

Geoengineering - report by David Millar, Quaker Earthcare Witness rep to CBD

US geoengineering lobbies are increasing pressure on Congress: National Academies of Sciences, Engineering, and Medicine report (March 2021), House Bill for U.S. Global Change Research Program \$100-200b. **News updates and lobbyists:**

[https://www.huffpost.com/entry/solar-geoengineering-climate-change\\_n\\_605c765dc5b67593e055ff9d](https://www.huffpost.com/entry/solar-geoengineering-climate-change_n_605c765dc5b67593e055ff9d)

[https://en.wikipedia.org/wiki/U.S.\\_Global\\_Change\\_Research\\_Program](https://en.wikipedia.org/wiki/U.S._Global_Change_Research_Program)

<https://www.globalchange.gov/browse/reports> Climate Assessment report IV

And California Senate Bill 27

For critical analysis see

<https://www.climatechangenews.com/2020/12/11/10-myths-net-zero-targets-carbon-offsetting-busted/>

[https://en.wikipedia.org/wiki/Climate\\_engineering](https://en.wikipedia.org/wiki/Climate_engineering) and

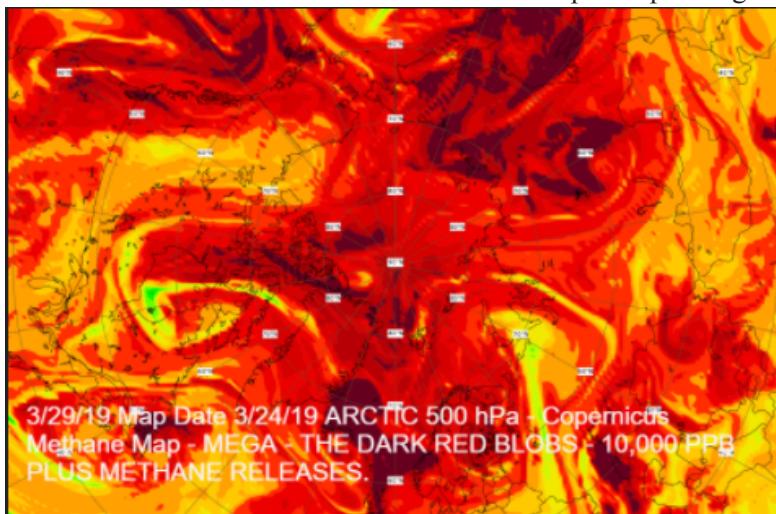
[https://en.wikipedia.org/wiki/Solar\\_geoengineering](https://en.wikipedia.org/wiki/Solar_geoengineering)

<https://map.geoengineeringmonitor.org/>

A number of the geoengineering projects claim to be meeting **the methane threat**  
aka methane bomb, clathrate gun (see [https://en.wikipedia.org/wiki/Clathrate\\_gun\\_hypothesis](https://en.wikipedia.org/wiki/Clathrate_gun_hypothesis))

My research:

methane release in Siberia 2019 - shown in European Space Agency's Copernicus satellite data



Recent re-calculation by Katey Walter Anthony of the American Geophysical Society suggests immediate impact of the methane bomb in the East Siberian Sea *alone* could be 1.4C (twice the change we've had in the last 200 years). The Alliance of World Scientists [downplays](#) the threat but quotes only a 10-year old study by Dr Peter Wadhams; however he endorses\* recent findings by Walter Anthony, K., Schneider von Deimling, T., Nitze, I., Frolking, S., Emond, A., Daanen, R., Anthony, P., Lindgren, P., Jones, B., Grosse, G. **2018**. 21st-century modeled permafrost carbon emissions accelerated by abrupt thaw beneath lakes. *Nature Communications*. 9(1). doi:

[10.1038/s41467-018-05738-9](https://doi.org/10.1038/s41467-018-05738-9) (*Bartsch (2016) Meyer (TE 2014) Miller (TE 2014)*, 71 citations)

Initial reports were from Siberia

<https://www.theguardian.com/science/2020/oct/27/sleeping-giant-arctic-methane-deposits-starting-to-release-scientists-find>

but surveys in 2020 have found ongoing methane release in Brazil offshore as well as Alaska

<https://phys.org/news/2020-09-massive-methane-gas-seafloor-southern.html>

<https://earthobservatory.nasa.gov/features/MethaneMatters>

\*Peter Wadhams in PSTW interview 185 <https://www.youtube.com/watch?v=2T7fEUelrm4&t=7s>

Maybe it's time to act as if the DUC ([Declaration of Climate Emergency](#)) is true...

### **The geoengineering crisis:**

On 24-25 March 2021 there was a key international strategy conference on zoom for HOME [handsoffmotherearth.org](http://handsoffmotherearth.org)

with simultaneous translation in Spanish and English. Presenters were:

Lili Fuhr, Heinrich Böll Foundation)

Niclas Hällström, WhatNext? Sweden <https://campaign.fossilfueltreaty.org>

Carroll Muffett of CIEL

The conference was recorded but I do not yet have the URL. However, I was able to screen-capture some of the presentations, which will give you an overview of the threat to humanity posed by these crazy ideas, backed by carbon offsets, billion-dollar investors and major universities.

**See the slides below to understand the basics.**

The coalition includes many trustworthy NGOs that I have worked with for more than a decade. CBD Alliance, ETC Group, Alianza por la Biodiversidad en América Latina, Amigos de la Tierra de América Latina y el Caribe (ATALC), Asian Peoples Movement on Debt and Development (APMDD), Biofuelwatch, Climate Justice Alliance, Corporate Accountability International, Corporate Europe Observatory, Development Alternatives with Women for a New Era (DAWN), Focus on Global South, Friends of the Earth International, Global Forest Coalition, Grain, Grassroots Global Justice Alliance (GGJA), Heinrich Böll Foundation, Indigenous Environmental Network, International Oil Working Group, JVE International, La Via Campesina, Navdanya, International, Oilwatch, Latinoamérica, The Gaia Foundation, Third World Network, Transnational Institute, World Indigenous Women's Alliance (TONATIERRA), World March of Women Americas, World Rainforest Movement, Oil Change International and **more than 100 others.**

Even if you do not know the NGOs, you may recognize some of the **key people**: Silvia Ribeiro and Laura Dunn of ETCgroup, Gadir Lavadenz of the CBD Alliance, Tom Goldtooth, Vandana Shiva, Nnimmo Bassey, Theresa Church of Global Justice Ecology Project and the Campaign to Stop GE Trees; Carroll Muffett of CIEL: the Center for International Environmental Law, Cindy Wiesner and Kitzia Esteva-Martinez of GGJA, Shorey Myers with the CS Fund. For many years I have written reports to QEW about their work.

Presentations on zoom (screen captures)

1. By Silvia Ribeiro of CBD Alliance

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## What is GEOENGINEERING?

**Categories of Geoengineering techniques**  
- as proposed by geoengineers

Carbon Dioxide Removal (CDR)	Solar Radiation Management (SRM)	Weather Modification
Remove GHGs from the atmosphere <b>after</b> they have been emitted	Reflect sunlight back into space to reduce warming effect	Manipulating or modifying the weather

**The Greenhouse Effect**  
Some sunlight that hits the earth is reflected. Some becomes heat. CO<sub>2</sub> and other gases in the atmosphere trap heat, keeping the earth warm.

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LF From Lili Fuhr, EN, she/her (Heinrich... Hallo! I am Lili with the Heinrich Bo...)

Participants Chat Share Screen Record Reactions English

Unmute Stop Video

Participants 29 Chat Share Screen Record Reactions English

Leave

Silvia Ribeiro /ETC (she/her)

David Millar

Ricardo Balderas-Español-él/he

Niclas Hallström, WhatNext? (En...)

Lili Fuhr, EN, she/her (Heinrich...)

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## Proposed geoengineering techniques to intervene LAND, OCEAN and AIR

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## Climate change would continue

- **None of the geoengineering techniques aim to address the root causes of climate change.** They aim to partially counteract some of its symptoms, ALL are unproven, mostly are just theoretical
- **Underlying drivers of climate change (e.g. unsustainable industrial production, growing unequal consumption, deforestation, unsustainable agriculture and land use changes) would continue unaffected.**

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From Sriram, he/him, English, US t...  
Hola a tod@s. Sriram here with Co...

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## Why is geoengineering dangerous?

- Mega-scale / transboundary
- No experimental phase
- High-risk and unreliable
- Unequal impacts
- A “perfect excuse” to avoid reductions
- Unilateral / exacerbates power imbalance
- Intergenerational injustice
- Weaponization risk

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## Crucial Geoengineering Developments

**America's race to zero emissions**



**The race to zero: can America reach net-zero emissions by 2050?**

**“Net zero” is NOT ZERO**

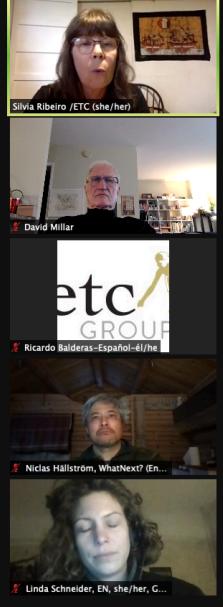
**“Nature Based Solutions” = advancing geoengineering through financialization and devastation of nature**

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**Crucial Geoengineering Developments**

**Hands Off Mother Earth!**

**Silicon Valley billionaires want to geoengineer the world's oceans**

**BHP invests US\$6m in emissions reduction company, Carbon Engineering**

**This Bill Gates-funded chemical cloud could help stop global warming**

Top US scientists back \$100m geoengineering research programme

Microsoft will be carbon negative by 2030

Jan 16, 2020 | Brad Smith - President

TECH

Chevron, Occidental invest in CO2 removal technology

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etc GROUP Ricardo Balderas-Español-él/he

Niclas Hallström, WhatNext? (En...)

