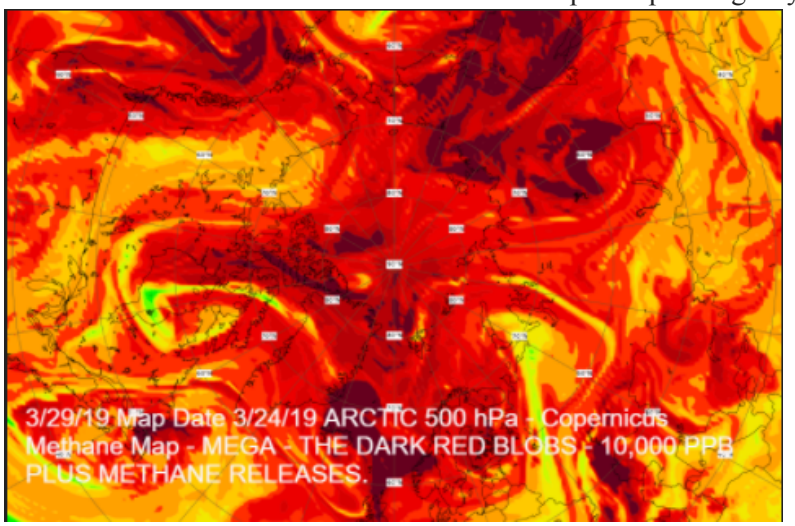
Geoengineering - report by David Millar, Quaker Earthcare Witness rep to CBD

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://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 and
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)
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 *(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 an key international strategy conference on zoom for HOME 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

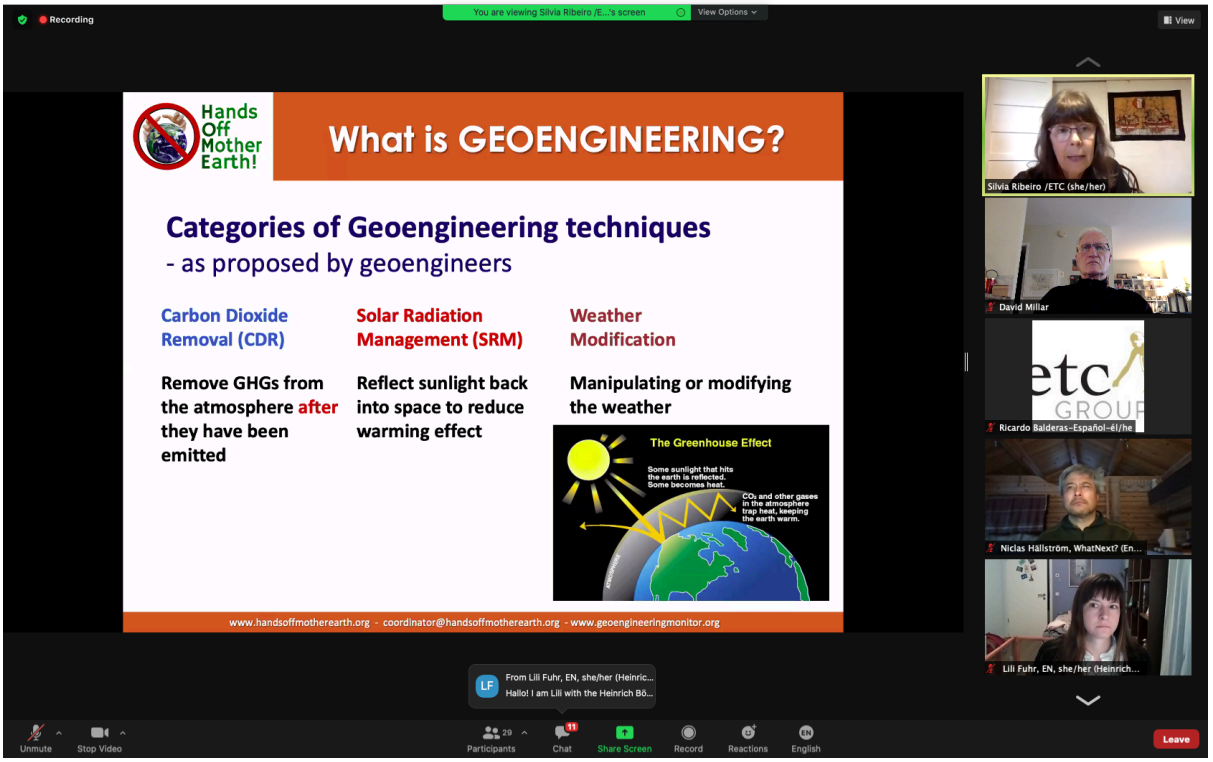
The conference was recorded but I do not yet have the URL. However, I was able to screen-capture some of the presentations, which will give you an overview of the threat to humany posed by these crazy ideas, backed by carbon offsets, billion-dollar investors and major universities. **See the slides below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

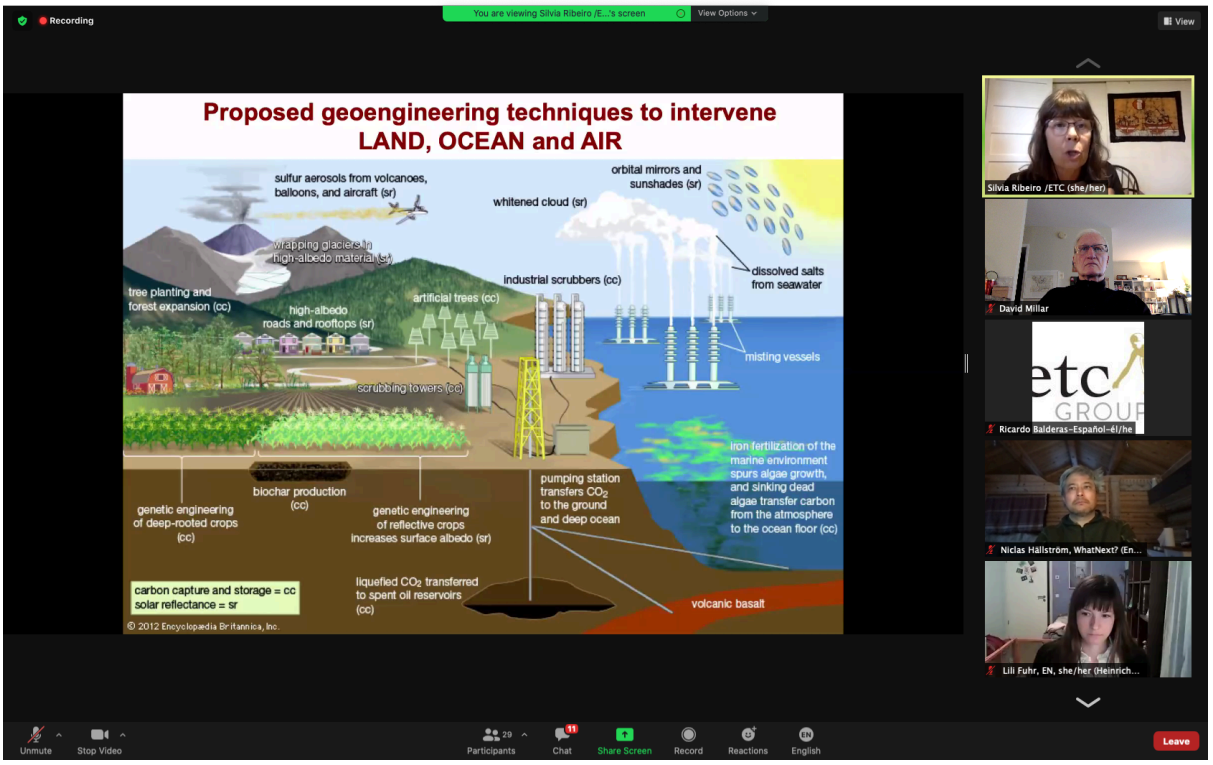
The coalition includes many trustworthy NGOs that I have worked with for more than a decade. CBD Alliance, ETC Group, Alianza por la Biodiversidad en América Latina, Amigos de la Tierra de América Latina y el Caribe (ATALC), Asian Peoples Movement on Debt and Development (APMDD), Biofuelwatch, Climate 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.**

