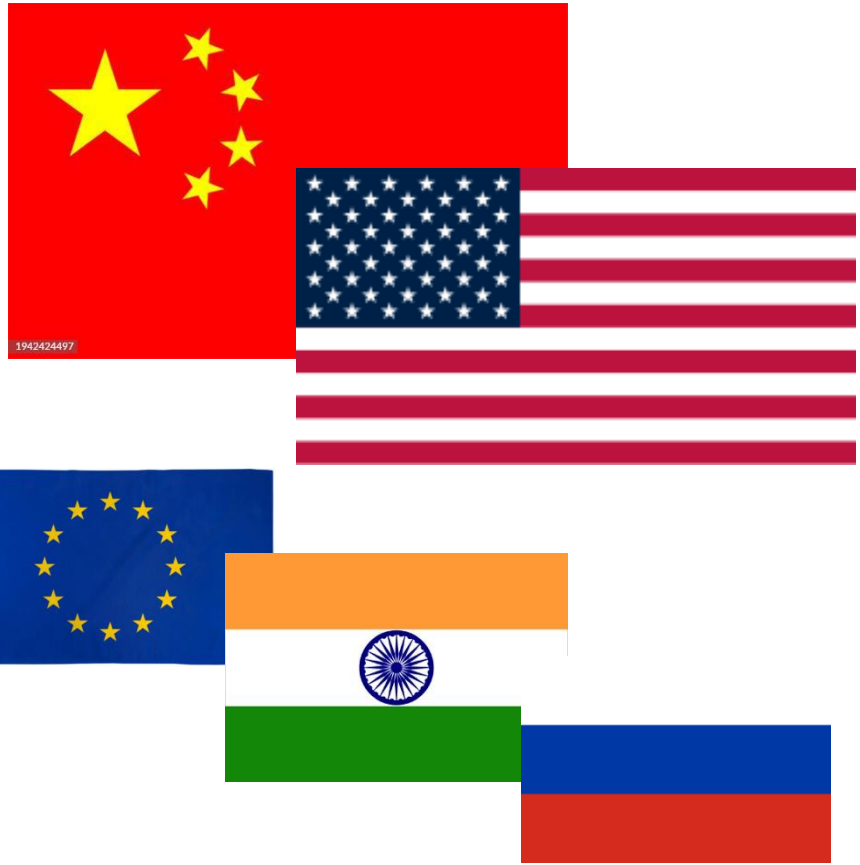
SRM360

Unilateral deployment?

For 1 C cooling

10 Million tons per year = ~$20B/yr

- 25 tons per flight
- Hundreds of flights per day
- Tens of aircraft
- Several airbases



SAI LOFTER CONFIGURATION CONCEPTUAL DESIGN

Conflict over extreme weather?

A building in Pakistan after the 2022 floods

Summary

CLIMATE CHANGE

It’s warming.

It’s us.

It’s bad.

We’re sure.

There’s hope.

SUNLIGHT REFLECTION METHODS

Reflecting light could cool the planet.

Tiny particles could do it.

This is not a solution.

But it might help.

If we cooperate.

Thank You .

SRM360

Sunlight Reflection Methods, Explained.