Linda Schneider, EN, she/her, G...

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**The HOME Campaign**

In 2018, 110 civil society organizations and popular movements signed the Hands Off Mother Earth! Manifesto and demanded an immediate stop to climate geoengineering.

The Manifesto was released in the same week that the Intergovernmental Panel of Experts on Climate Change (IPCC) was meeting in South Korea to debate a new report on how to limit global warming to 1.5 degrees Celsius.

Download here: <https://www.geoengineeringmonitor.org/2018/10/news-release-hands-off-mother-earth-110-civil-society-organizations-and-popular-movements-demand-an-immediate-stop-to-climate-geoengineering/>

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**HOME Campaign Updates**

Recent collaborations for online events

GROUNDING TEACH-IN ON GEOENGINEERING: A FALSE SOLUTION TO THE CLIMATE CRISIS

Click to add notes

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## 2. By Cynthia Mellon of Climate Justice Alliance

The screenshot shows a Microsoft Teams video call interface. At the top, a green bar indicates 'Recording' and 'You are viewing Cynthia Mellon She/Her screen'. The main window displays a Microsoft Word document titled 'HOME Assembly'. The document features a red banner at the top with the text 'HOME Assembly' and a 'Hands Off Mother Earth!' logo. Below the banner, the title 'Updates on the HOME Campaign and related activities' is displayed in a large, bold, dark blue font. The author is listed as 'by Cynthia Mellon, Climate Justice Alliance'. The document also includes a link: 'www.handsoffmotherearth.org · coordinate@handsoffmotherearth.org · www.growinginequality.org'. The footer of the document says 'Click to add notes'. The bottom of the screen shows the Microsoft Teams control bar with 'Participants' (29), 'Chat' (30), 'Share Screen', 'Record', 'Reactions', and 'English'. The video call interface on the right shows five participants: Silvia Ribeiro (ETC), David Miller (ETC), Ricardo Salcedo (ETC), Cynthia Mellon (Climate Justice Alliance), and Laura Dunn (Canada). The video call controls at the bottom include 'Unmute', 'Stop Video', and 'Leave'.

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Recording

## Resisting GE experiments



- Artic Project / Ice911**
  - 2018, IEN, Native Movement, CJA, HOME
- SCoPEx: Harvard SRM project**
  - From 2015 actions by ETC Group, Tonatierra, IEN, CJA, HOME
  - 2021 : announced in Kiruna, Sweden; (Swedish orgs, Saami Council, HOME)
- Marine Cloud Brightening**
  - 2010, Silver Lining, California, (ETC, HOME)
  - 2020, MCB Project, Australia (FoE Australia, HOME)
- Ocean Fertilization:** ETC Group, Terram (Chile), Acción Ecológica, Searice, Greenpeace and other HOME members have been collaborating against Ocean Fertilization open air experiments:
  - 2007, Planktos Corp in Galapagos, Ecuador
  - 2008, ONC Corp in Sulu Sea, Philippines
  - 2012, Haida Salmon Restoration Corp, Haida Gwaii, Canada
  - From 2018 Oceaneos, Chile (Terram, HOME)

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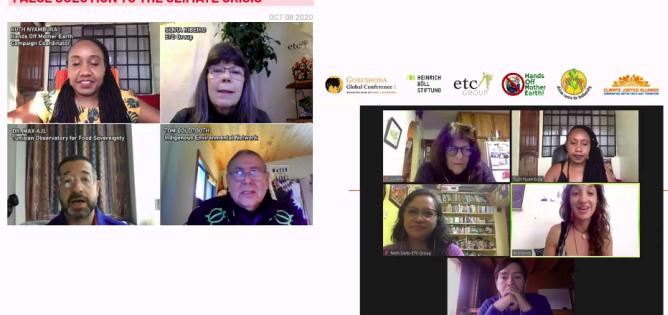
## HOME Campaign Updates



### Recent collaborations for online events

GROUNDING TEACH-IN ON GEOENGINEERING: A FALSE SOLUTION TO THE CLIMATE CRISIS

OCT 08 2020



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 **HOME Campaign Updates**

## Online Content and Resources

LOOKING BACK, MOVING INTO THE FUTURE – A CONVERSATION WITH NIGERIAN ENVIRONMENTALIST NNIMMO BASSEY

 **GEODEENGINEERING IN THE GLOBAL SOUTH (ETC PODCAST)**

 **GEODEENGINEERING IN THE GLOBAL SOUTH (ETC PODCAST)**

 **GEODEENGINEERING AND DECOLONIZATION (ETC PODCAST)**

 Issue No. 1 - 16 Oct 2020 View this email in your browser

**HANDS OFF MOTHER EARTH**  
Say NO to Geoengineering!

[Traduction en Français ci-dessous, Traducción Española ci-dessous]  
Greetings,  
We sincerely hope that you are doing well, as well as one can be in these times of continued crisis.

Hands off Mother Earth (HOME) welcomes you to read our first newsletter! We are delighted to introduce this new communication resource that will be sent to our community of supporters once a month. The newsletter will be used primarily to update you on the campaign's progress, scheduled webinars, as well as to provide resources that will support you in your advocacy and campaign work against geoengineering technologies and other false solutions to the climate crisis.

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## Online Content & Resources

### GEOENGINEERING MONITOR

[www.geoengineeringmonitor.org](http://www.geoengineeringmonitor.org)  
[facebook.com/geoengineeringmonitor](http://facebook.com/geoengineeringmonitor)  
Twitter: @GeoEngMon

**Geoengineering Monitor**  
This is a joint project of Biofuelwatch & ETC Group, with support from Heinrich Boell Foundation.  
It aims to be a timely source for information & critical perspectives on climate engineering.  
Some resources published on the website include:  
- technology and experiment factsheets  
- regular reports on geoengineering developments  
- HOME Campaign statements, letters & activities

**Geoengineering Map**  
An interactive map that attempts to shed light on the worldwide state of geoengineering by showing the scope of research and experimentation.  
The map is prepared by ETC Group and the Heinrich Boell Foundation.

[map.geoengineeringmonitor.org](http://map.geoengineeringmonitor.org)

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Laura Dunn Canada – EN (she/her)

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## The Big Bad Fix

**In this report, ETC Group, BiofuelWatch and Heinrich Boell Foundation present a comprehensive argument against geoengineering.**

Available in English, Spanish and French.

Big Bad Fix (English):  
<http://www.geoengineeringmonitor.org/2017/12/3087/>

El Gran fraude climático (Español):  
<https://www.etcgroup.org/es/content/big-bad-fix-el-gran-fraude-climatico>

La grande fraude climatique (Français):  
<https://www.etcgroup.org/fr/content/la-grande-fraude-climatique>

More links to online resources is posted on the Zoom chat box

From Laura Dunn Canada – EN (she/her) Hola. Les organizadores del evento...

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David Millar

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Cynthia Mellon She/Her English...

Laura Dunn Canada – EN (she/her)

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**Regional Activities**

**Hands Off Mother Earth!**

**North American Working Group on Geoengineering led by Climate Justice Alliance**

<https://climatejusticealliance.org/geoengineering/>

**GEOENGINEERING 101**  
Hacking the Planet

FEATURED WORK  
Women on the Frontlines of the Climate Crisis, Are Leading the Fight for Climate Justice

Welcome to a new feature of CJA's website: **Geoengineering 101: Hacking the Planet.**

Newsletter Sign Up

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**Regional Activities**

**Hands Off Mother Earth!**

**North America Geoengineering Working Group**

- Convened in October of 2019 by Climate Justice Alliance
- CJA is a national alliance of currently 74 frontline organizations and support groups
- CJA works against false solutions and market-based approaches to the climate crisis
- Both CJA members and non-members participate in the working group