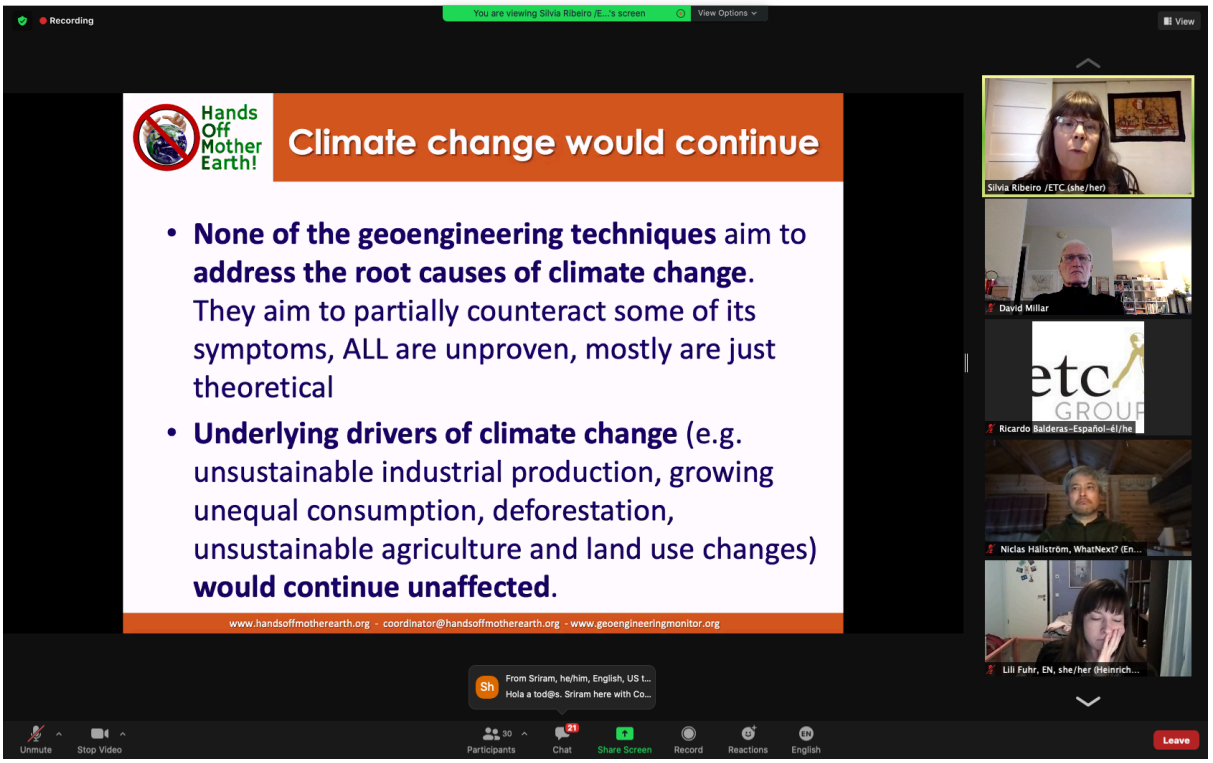
Even if you do not know the NGOs, you may recognize some of the **key people**: Silvia Ribeiro and Laura Dunn of ETCgroup, Gadir Lavadenz of the CBD Alliance, Tom Goldtooth, Vandana Shiva, Nnimmo Bassey, Theresa Church of Global Justice Ecology Project and the Campaign to Stop GE Trees; Carroll Muffett 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.

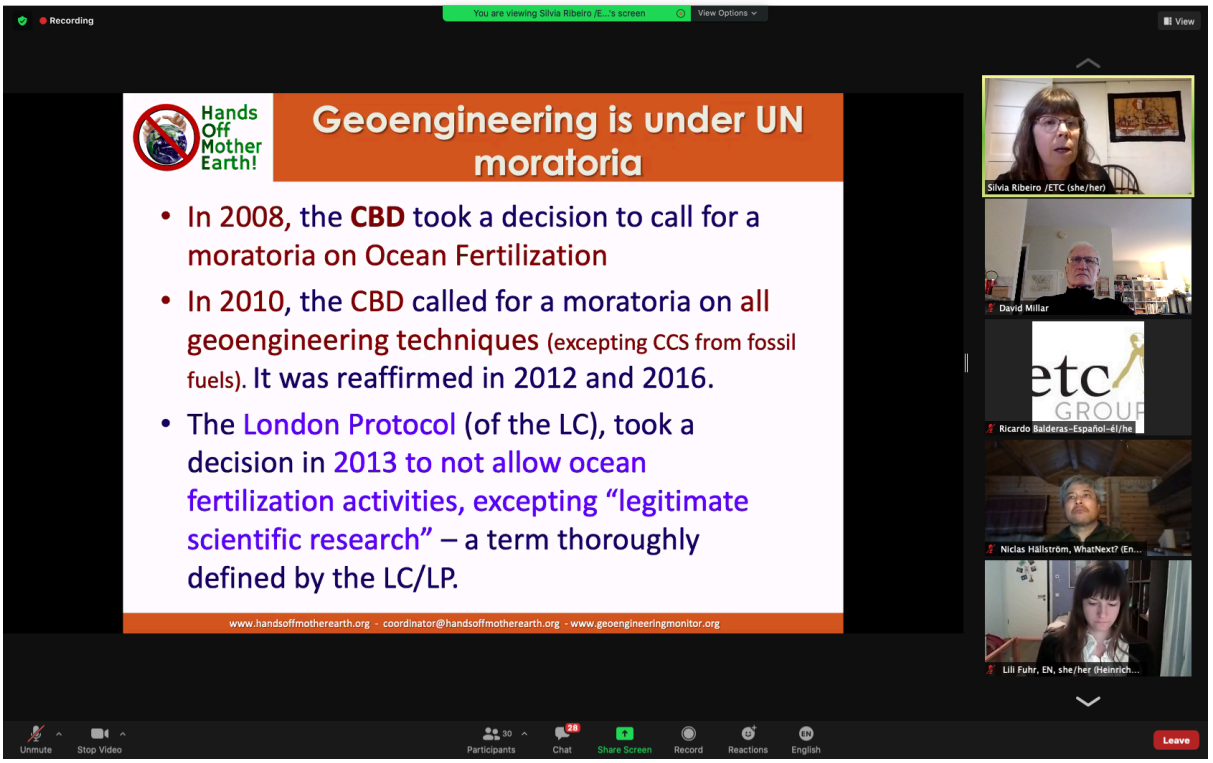
Presentations on zoom (screen captures)

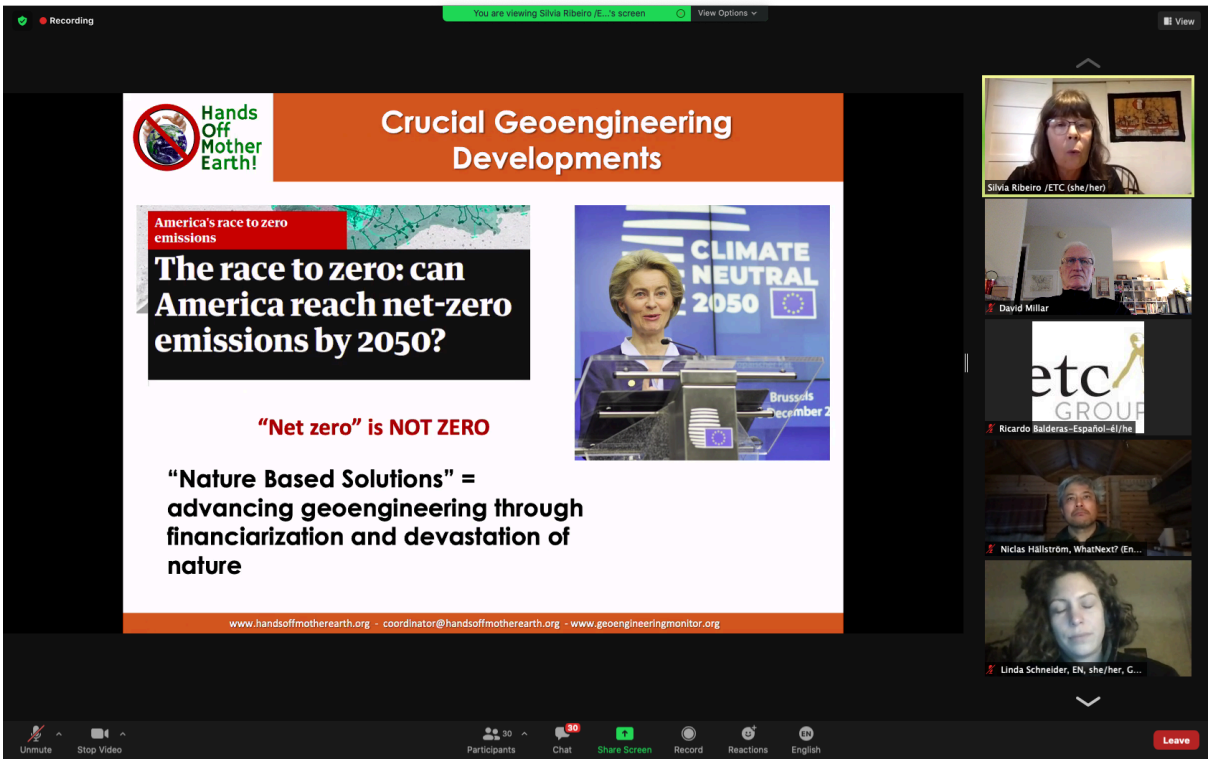
1. By Silvia Ribeiro of CBD Alliance

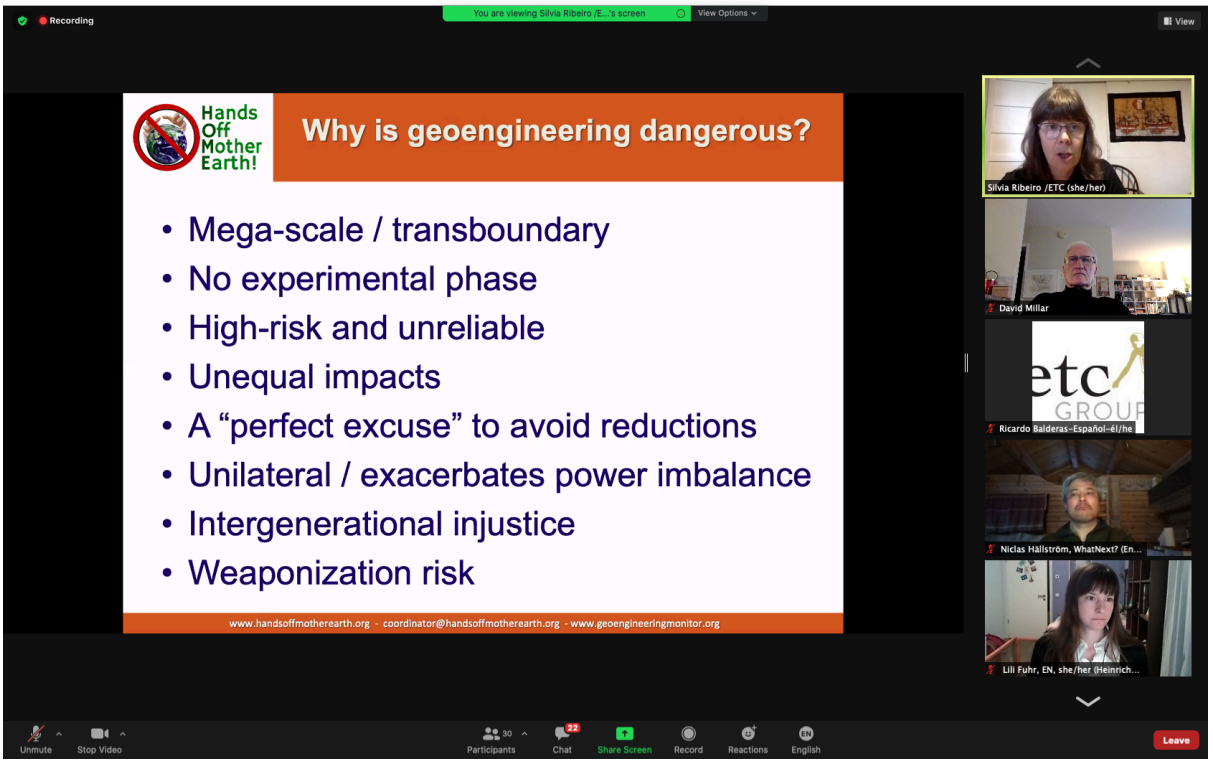


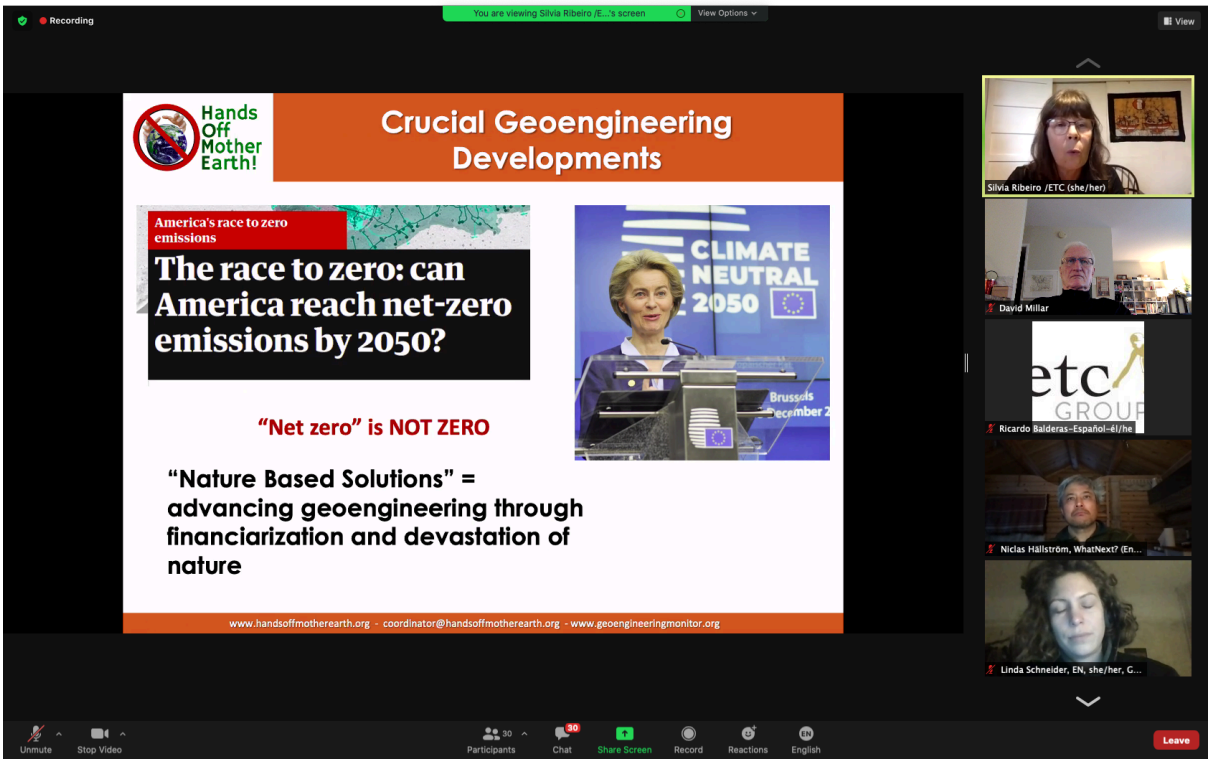


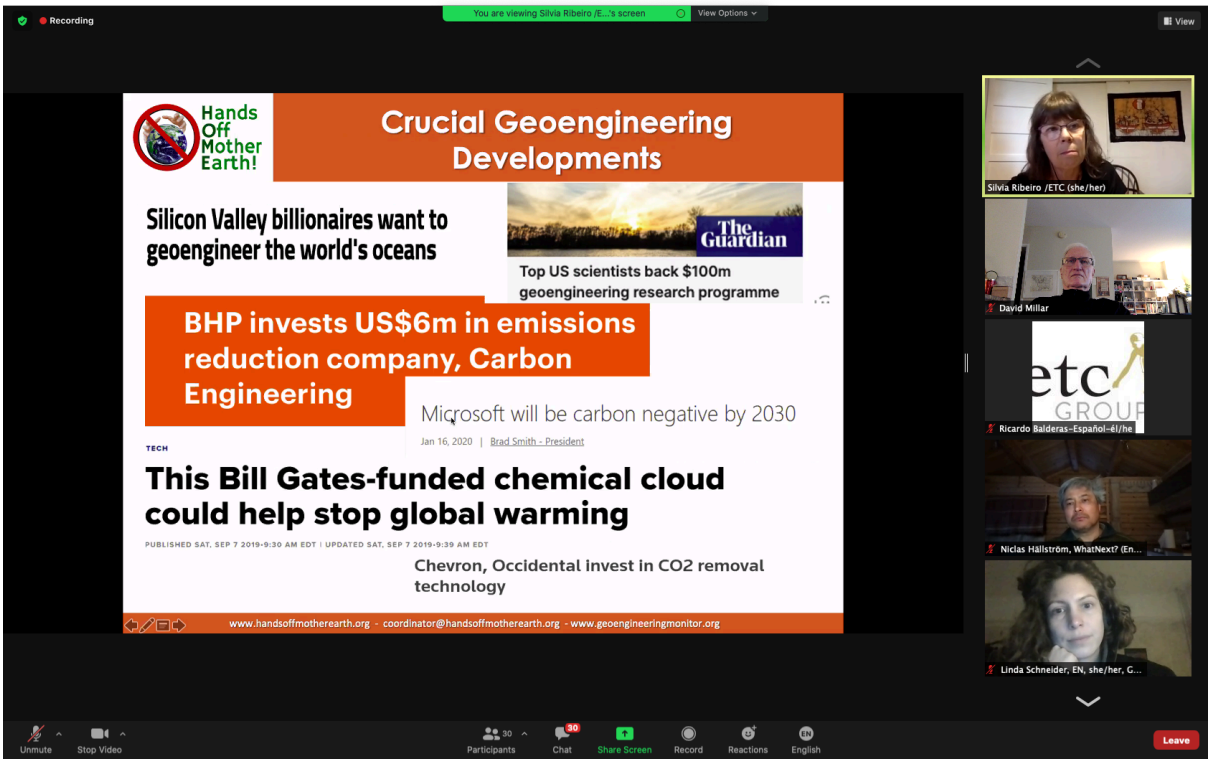

Recording
You are viewing Silvia Ribeiro /E..'s screen
View Options
View
Hands Off Mother Earth!
Climate change would continue
• None of the geoengineering techniques aim to address the root causes of climate change. They aim to partially counteract some of its symptoms, ALL are unproven, mostly are 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.
www.handsoffmotherearth.org - coordinator@handsoffmotherearth.org - www.geoengineeringmonitor.org
Silvia Ribeiro /ETC (she/her)
David Millar
etc GROUP
Ricardo Balderas-Español-él/he
Niclas Hällström, WhatNext? (En...
Lili Fuhr, EN, she/her (Heinrich...
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Reactions
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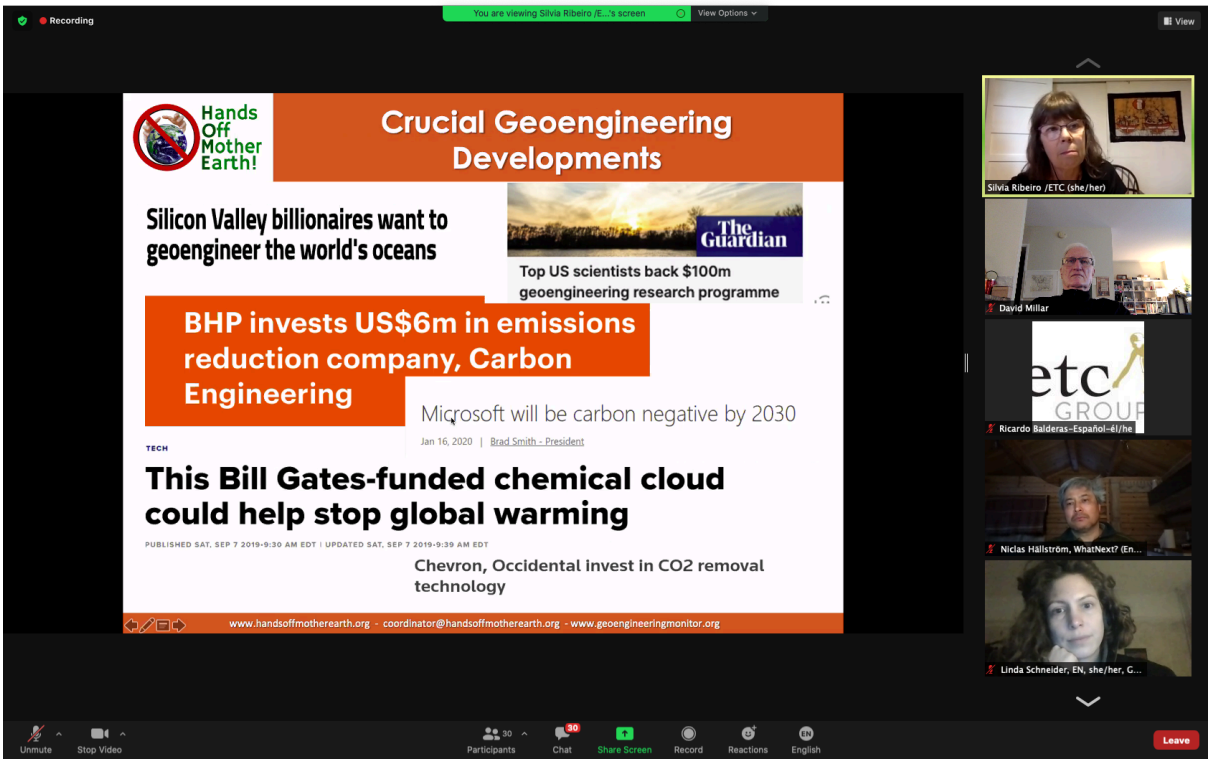