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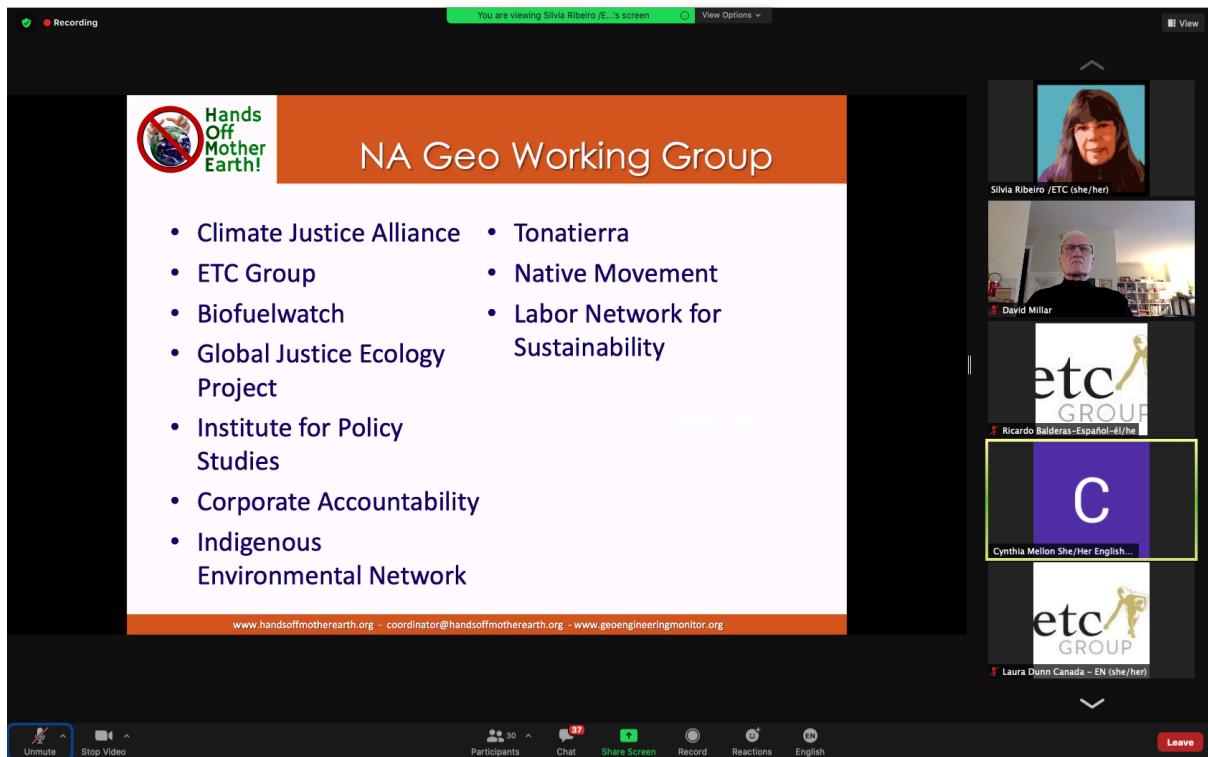
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Laura Dunn Canada - EN (she/her)

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## NA Geo Working Group

Hands Off Mother Earth!

- Climate Justice Alliance
- ETC Group
- Biofuelwatch
- Global Justice Ecology Project
- Institute for Policy Studies
- Corporate Accountability
- Indigenous Environmental Network
- Tonatierra
- Native Movement
- Labor Network for Sustainability

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Laura Dunn Canada – EN (she/her)

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## Activities & Achievements

Hands Off Mother Earth!

- Geoengineering 101: Hacking the Planet <https://climatejusticealliance.org/geoengineering/>
- Strategy for exposing unaccountable SCoPEx Advisory Committee
- Webinar for national CJA membership
- Congressional Briefing on Carbon Capture and Storage (March 2021)

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**Tracking Legislation**

- Consolidated Appropriations Act (Pub.L. 116-260/HR 133): Includes Energy Law that promotes CCS and solar geoengineering
- CLEAN Future Act (HR 1512): Promotes CCS and BECCS

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**Tracking Legislation**

- Storing CO2 and Lowering Emissions Act (SCALE)  
"Requires Secretary of Energy to establish programs for carbon dioxide capture, transport, utilization, and storage and for other purposes."

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 **Tracking Legislation**

- State of California

Senate Bill 27

Would require the Natural Resources Agency and other state agencies to establish carbon sequestration goals.

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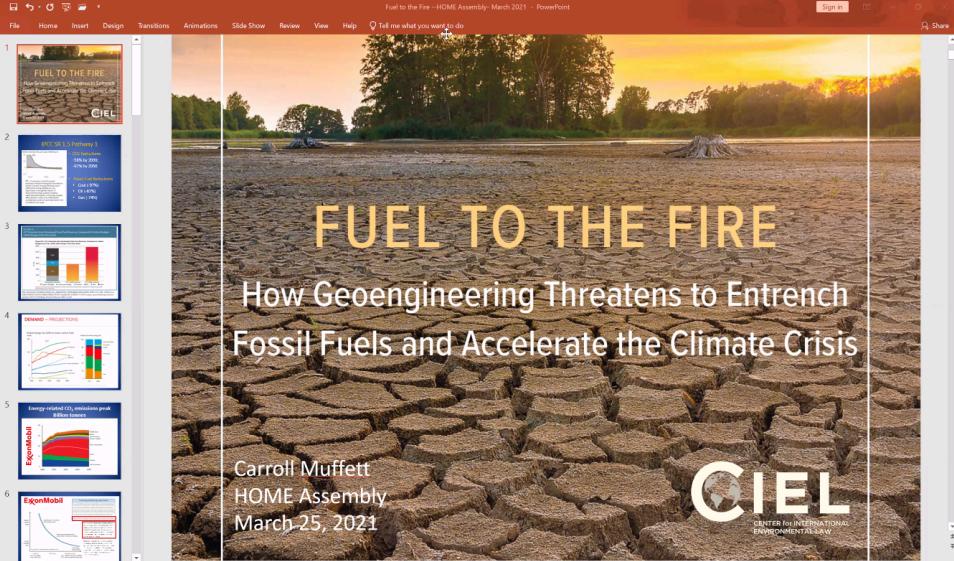
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### 3. By Carroll Muffett of CIEL

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Fuel to the Fire - HOME Assembly - March 2021 - PowerPoint



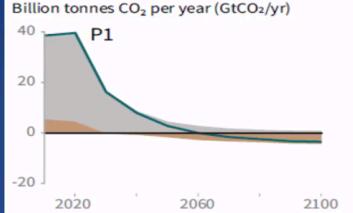
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## IPCC SR 1.5 Pathway 1



**P1:** A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A downsized energy system enables rapid decarbonization of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

- CO2 Reductions
  - 58% by 2030;
  - 97% by 2050
- Fossil Fuel Reductions
  - Coal (-97%)
  - Oil (-87%)
  - Gas (-74%)

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David Millar

Carroll Muffett-English (he/him)

Cynthia Mellon She/Her English...

etc GROUP

Laura Dunn Canada – EN (she/her)

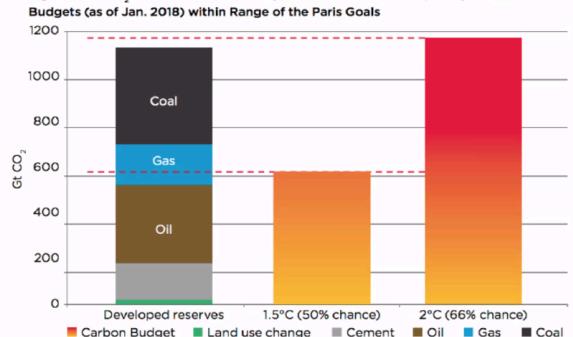
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Recording

### FIGURE 6

CO<sub>2</sub> Emissions from Developed Fossil Fuel Reserves, Compared to Carbon Budgets within Range of the Paris Goals

Figure ES-1: CO<sub>2</sub> Emissions from Developed Fossil Fuel Reserves, Compared to Carbon Budgets (as of Jan. 2018) within Range of the Paris Goals



1200  
1000  
800  
600  
400  
200  
0

Developed reserves 1.5°C (50% chance) 2°C (66% chance)

■ Carbon Budget ■ Land use change ■ Cement ■ Oil ■ Gas ■ Coal

Sources: Oil Change International analysis<sup>51</sup> based on data from Rystad Energy, International Energy Agency (IEA), World Energy Council, and IPCC

OIL CHANGE INTERNATIONAL, DRILLING TOWARDS DISASTER: WHY U.S. OIL AND GAS EXPANSION IS INCOMPATIBLE WITH CLIMATE LIMITS 5 (2019), <http://priceoffoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v2.pdf>.

Participants 30 Chat 40 Share Screen Record Reactions English

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## DEMAND – PROJECTIONS

Global energy mix shifts to lower-carbon fuels

Quads

Percent of primary energy (%)

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## Energy-related CO<sub>2</sub> emissions peak

Billion tonnes

ExxonMobil

Participants 30 Chat 40 Share Screen Record Reactions English

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Silvia Ribeiro /ETC (she/her)