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Geoengineering is under UN moratoria
• In 2008, the CBD took a decision to call for a moratoria on Ocean Fertilization
• In 2010, the CBD called for a moratoria on all geoengineering techniques (excepting CCS from fossil fuels). It was reaffirmed in 2012 and 2016.
• The London Protocol (of the LC), took a decision in 2013 to not allow ocean fertilization activities, excepting "legitimate scientific research" – a term thoroughly defined by the LC/LP.
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Silvia Ribeiro /ETC (she/her)
David Millar
Ricardo Balderas-Español-él/he
Niclas Hällström, WhatNext? (En...
Lili Fuhr, EN, she/her (Heinrich...
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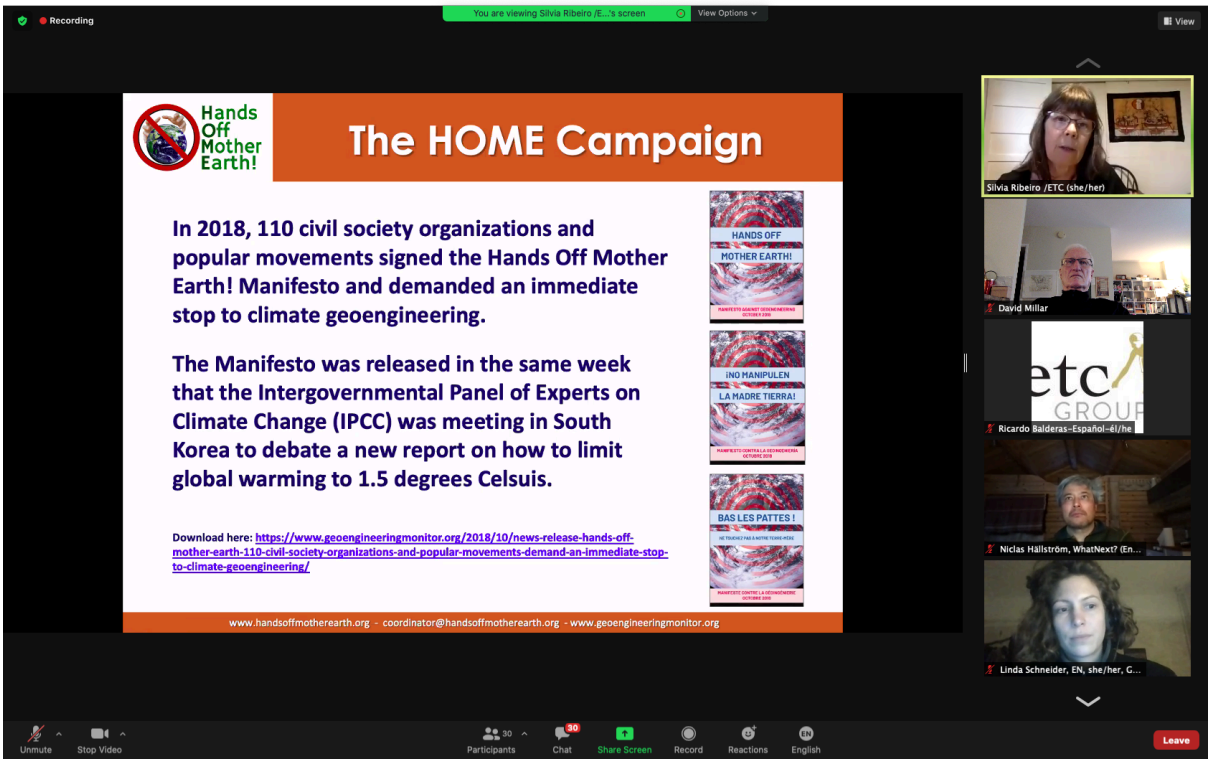

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Hands Off Mother Earth!
Crucial Geoengineering Developments
America's race to zero emissions
The race to zero: can America reach net-zero emissions by 2050?
CLIMATE NEUTRAL
2050
"Net zero" is NOT ZERO
"Nature Based Solutions" = advancing geoengineering through financiarization and devastation of nature
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David Millar
Ricardo Balderas-Español-él/he
Niclas Hällström, WhatNext? (En...
Linda Schneider, EN, she/her, G...
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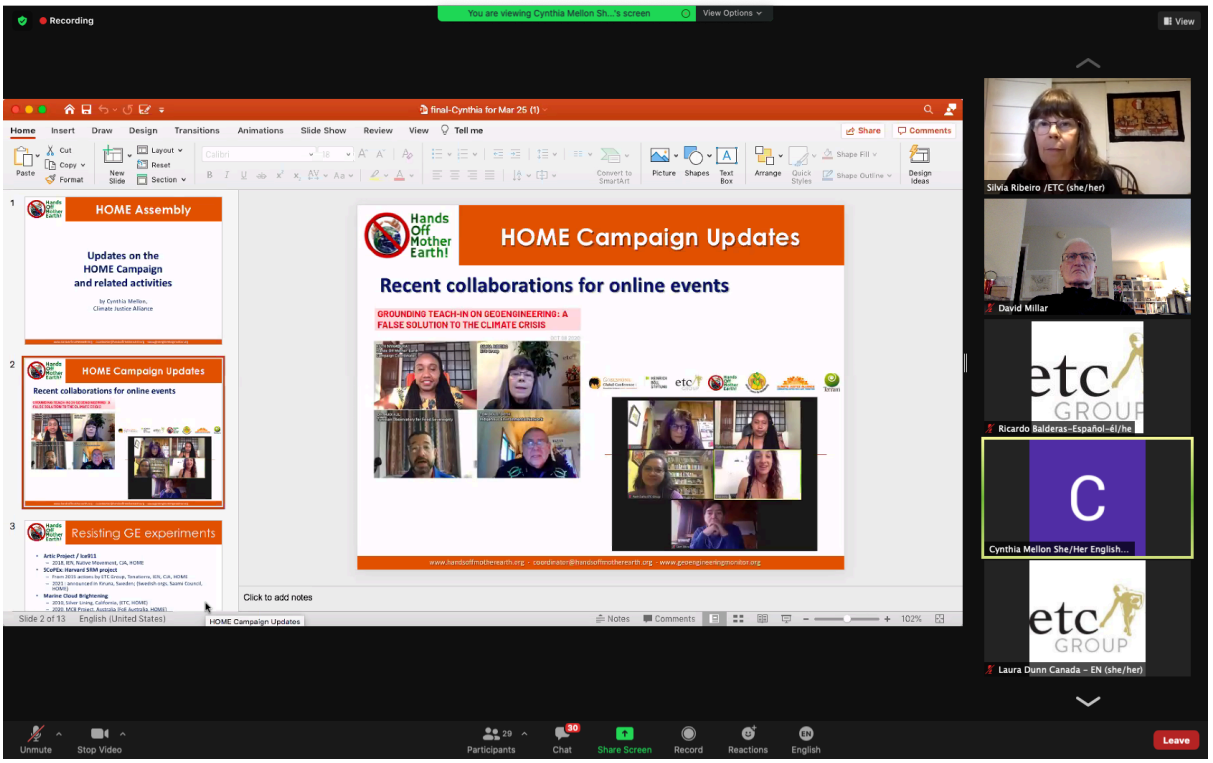