David Millar

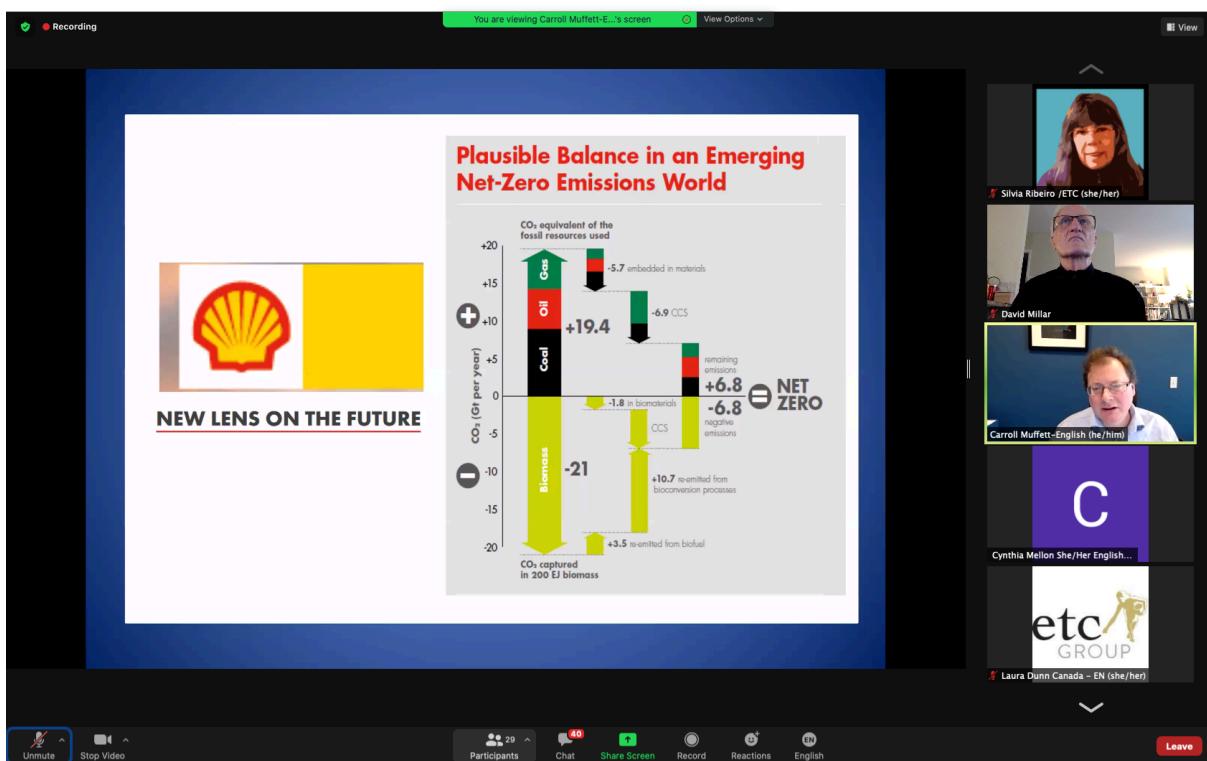
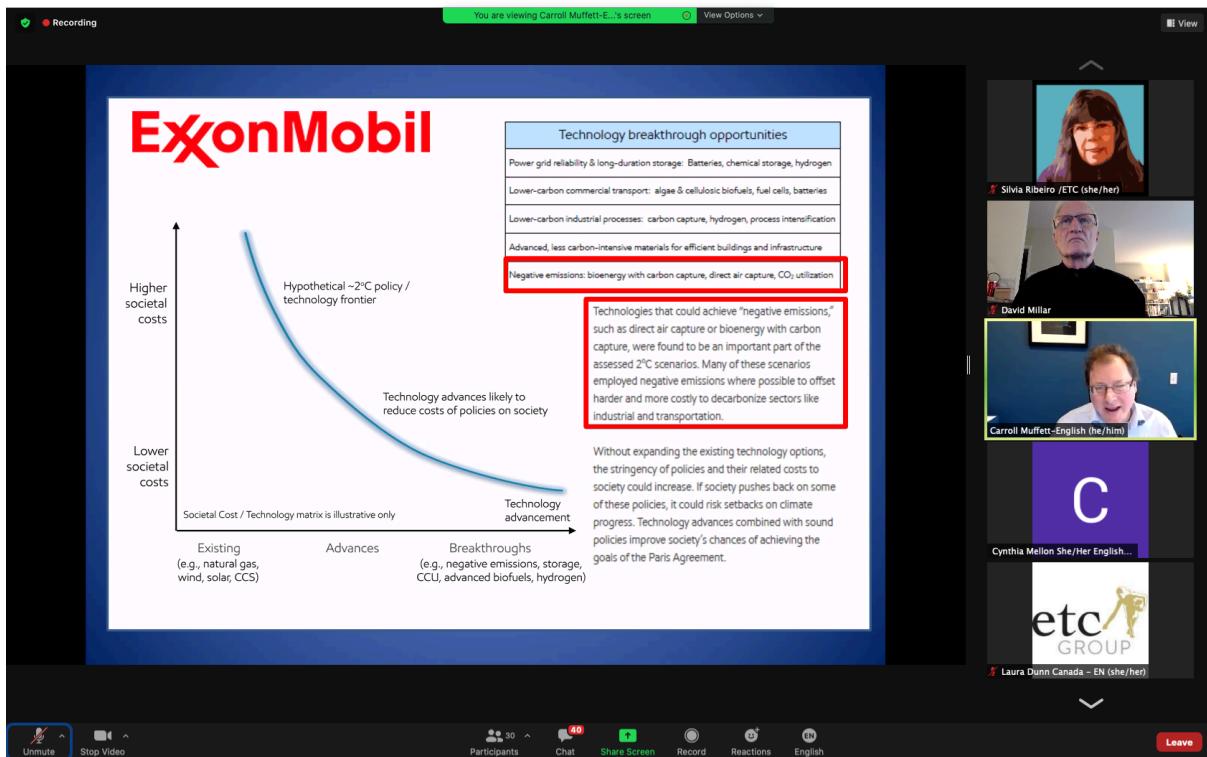
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Cynthia Mellon She/Her English...

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Bill Gates Says \$11 Trillion Anti-Oil Push Isn't Working

By Julianne Geger - Sep 17, 2019, 3:00 PM CDT

**Join Our Community**

It may make you feel like you're doing something, but those climate activists screaming at investors to divest from those dirty fossil fuels could be wasting their time, Microsoft mogul Bill Gates has said.

Gates, one of the world's leading philanthropists, is telling the climate brigade that they would be better off abandoning their divestment crusades and instead encouraging investments in alternatives such as [disruptive technologies](#) that will [slow carbon emissions](#).

Is Bill Gates Right On Energy Investing? **OILPRICE** The No. 1 Source for Oil & Energy News

Bill Gates

Participants: 29 Chat: 40 Share Screen Record Reactions English

Participants (4): Silvia Ribeiro /ETC (she/her), David Millar, Carroll Muffett-English (he/him), Cynthia Mellon She/Her English...

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“...with Carbon Capture & Storage”:

Inside Energy

Home | Investors | Business customers | Energy and innovation | Sustainability | Careers

Can this technology tackle climate change?

The world needs to reduce its emissions to tackle climate change. Carbon capture and storage is often touted as a solution. But what is it and how much of an impact can it have? Watch the Inside Energy film.

Participants: 29 Chat: 40 Share Screen Record Reactions English

Participants (4): Silvia Ribeiro /ETC (she/her), David Millar, Carroll Muffett-English (he/him), Cynthia Mellon She/Her English...

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**EOR is “currently the only commercially ready process allowing for simultaneous utilization and storage (CCUS) of industrial-scale volumes[.]”--NORCE**

Participants: 29 Chat: 40 Share Screen Record Reactions English

Unmute Stop Video

Silvia Ribeiro /ETC (she/her)

David Millar

Carroll Muffett-English (he/him)

Cynthia Mellon She/Her English...

etc GROUP

Laura Dunn Canada – EN (she/her)

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**Bill Gates and Big Oil back this company that's trying to solve climate change by sucking CO2 out of the air**

PUBLISHED SAT, JUN 22 2019 9:15 AM EDT

Katie Brigham

SHARE f t in e ...

**VIDEO 14:43**

This Bill Gates and big-oil backed company wants to fight climate change by...

Participants 29 Chat 40 Share Screen Record Reactions English

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David Millar

Carroll Muffett-English (he/him)

Cynthia Mellon She/Her English...

etc GROUP

Laura Dunn Canada – EN (she/her)

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**Simulated case study**

REPP norway grants

CO<sub>2</sub> pilot 2020-2026; CO<sub>2</sub>-EOR 2026-2029; Fullscale CO<sub>2</sub> storage 2030 – 2040

Source: Roman Berenblyum, NORCE at COP 24, "Regional business case for CO2-EOR and storage-the subsurface solution toolbox."

Participants 29 Chat 40 Share Screen Record Reactions English

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etc GROUP

Laura Dunn Canada – EN (she/her)

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## Direct Air Capture

- Massively more energy intensive than CCS
- Most business cases process captured CO<sub>2</sub> into new transportation fuels, such as jet fuel



Above: Air-to-Fuels involves capturing CO<sub>2</sub> from the atmosphere, producing green hydrogen with low-carbon electricity, and reacting the two to form liquid transportation fuels such as gasoline, diesel, or Jet-A. Such fuels can be closed carbon cycle and can displace the need for crude oil.

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### Chevron’s Fig Leaf Part 4: Carbon Engineering’s Only Market Is Pumping More Oil



Source: Michael Barnard, Clean Technica, April 19, 2019

In recent years, direct oil industry investments in DAC have accelerated, with EOR identified as the key market opportunity.

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Recording

## Carbon Engineering doubling size of direct air capture plant in Permian Basin

By JWN staff | Sept. 19, 2019, 7:23 a.m. | Share [Facebook](#) [Twitter](#) [LinkedIn](#) [Google+](#)



This May the company announced the deal for the plant, which is to be located in the Permian Basin. It will capture CO<sub>2</sub> directly from the atmosphere to be used in Occidental's enhanced oil recovery operations.