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Hands Off Mother Earth!
Why is geoengineering dangerous?
• Mega-scale / transboundary
• No experimental phase
• High-risk and unreliable
• Unequal impacts
• A "perfect excuse" to avoid reductions
• Unilateral / exacerbates power imbalance
• Intergenerational injustice
• Weaponization risk
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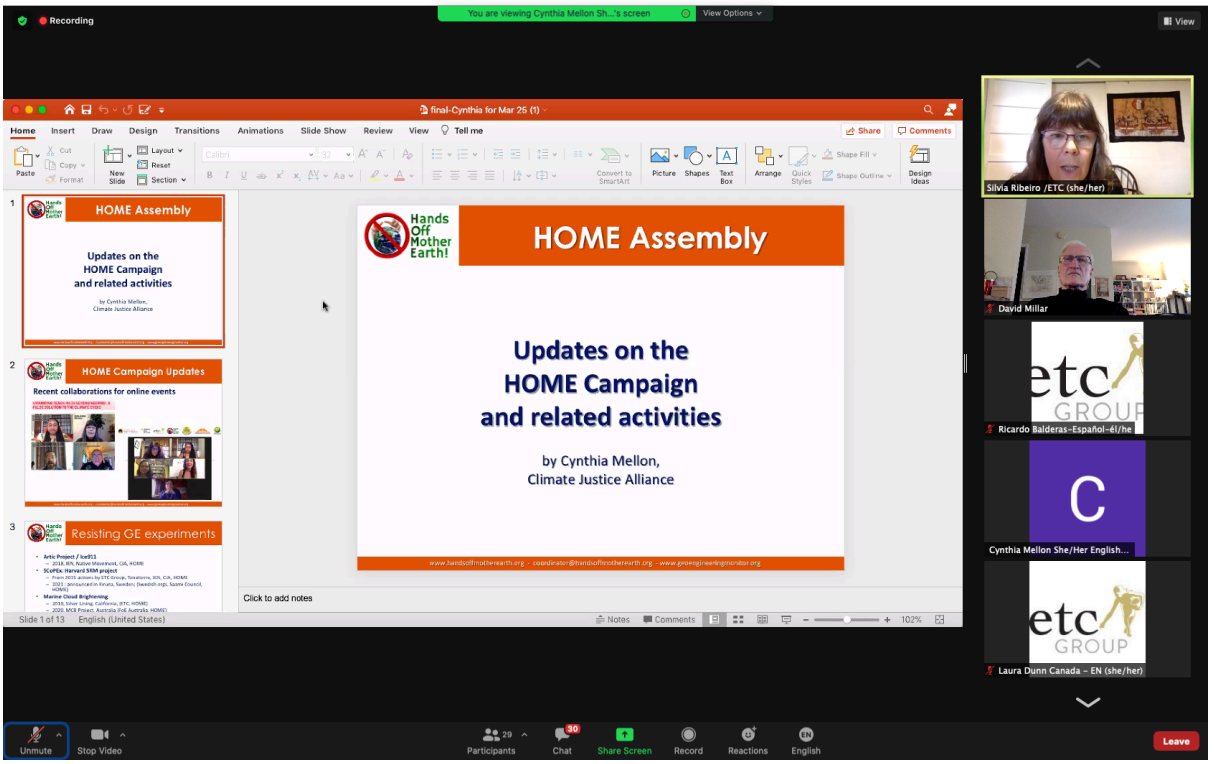

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Silicon Valley billionaires want to geoengineer the world's oceans
The Guardian
Top US scientists back $100m geoengineering research programme
BHP invests US$6m in emissions reduction company, Carbon Engineering
Microsoft will be carbon negative by 2030
Jan 16, 2020 | Brad Smith - President
TECH
This Bill Gates-funded chemical cloud could help stop global warming
PUBLISHED SAT, SEP 7 2019-9:30 AM EDT | UPDATED SAT, SEP 7 2019-9:39 AM EDT
Chevron, Occidental invest in CO2 removal technology
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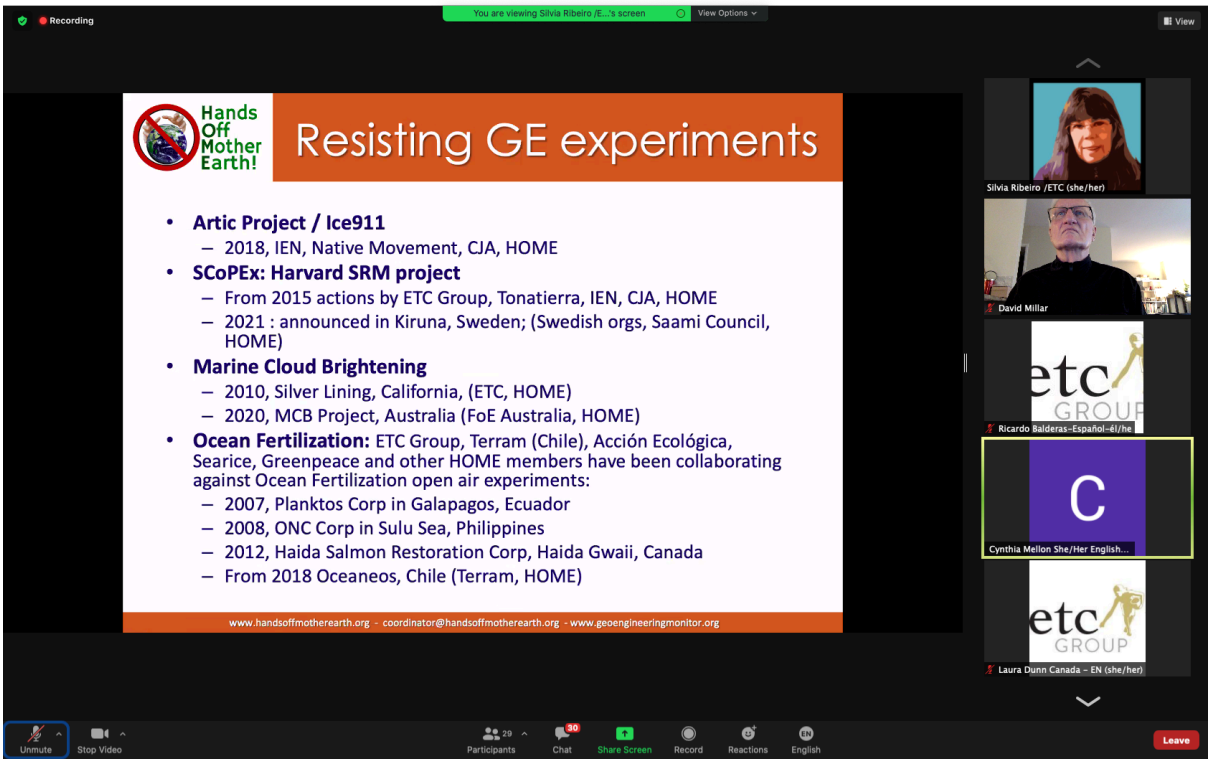

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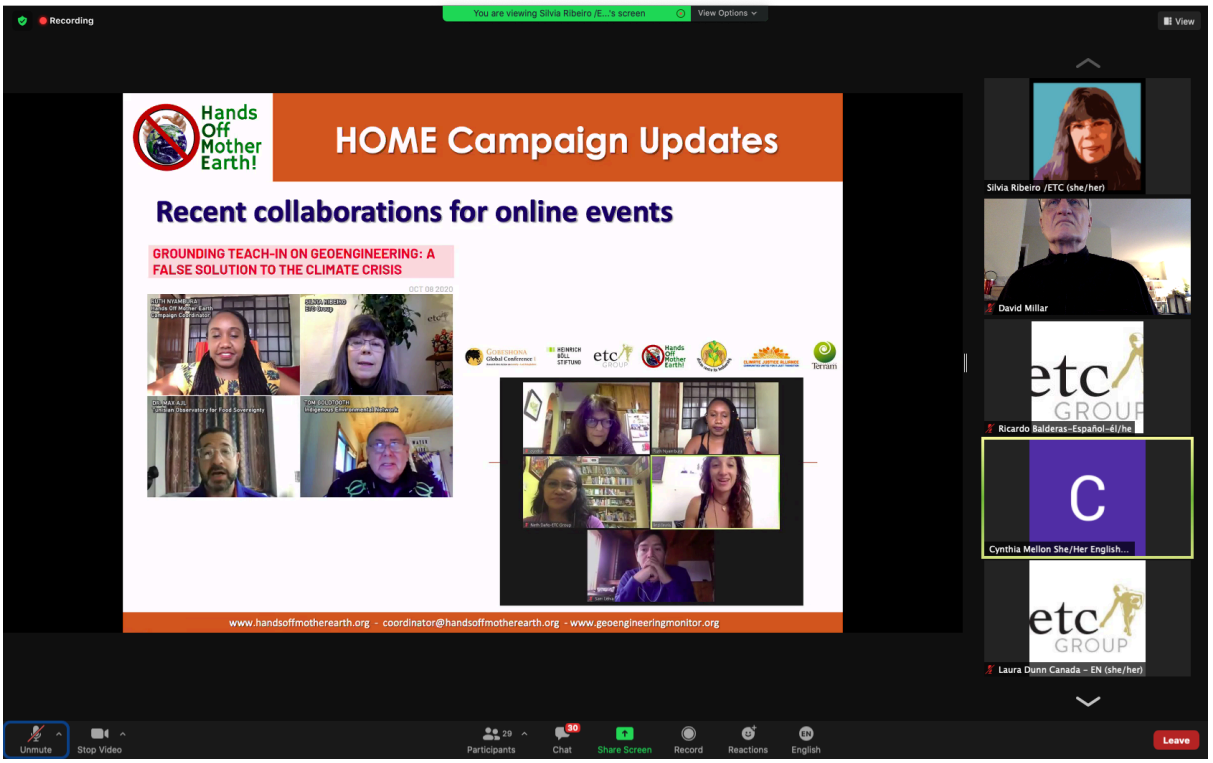