Participants 29 Chat 40 Share Screen Record Reactions English

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David Millar

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Cynthia Mellon She/Her English...

etc GROUP

Laura Dunn Canada – EN (she/her)

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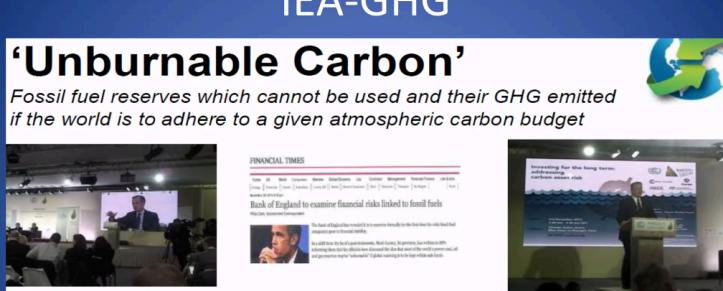
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Recording

## IEA-GHG

### ‘Unburnable Carbon’

*Fossil fuel reserves which cannot be used and their GHG emitted if the world is to adhere to a given atmospheric carbon budget*



IEAGHG Report 2016-05. Contractor: SGI at Imperial College UK

- Global CO<sub>2</sub> storage capacity (volumetric) is large and well above known fossil fuel reserves
- CCS enables access to significantly higher quantities of fossil fuels in a 2°C world
- CCS unlocks ‘Unburnable Carbon’

Participants 29 Chat 40 Share Screen Record Reactions English

Unmute Stop Video

Silvia Ribeiro /ETC (she/her)

David Millar

Carroll Muffett-English (he/him)

Cynthia Mellon She/Her English...

etc GROUP

Laura Dunn Canada – EN (she/her)

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The slide features a grid of logos for energy companies including SOUTHERN COMPANY, Chevron, Shell, TOTAL, UPOWER, CIAB, ExxonMobil, INSTITUTO DE INVESTIGACIONES ELECTRICAS, PETROBRAS, Khalifa University, JGC, and RWE. The word "sieaghg" is prominently displayed in the center, with "gradiente tecnológico conforme a la estrategia de desarrollo sostenible" written below it. The sidebar lists participants: Silvia Ribeiro /ETC (she/her), David Millar, Carroll Muffett-English (he/him), Cynthia Mellon She/Her English..., and Laura Dunn Canada – EN (she/her). The video conference interface includes standard controls for Unmute, Stop Video, Participants (29), Chat (40), Share Screen, Record, Reactions, and English, along with a red Leave button.

You are viewing Carroll Muffett-English's screen View Options ▾

The slide features a large rainbow gradient background. In the top left corner is a logo for "CO2 GeoNet" with a yellow arrow pointing downwards. In the bottom left corner, there is an image of a factory chimney emitting a plume of smoke. A blue box contains the text "A FUTURE WITHOUT CO2 EMISSION" and "Enabling the safe and efficient deployment of the CO2 Capture and Storage (CCS) technology." The sidebar lists participants: Silvia Ribeiro /ETC (she/her), David Millar, Carroll Muffett-English (he/him), Cynthia Mellon She/Her English..., and Laura Dunn Canada – EN (she/her). The video conference interface includes standard controls for Unmute, Stop Video, Participants (29), Chat (40), Share Screen, Record, Reactions, and English, along with a red Leave button.

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Recording

**CARBON DIOXIDE REMOVAL**

Ultimately, it may be necessary to remove CO<sub>2</sub> from the atmosphere. A variety of technologies, several of which are listed below, are available to do this. They all face one or more major issues, including scalability, technology hurdles, cost and practical pathways to implementation. CO<sub>2</sub> removal may even begin to fall into the category of geoengineering. That is, deliberate, large-scale intervention in the climate system to combat climate change. While the scale, responsibility and ethical issues related to such action would be daunting, consideration of geoengineering also raises the question of solar radiation management (SRM), a type of geoengineering that seeks to reflect sunlight and therefore reduce warming.

**Biocarbon with carbon capture and storage (BECCS)**  
Plants take in CO<sub>2</sub> from the atmosphere as they grow. If that CO<sub>2</sub> is captured and geologically stored when the plant is used for energy use, then there is a net removal from the biosphere.

**Direct CO<sub>2</sub> capture from air with storage (DACCs)**  
CO<sub>2</sub> can be removed directly from the air by chemical absorption. A regeneration step releases the CO<sub>2</sub> as a pure stream, which can then be geologically stored.

**Soil carbon uptake**  
Through relatively simple changes in farming practices or the addition of organic material to soil, CO<sub>2</sub> can be absorbed by the soil. When carbon in the form soil can be raised, effectively sequestering CO<sub>2</sub> from the atmosphere. Biochar also makes soil more fertile.

**Building with biomass**  
While carbon is stored in many countries, building with wood is not a common practice. Renewable building materials containing carbon can sequester carbon for decades or even centuries.

**Reforestation**  
Large-scale tree planting increases natural storage of carbon in biomass and forest floor soil. During the Great Depression, the US planted over 3 billion trees on 50 million acres of land in the Great Plains. Today, annual net sequestration of carbon in managed US forests offsets approximately 15% of the annual emissions of carbon that result from burning fossil fuels.

**Enhanced ocean uptake**  
The ocean is a large sink of CO<sub>2</sub>, although increasing levels dissolved in the water are raising ocean acidity. However, uptake could be safely enhanced by increasing marine photosynthesis, such as through large-scale restoration of seagrass in shallow waters.

**Mineralization and enhanced weathering**  
Marine carbon fixation involves reactions of marine silicate carbon species (typically contained in mineral silicates and industrial waste) with CO<sub>2</sub> to give inert carbonates. These reactions occur slowly in nature and require large quantities of carbon, but perhaps could have been built to do this in industrial scale and produce useful products.

Unmute Stop Video Participants 29 Chat 40 Share Screen Record Reactions English Leave

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Recording

**Enhanced weathering/mineralization**

**Journal of CO<sub>2</sub> Utilization 29 (2019) 82–102**  
Contents lists available at ScienceDirect  
Journal of CO<sub>2</sub> Utilization  
journal homepage: [www.elsevier.com/locate/jcou](http://www.elsevier.com/locate/jcou)

**Review Article**  
Applications of fly ash for CO<sub>2</sub> capture, utilization, and storage  
Abdallah Dind<sup>a</sup>, Dang Viet Quang<sup>a</sup>, Lourdes F. Vega<sup>a</sup>, Enas Nashe<sup>a</sup>,  
Mohammad R.M. Abu-Zahr<sup>a,c</sup>  
<sup>a</sup> Department of Chemical Engineering, Masdar Institute of Science and Technology, Khalifa University of Science and Technology, P.O. Box 54224, Masdar City, Abu Dhabi, United Arab Emirates  
<sup>b</sup> Carbon Research Center and Chemical Engineering Department, The Petroleum Institute, Khalifa University of Science and Technology, P.O. Box 2355, Abu Dhabi, United Arab Emirates

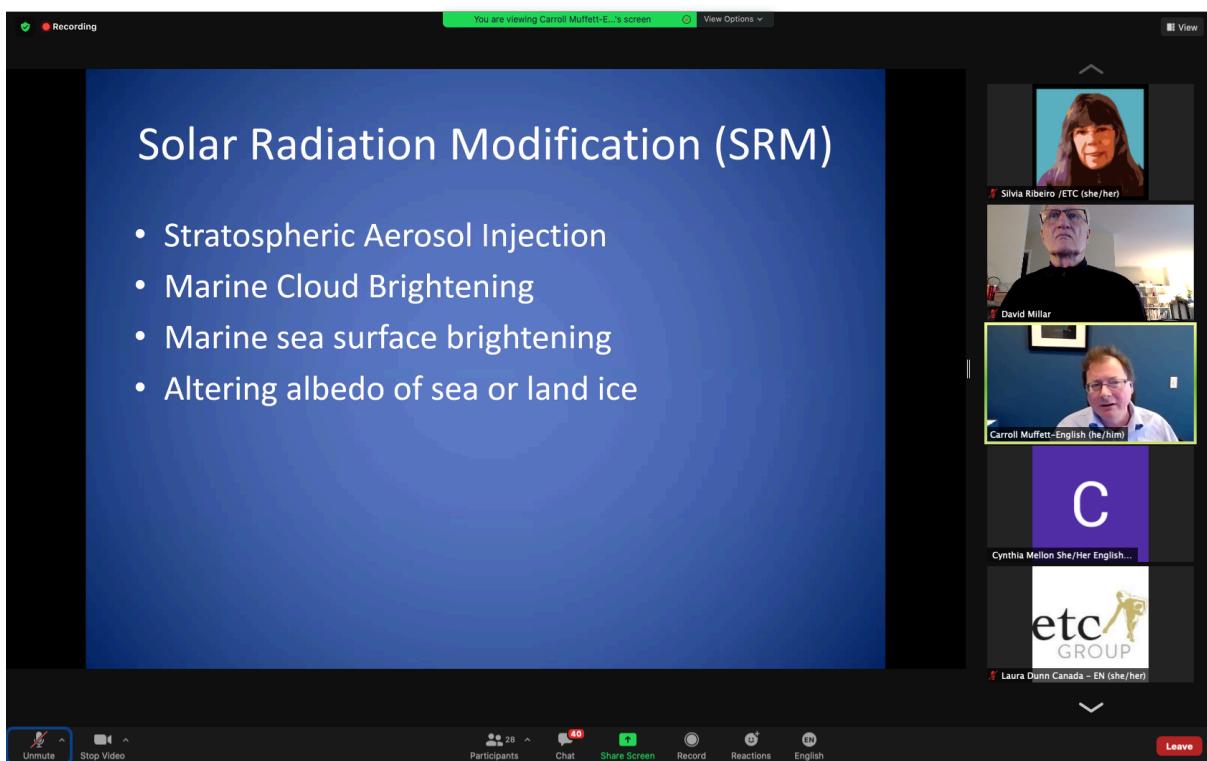
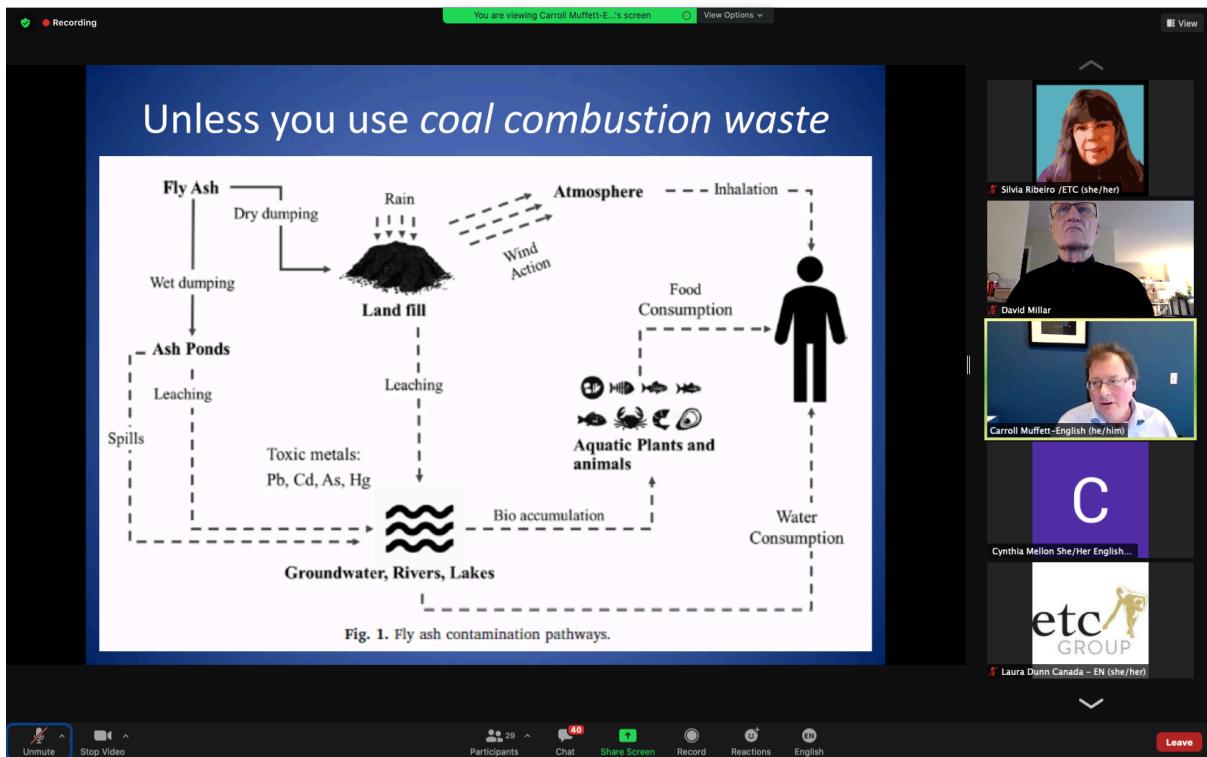
**Requires mining of up to 4x scale of annual coal production**

**Fig. 2: Pathways for fly ash application in CCUS.**

```

graph TD
    FlyAsh[Fly Ash] --> Capture
    FlyAsh --> Utilization
    FlyAsh --> Storage
    Capture --> Adsorbents
    Capture --> Catalysts
    Utilization --> Products
    Utilization --> Storage
    Storage --> Mineralization
    Adsorbents --> MesoporousSilica
    Adsorbents --> RFA
    Adsorbents --> AC
    Adsorbents --> AlkaliSilicates
    Adsorbents --> Zeolites
    Catalysts --> CementAdmixtures
    Catalysts --> AmorphousSilica
    Products --> IndirectMineralization
    Products --> DirectMineralization
    Mineralization --> IndirectMineralization
    Mineralization --> DirectMineralization
  
```

Unmute Stop Video Participants 29 Chat 40 Share Screen Record Reactions English Leave



#### 4. By Niclas Hällstätt of WhatsNext, Sweden

The image is a screenshot of a video conference interface. At the top, a green bar indicates 'Recording'. The main title 'HOME Campaign Milestones' is displayed in large white text on an orange background. To the left, a logo with a globe and the text 'Hands Off Mother Earth!' is shown. The main content area features a section titled 'SCoPEx Sweden highlights' with two bullet points. The first point discusses the first open-air experimentation using a stratospheric balloon for developing Stratospheric Aerosol Injection technology. The second point mentions plans for a first flight in June at the Swedish Space Corporation in Kiruna, announced by Harvard on December 15, 2020. Below this text is a photograph of a white stratospheric balloon with a long tether against a clear blue sky. To the right of the main content are five video feeds of participants: Silvia Ribeiro (she/her), David Millar, Niclas Hällström (WhatNext? EN...), Martin Vilela, and Carroll Muffett-English (he/him). The bottom of the screen shows standard video conference controls for Unmute, Stop Video, Participants, Chat, Share Screen, Record, Reactions, and English.

The image is a screenshot of a video conference call. At the top, a green bar indicates 'Recording' and 'You are viewing Nicas Hallström,...'s screen'. Below this, a large orange header reads 'HOME Campaign Milestones'. To the left, a circular logo with a globe and the text 'Hands Off Mother Earth!' is displayed. The main content area shows a presentation slide with the title 'SCoPEx Sweden highlights' and a list of bullet points. To the right, a video grid shows five participants: Silvia Ribeiro (she/her), David Millar, Nicas Hallström (WhatNext? (En...)), Martin Vilela, and Carroll Muffett (English (he/him)). The bottom of the screen shows standard video conference controls for Unmute, Stop Video, Participants, Chat, Share Screen, Record, Reactions, and English.

## SCoPEx Sweden highlights

- Letters by Swedish and international organisations, and the Saami Council.
- Key message: Rejection of the project.**  
"SAI is a technology with the potential for extreme consequences, and stands out as dangerous, unpredictable, and unmanageable. There is no justification for testing and experimenting with technology that seems to be too dangerous to ever be used."
- A battle of narratives and framing:** The first flight is fundamentally dangerous since a slippery slope. SAI can never be a plan B.

**Open letter requesting cancellation of plans for geoengineering related test flights in Kiruna**

**Covers:** Brandon Wilson/RuO

The Saami Council has together with Swedish environmental organisations sent a letter to the

**Participants:** Silvia Ribeiro /ETC (she/her), David Millar, Nicas Hallström, WhatNext? (En...), Martin Vilela, Carroll Muffett-English (he/him)

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Recording

**HOME Campaign Milestones**

**Mobilization in Sweden against SCoPEx**

**Greta Thunberg** @GretaThunberg - 13. Feb. A small piece of advice for humanity: when you're in a hole - stop digging. A crisis created by lack of respect for nature will most likely not be solved by taking that lack of respect to the next level...

**The Guardian** Balloon test flight plan under fire over solar geoengineering fears Swedish environmental groups warn test flight could be first step towards the adoption of a potentially “dangerous, unpredictable, and

**Planned Harvard balloon test in Sweden stirs solar geoengineering unease**

**GEOPHYSICS** SCOPEx in Sweden: FIRST STEP DOWN THE SLIPPERY SLOPE OF RISKY SOLAR GEOPHYSICS

**Stratospheric Aerosol Injection**

**Science** Geoengineers inch closer to Sun-dimming balloon test

[www.handsoffmotherearth.org](http://www.handsoffmotherearth.org) - [coordinator@handsoffmotherearth.org](mailto:coordinator@handsoffmotherearth.org) - [www.geoengineeringmonitor.org](http://www.geoengineeringmonitor.org)

From Laura Dunn Canada - EN (she/her) Great!

Participants 28 Chat Share Screen Record Reactions EN

Unmute Stop Video Leave

**Silvia Ribeiro /ETC (she/her)**  
**David Millar**  
**Niclas Hällström, WhatNext? (En...)**  
**Basav Sen (he/him), Turtle Island...**  
**Carroll Muffett-English (he/him)**

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Recording

**HOME Campaign Milestones**

**SCoPEx Sweden highlights**

- First open-air experimentation: stratospheric balloon flight for development of Stratospheric Aerosol Injection (“Albedo Hacking”) technology.
- Plans for first flight in June at Swedish Space Corporation in Sweden (Kiruna) announced by Harvard on 15 December 2020. Major mobilization by civil society and scientists calling for the cancellation of the project.

**SCoPEx Stratospheric Controlled Perturbation Experiment**

**Carroll Muffett-English (he/him)**  
**martin vilela**  
**Niclas Hällström, WhatNext? (En...)**  
**David Millar**  
**Silvia Ribeiro /ETC (she/her)**

Participants 27 Chat Share Screen Record Reactions EN

Unmute Stop Video Leave

1 Apr 2021 after widespread protests, Swedish Space Corporation has cancelled the balloon test

<https://etcgroup.org/content/saami-swedes-and-civil-society-stop-solar-geoengineering-trial-balloon>

You are viewing Niclas Hallström's screen View Options

**HOME Campaign Milestones**

**SCoPEx Sweden highlights**

- Letters by Swedish and international organisations, and the Saami Council.
- Key message: Rejection of the project.**  
"SAI is a technology with the potential for extreme consequences, and stands out as dangerous, unpredictable, and unmanageable. There is no justification for testing and experimenting with technology that seems to be too dangerous to ever be used."
- A battle of narratives and framing: The first flight is fundamentally dangerous since a slippery slope. SAI can never be a plan B.