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Hands Off Mother Earth!
The HOME Campaign
In 2018, 110 civil society organizations and popular movements signed the Hands Off Mother Earth! Manifesto and demanded an immediate stop to climate geoengineering.
The Manifesto was released in the same week 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 Celsuis.
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/
HANDS OFF MOTHER EARTH!
¡NO MANIPULEN LA MADRE TIERRA!
BAS LES PATTES !
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Silvia Ribeiro /ETC (she/her)
David Millar
Ricardo Balderas-Español-él/he
Niclas Hällström, WhatNext? (En...
Linda Schneider, EN, she/her, G...
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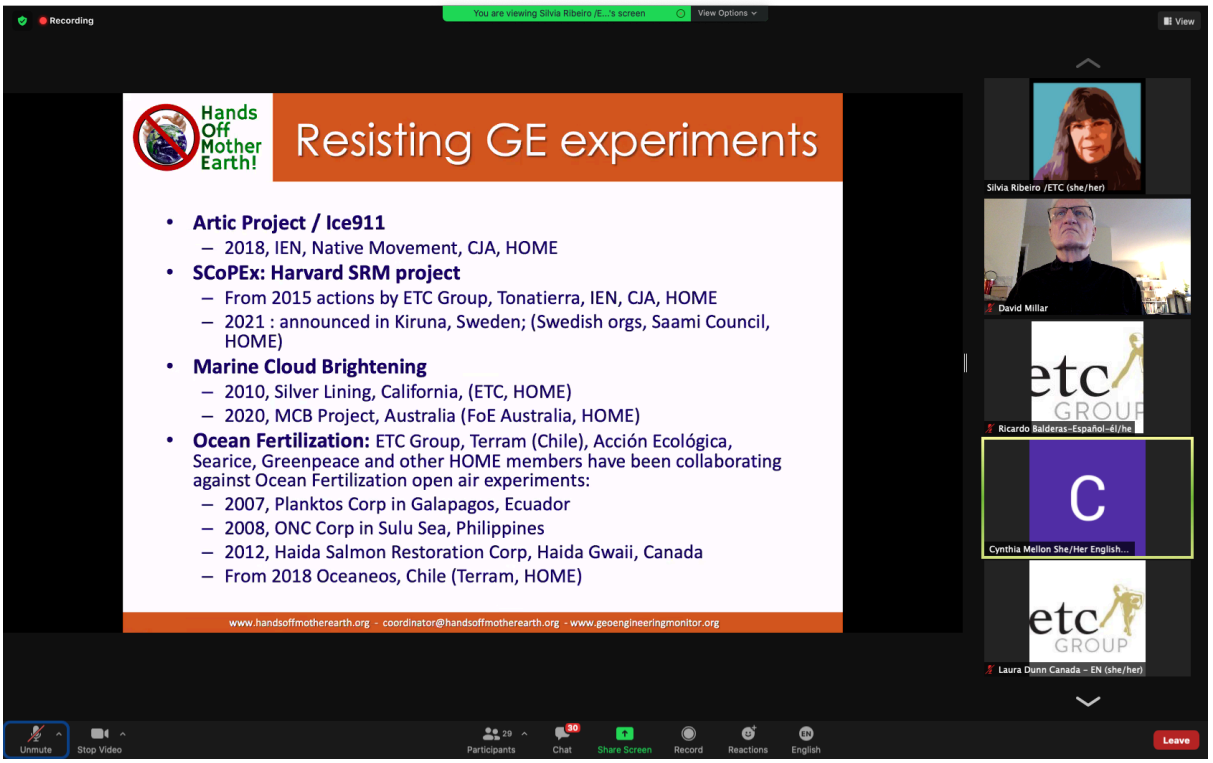

Recording
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View Options
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final-Cynthia for Mar 25 (1)
HOME Assembly
Updates on the HOME Campaign and related activities
HOME Campaign Updates
Recent collaborations for online events
Resisting GE experiments
Hands Off Mother Earth!
HOME Campaign Updates
Recent collaborations for online events
GROUNDING TEACH-IN ON GEOENGINEERING: A FALSE SOLUTION TO THE CLIMATE CRISIS
Click to add notes
Slide 2 of 13
English (United States)
HOME Campaign Updates
Silvia Ribeiro /ETC (she/her)
David Millar
Ricardo Balderas-Español-él/he
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Cynthia Mellon She/Her English...
Laura Dunn Canada - EN (she/her)
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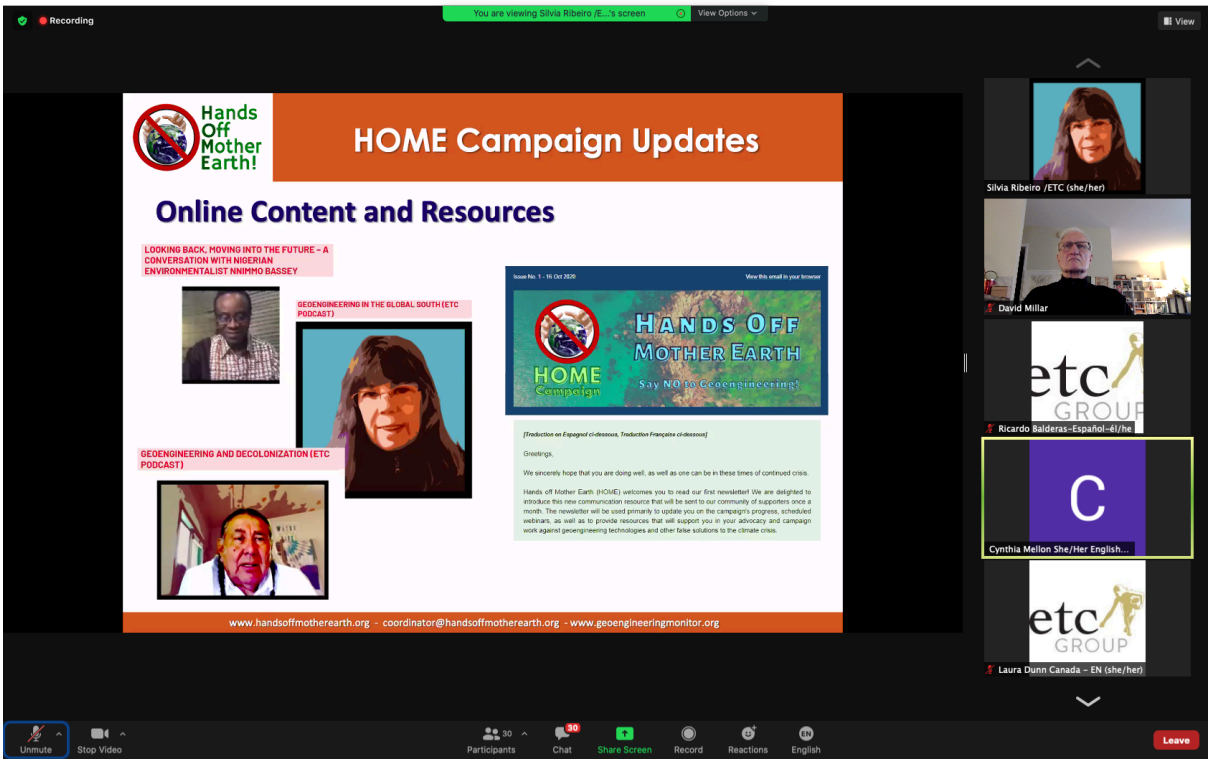
2. By Cynthia Mellon of Climate Justice Alliance