**Open letter requesting cancellation of plans for geoengineering related test flights in Kiruna**

**March 5, 2021 - Saami Council**

The Saami Council has together with Swedish environmental organisations sent a letter to the

[www.handsoffmotherearth.org](http://www.handsoffmotherearth.org) - coordinator@handsoffmotherearth.org - [www.geoengineeringmonitor.org](http://www.geoengineeringmonitor.org)

Participants: 27 Chat Share Screen Record Reactions English Leave

5. Anja Chalman of [geoengineeringmonitor.org](http://geoengineeringmonitor.org) explains how to use their interactive map system which tracks hundreds of projects worldwide

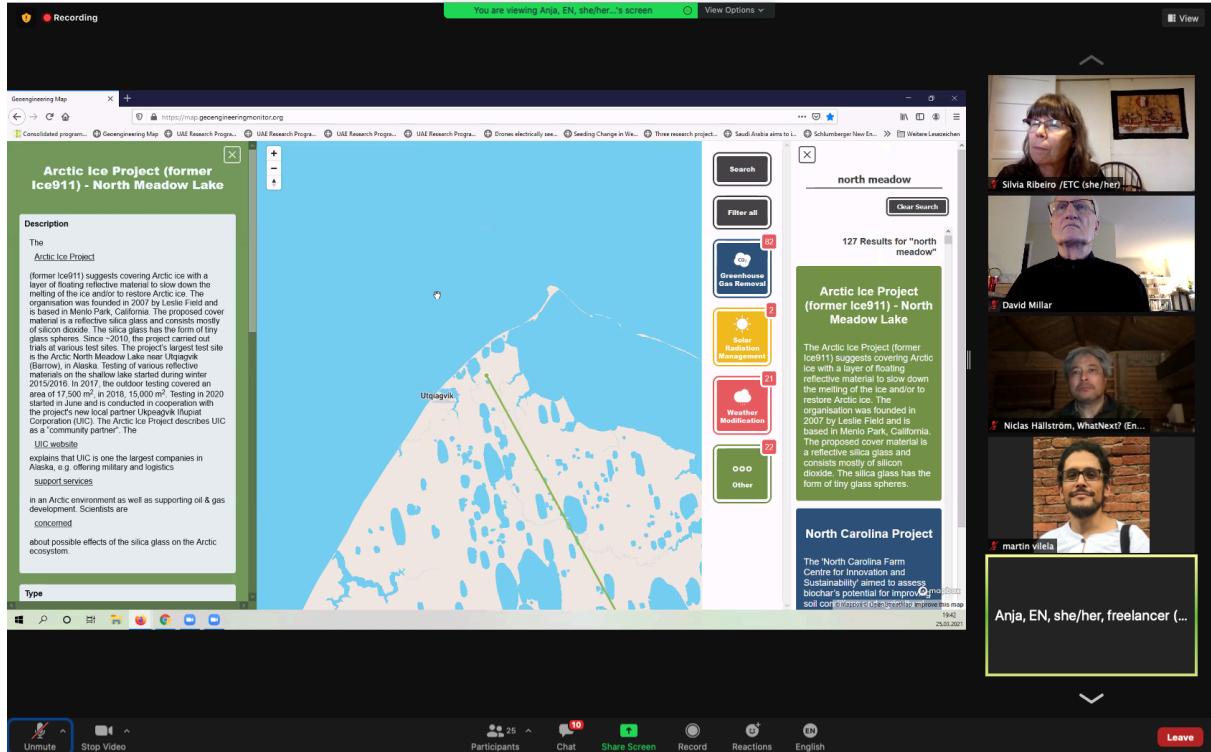
You are viewing Anja EN, shelher...'s screen View Options

**Geoengineering Map**

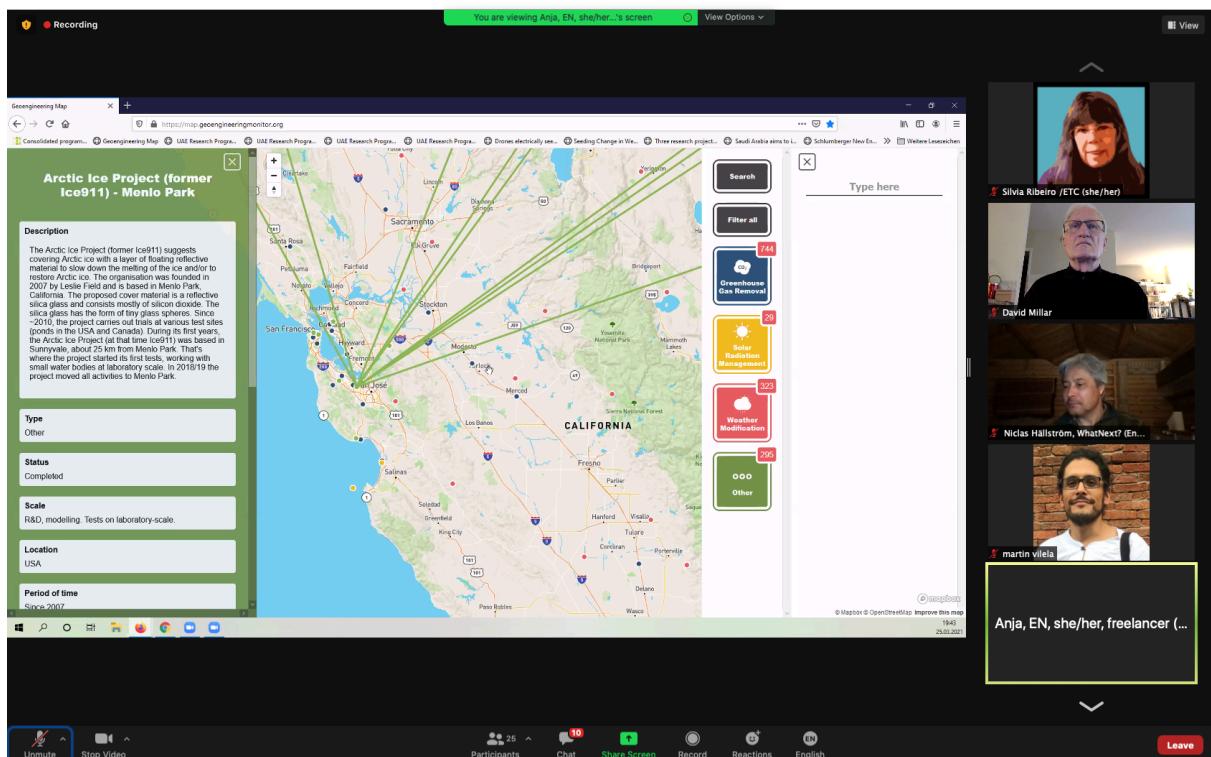
Search Filter all Greenhouse Gas Removal Solar Radiation Management Weather Modification Other

Participants: 26 Chat Share Screen Record Reactions English Leave

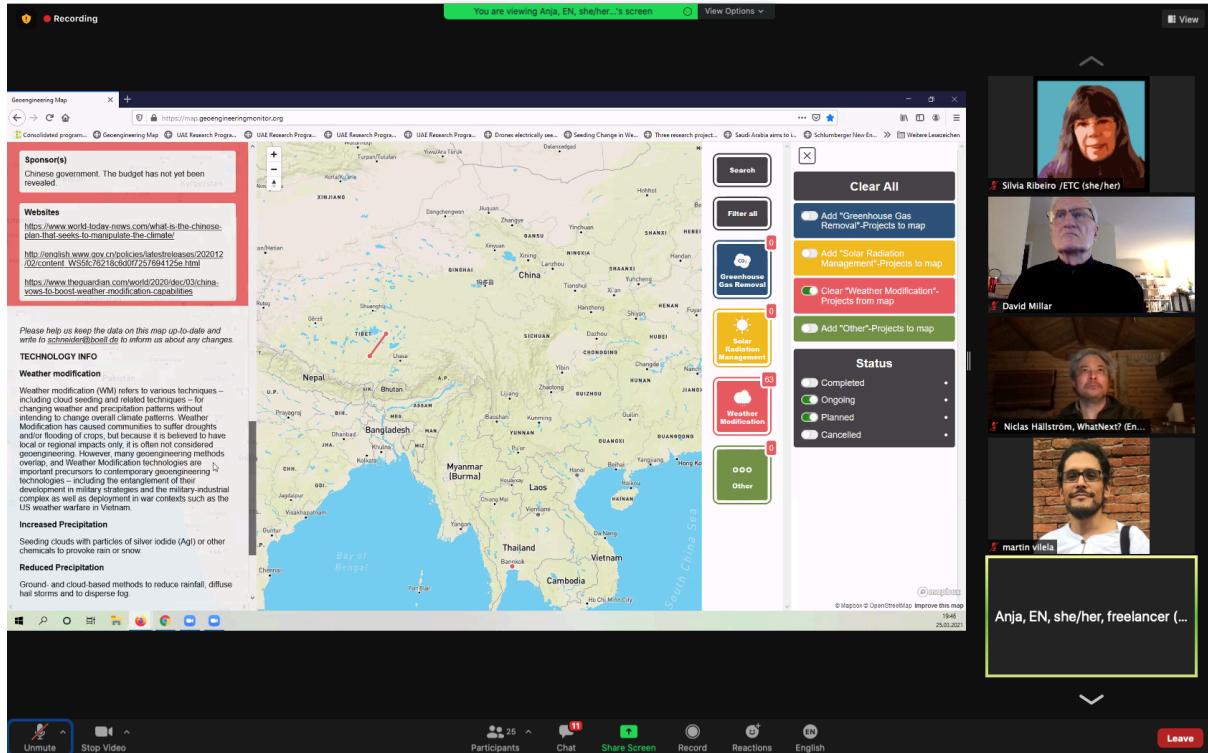
For instance, click on a button in Alaska. ArcticIce (formerly Ice911) proposes to increase albedo by spreading silica beads on Alaskan sea ice. No consultation with native peoples, risk of pollution, changes to wildlife & ecosystems. Read description of project in lefthand column.



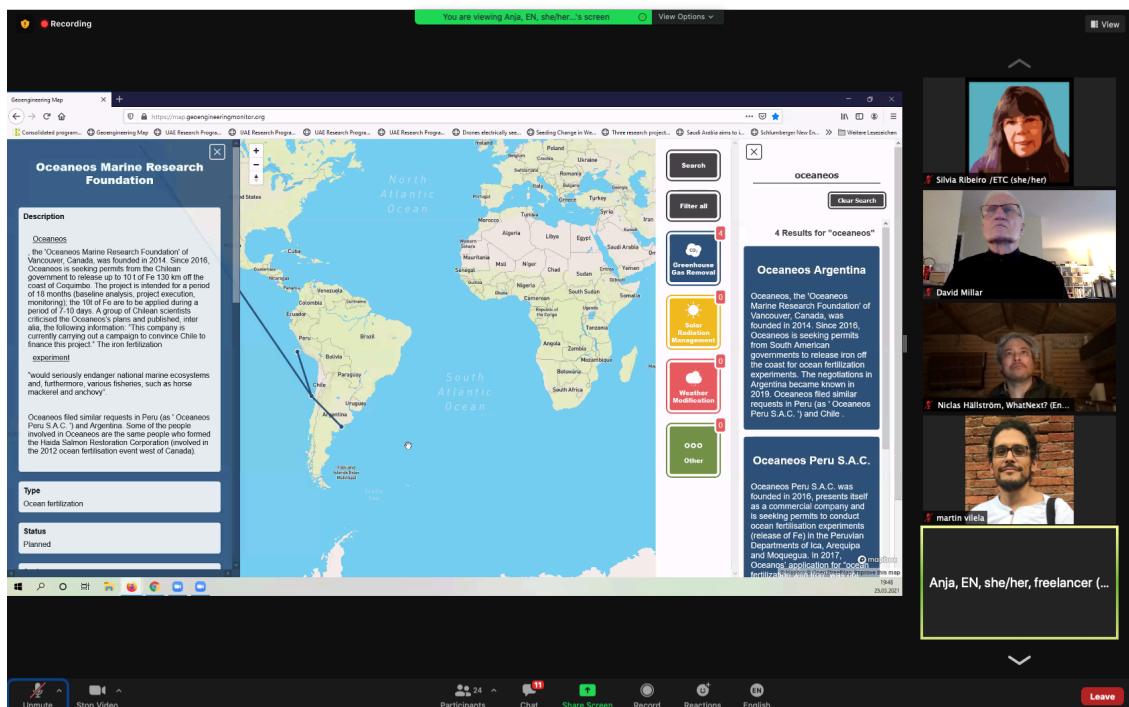
Green lines link to financial and corporate sponsors, lobbyists.



Example 2: Chinese govt's Sky River / Tianhe project plans several thousand silver-iodide burning chambers to "seed" rainclouds over Chinese drought-stricken northern plains, a major food source for Beijing and other N China cities. Plans to extend this to 63% of China's land mass. Changes rainfall patterns for the whole of Asia, could cause droughts in India and S Asia, unpredictable climate chaos.



Oceaneos project in Peru, Chile, Argentina. Already tried on Canada's West Coast but Haida nation revolted to stop it. Ocean fertilization with iron powder, supposedly taken up by phytoplankton which in the process absorb C2. Supposedly stops ocean acidification (due to climate change, increasing inability of oceans to act as "carbon sinks"). Risk of unpredictable changes to ecosystems, dead zones.



Closeup of lefthand column - next image -- includes details of financiers and corporate links.

## Oceaneos Marine Research Foundation

### Description

#### Oceaneos

, the 'Oceaneos Marine Research Foundation' of Vancouver, Canada, was founded in 2014. Since 2016, Oceaneos is seeking permits from the Chilean government to release up to 10 t of Fe 130 km off the coast of Coquimbo. The project is intended for a period of 18 months (baseline analysis, project execution, monitoring); the 10t of Fe are to be applied during a period of 7-10 days. A group of Chilean scientists criticised the Oceaneos's plans and published, *inter alia*, the following information: "This company is currently carrying out a campaign to convince Chile to finance this project." The iron fertilization

#### experiment

"would seriously endanger national marine ecosystems and, furthermore, various fisheries, such as horse mackerel and anchovy".

Oceaneos filed similar requests in Peru (as ' Oceaneos Peru S.A.C. ') and Argentina. Some of the people involved in Oceaneos are the same people who formed the Haida Salmon Restoration Corporation (involved in the 2012 ocean fertilisation event west of Canada).

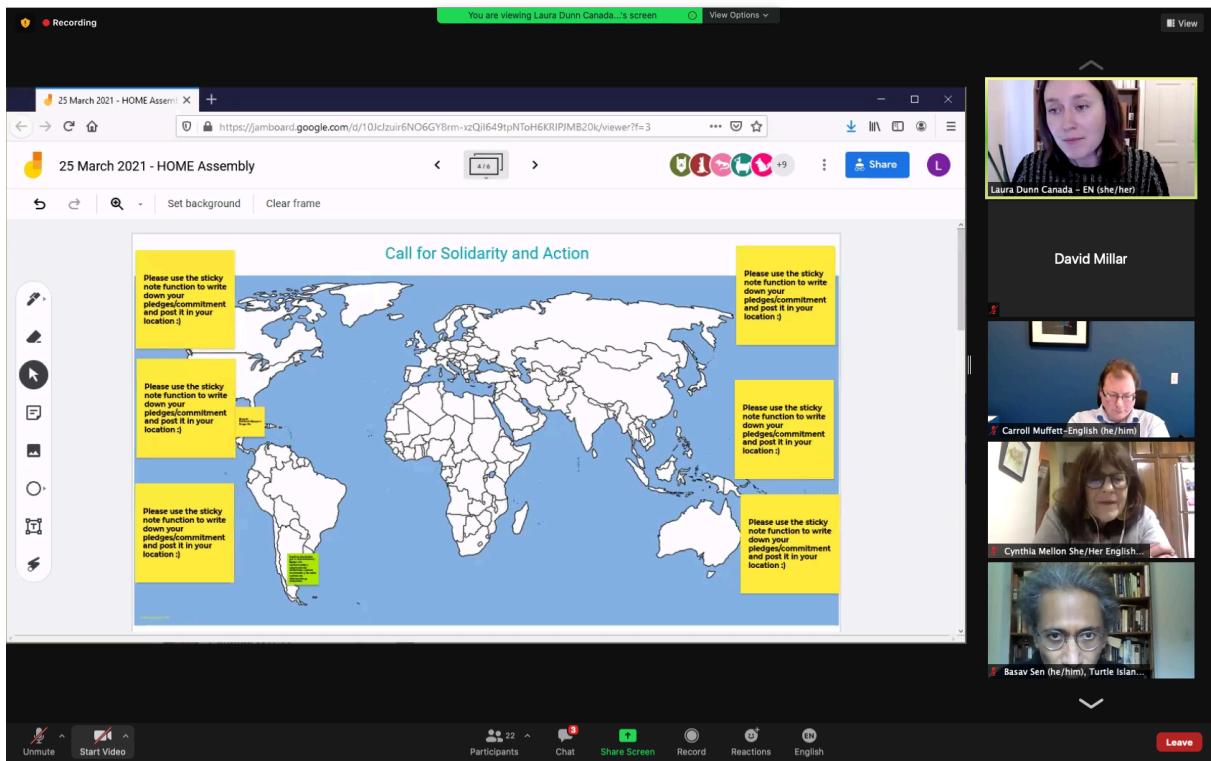
6. Breakout rooms for discussion of HOME campaign, how to work together strategically.



## Assembly Objectives

1. Activate the Campaign by bringing together HOMEies to reinforce solidarity, re-establish connections and develop familiarity;
2. Be able to update HOMEies of the most crucial and real-world geoengineering updates and emphasize the urgency of action;
3. Share relevant geoengineering-related resources that the HOME Campaign and Geoengineering Monitor have developed over the last few years;
4. Identify the type/s of support needed by HOMEies to capacitate themselves and be able to engage more in mobilization activities.

[www.handsoffmotherearth.org](http://www.handsoffmotherearth.org) - [coordinator@handsoffmotherearth.org](mailto:coordinator@handsoffmotherearth.org) - [www.geoengineeringmonitor.org](http://www.geoengineeringmonitor.org)



How can the HOME Campaign Team support HOMEies in building their capacity and enable a more active engagement? organize teach-ins? arrange peer to peer discussions?



- double tap to write insights on Question 1

What assistance can the HOME network provide to the domestic fight at the policy level in the US?

Response 1: lots of signatories but just a few active orgs, most outside of the US; most US groups have not wanted to touch geoengineering (have other priorities) and now it's moving really quickly and capacity to deal with this is limited. How do we build out the HOME campaign so that we make use of capacity that already exists across the movements? US movements aligned around CCS and BECCS -> open up to talk about the harder and more difficult stuff like DACCS and SRM.

Response 2: Need to work around net zero in the US as well as a frame.

Question: how do we better connect North American Working Group and HOME?

Aligned US movements: No fossil fuel bailout, GGON (but even in that space, some folks want to keep "all options on the table"); explore the natural partnerships first. Mobilize those groups that are aligned, have positions but have not been outspoken on geoengineering yet, like Sierra Club.

How about US CAN: CAN US has taken a clear position against SRM and CCS.

Some US CAN members go to international fora and take positions contrary to US CAN which leads to conflict.

What kind of research would be useful / what are we not tracking? Subsidies - are included in the map and will be part of next quarterly review.

Significant needs: There are a lot of scientists aligned and willing to speak (but we don't have the connected with us and organized); need more reports / research (short, credible etc.) that debunk specific technologies.