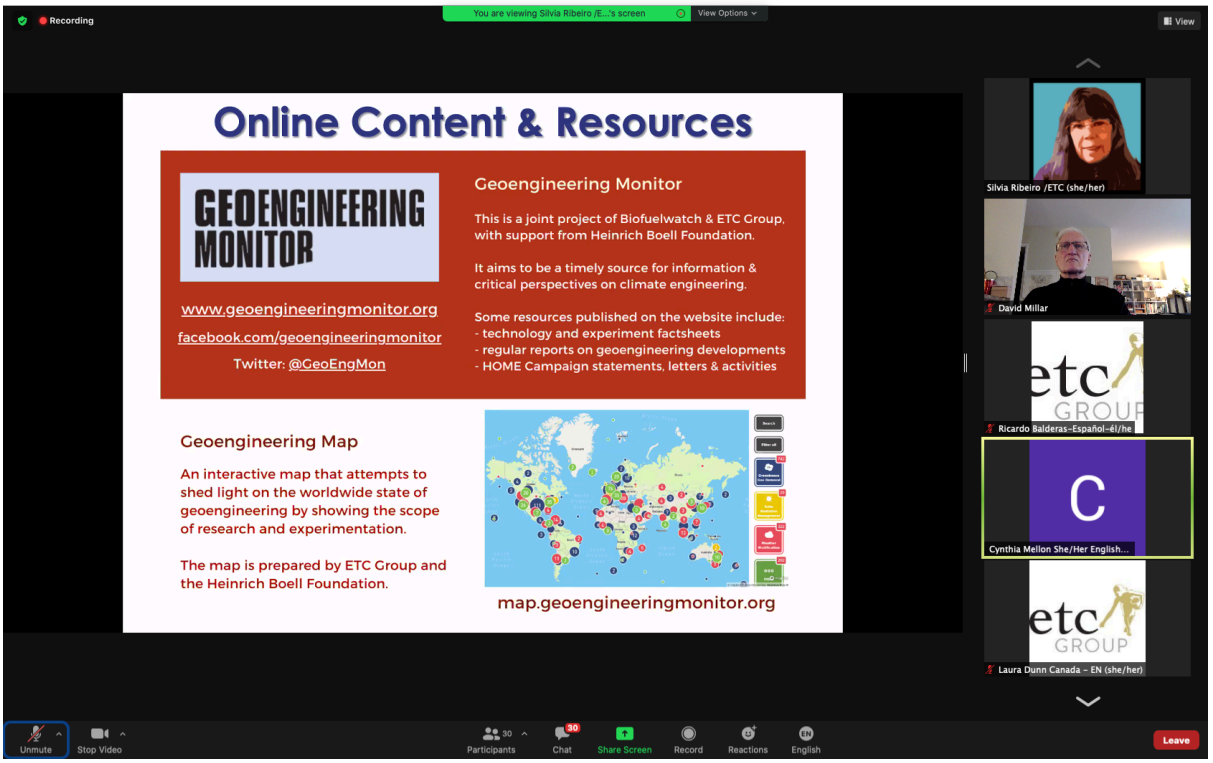


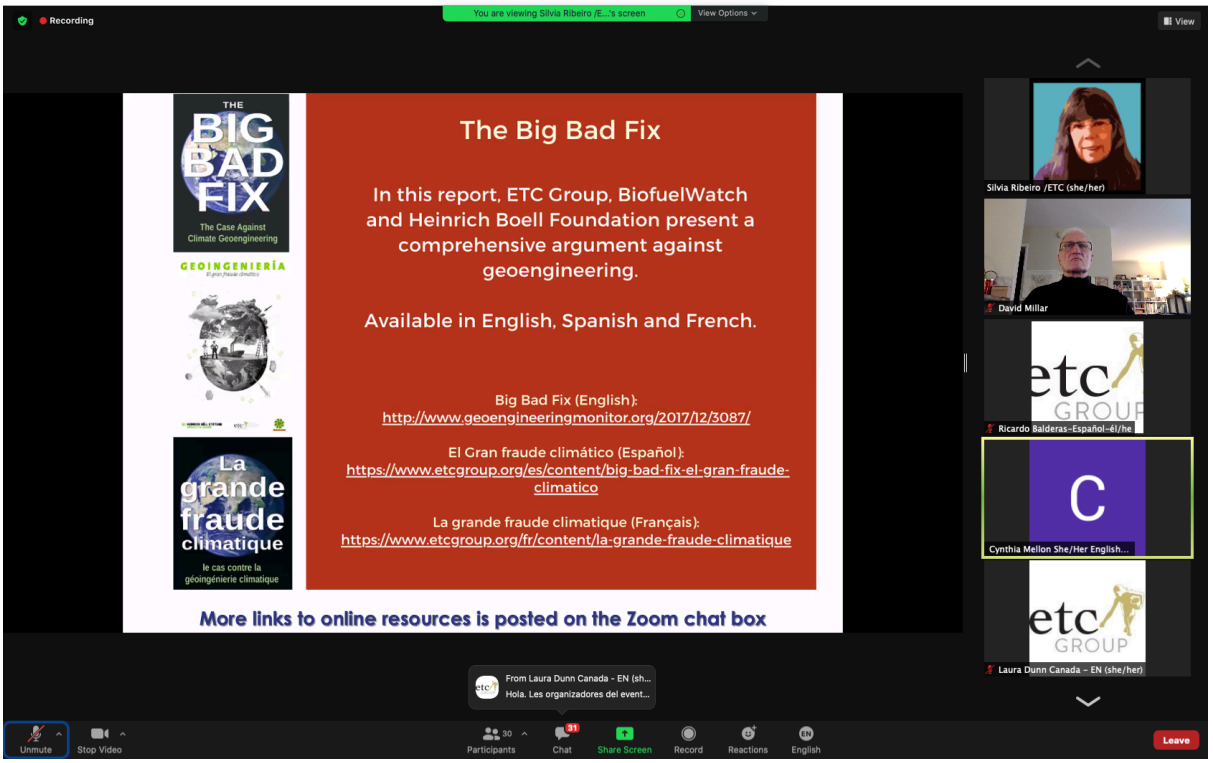

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Hands Off Mother Earth!
Resisting GE experiments
• Artic Project / Ice911
– 2018, IEN, Native Movement, CJA, HOME
• SCoPEx: Harvard SRM project
– From 2015 actions by ETC Group, Tonatierra, IEN, CJA, HOME
– 2021 : announced in Kiruna, Sweden; (Swedish 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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Silvia Ribeiro /ETC (she/her)
David Millar
Ricardo Balderas-Español-él/he
Cynthia Mellon She/Her English...
Laura Dunn Canada - EN (she/her)
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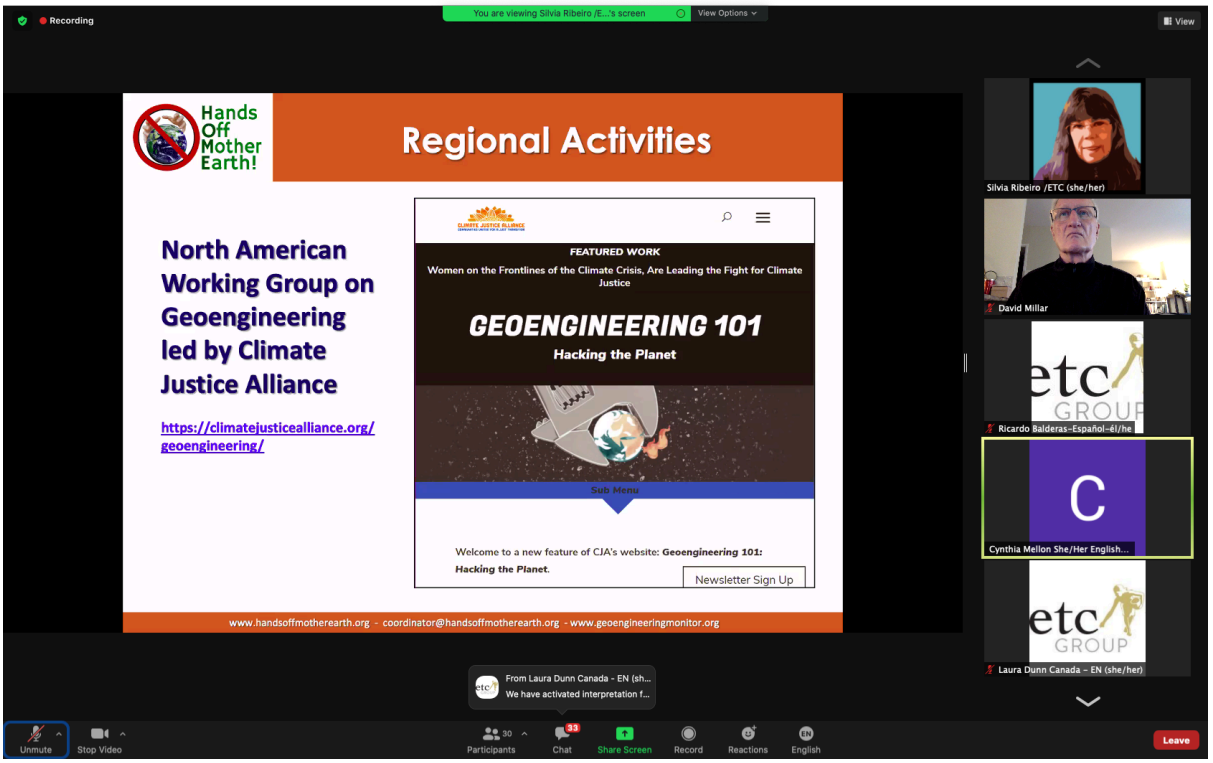

Recording
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Hands Off Mother Earth!
HOME Campaign Updates
Recent collaborations for online events
GROUNDING TEACH-IN ON GEOENGINEERING: A FALSE SOLUTION TO THE CLIMATE CRISIS
OCT 08 2020
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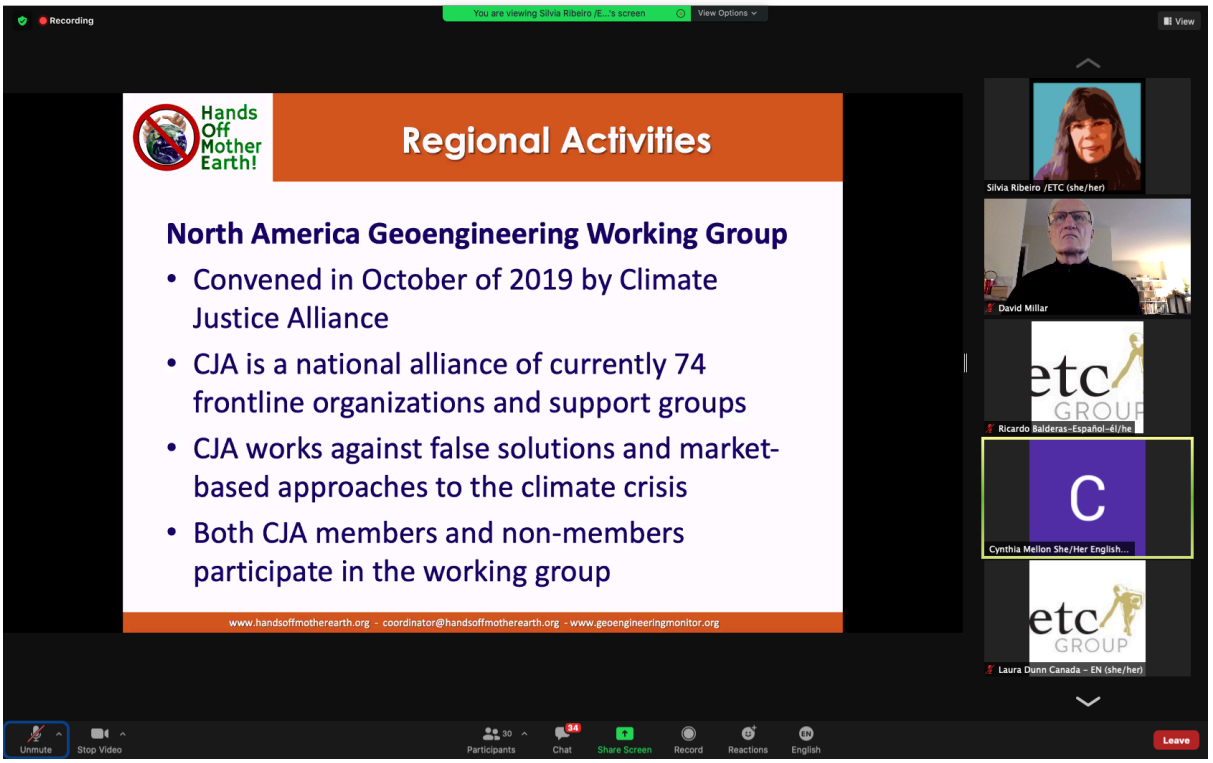

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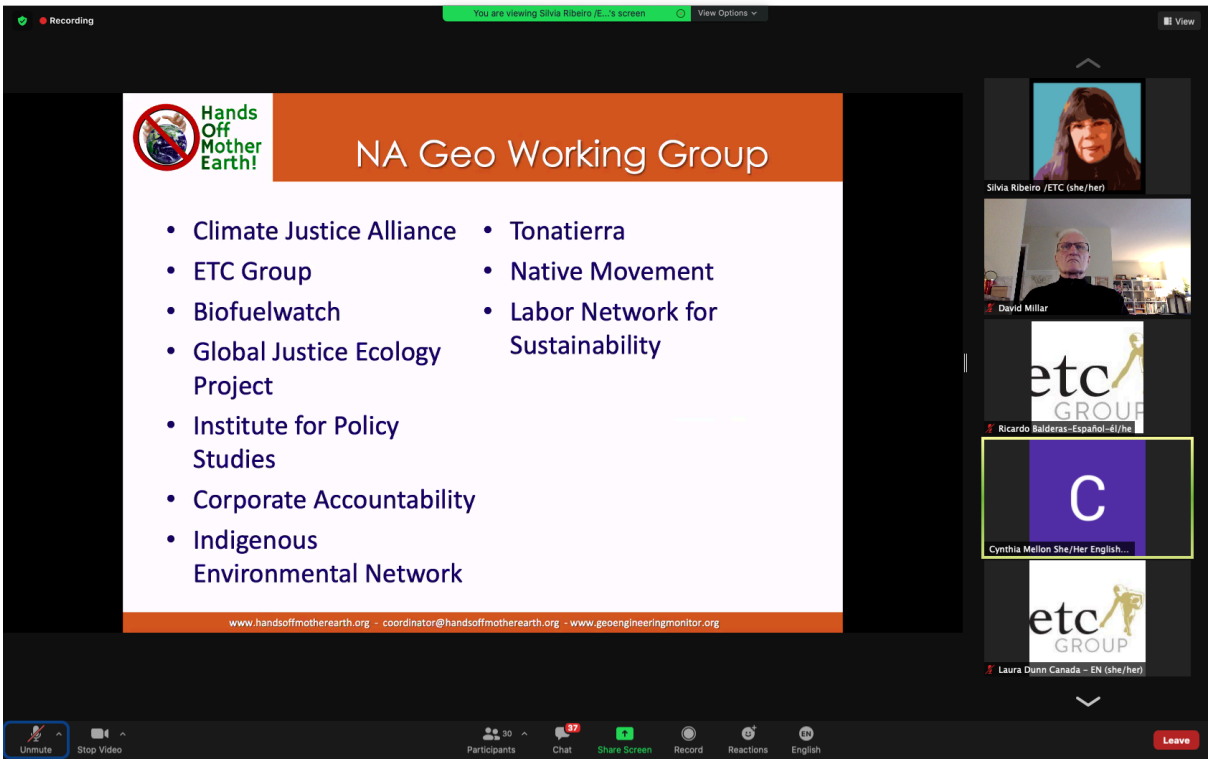

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Hands Off Mother Earth!
HOME Campaign Updates
Online Content and Resources
LOOKING BACK, MOVING INTO THE FUTURE – A CONVERSATION WITH NIGERIAN ENVIRONMENTALIST NNIMMO BASSEY
GEOENGINEERING IN THE GLOBAL SOUTH (ETC PODCAST)
GEOENGINEERING AND DECOLONIZATION (ETC PODCAST)
HANDS OFF MOTHER EARTH
HOME Campaign
Say NO to Geoengineering!
Greetings,
We sincerely hope that you are doing well, as well as one can be in these times of continued crisis.
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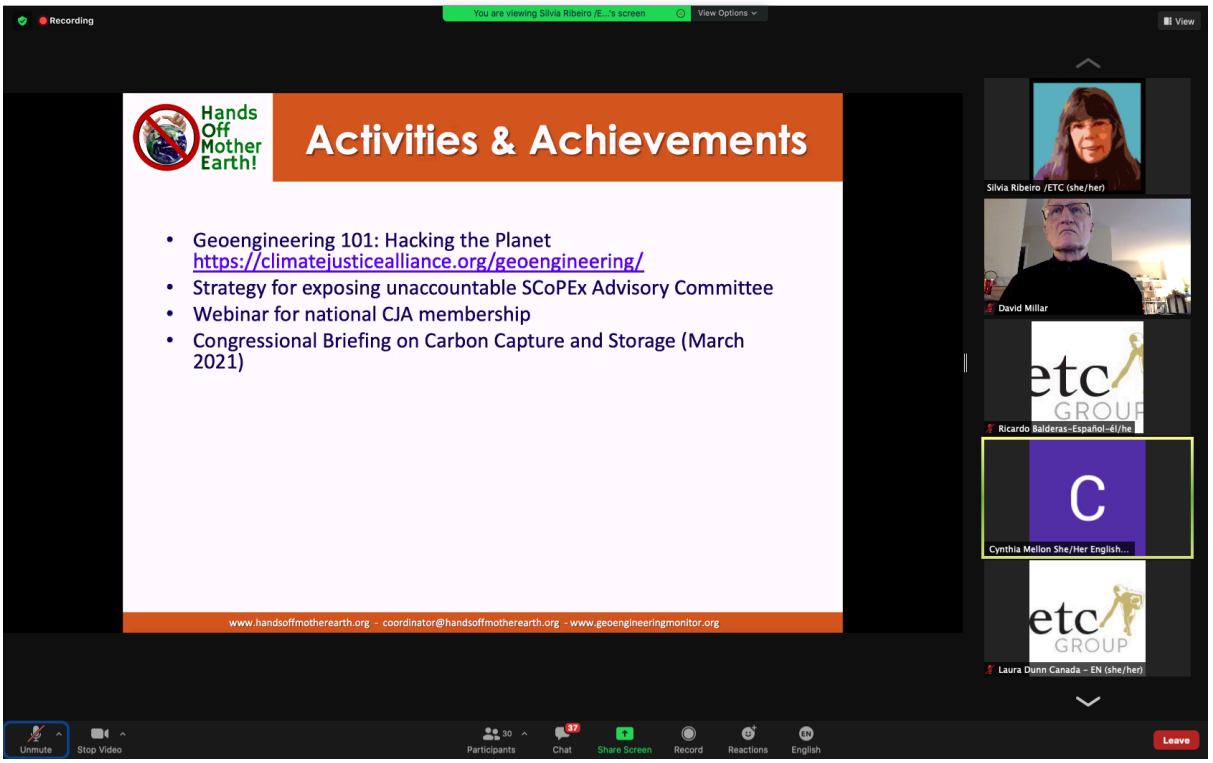

Recording
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Online Content & Resources
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Geoengineering Monitor
This is a joint project of Biofuelwatch & ETC Group, with support from Heinrich Boell Foundation.
It aims to be a timely source for information & 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
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Ricardo Balderas-Español-él/he
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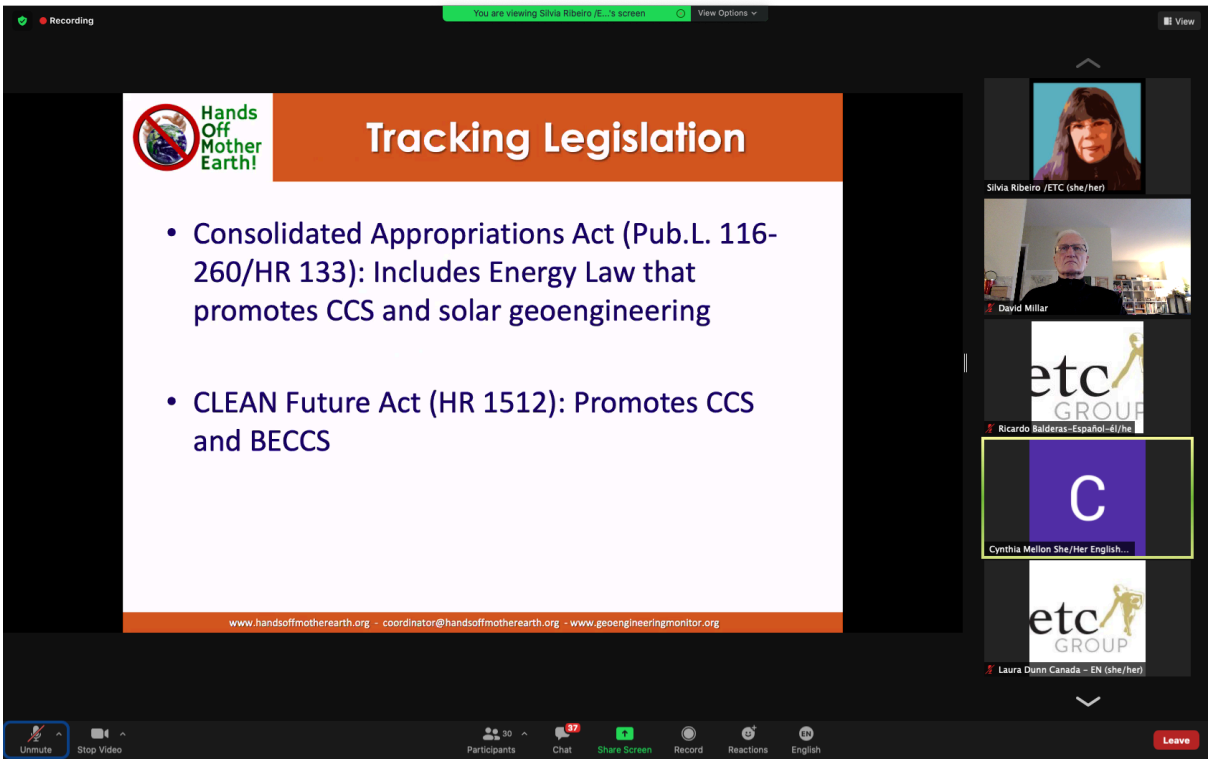

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THE BIG BAD FIX
The Case Against Climate Geoengineering
GEOINGENIERÍA
La grande fraude climatique
le cas contre la géoingénierie climatique
The Big Bad Fix
In this report, ETC Group, BiofuelWatch and Heinrich Boell Foundation present a comprehensive 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 (sh...
Hola. Les organizadores del event...
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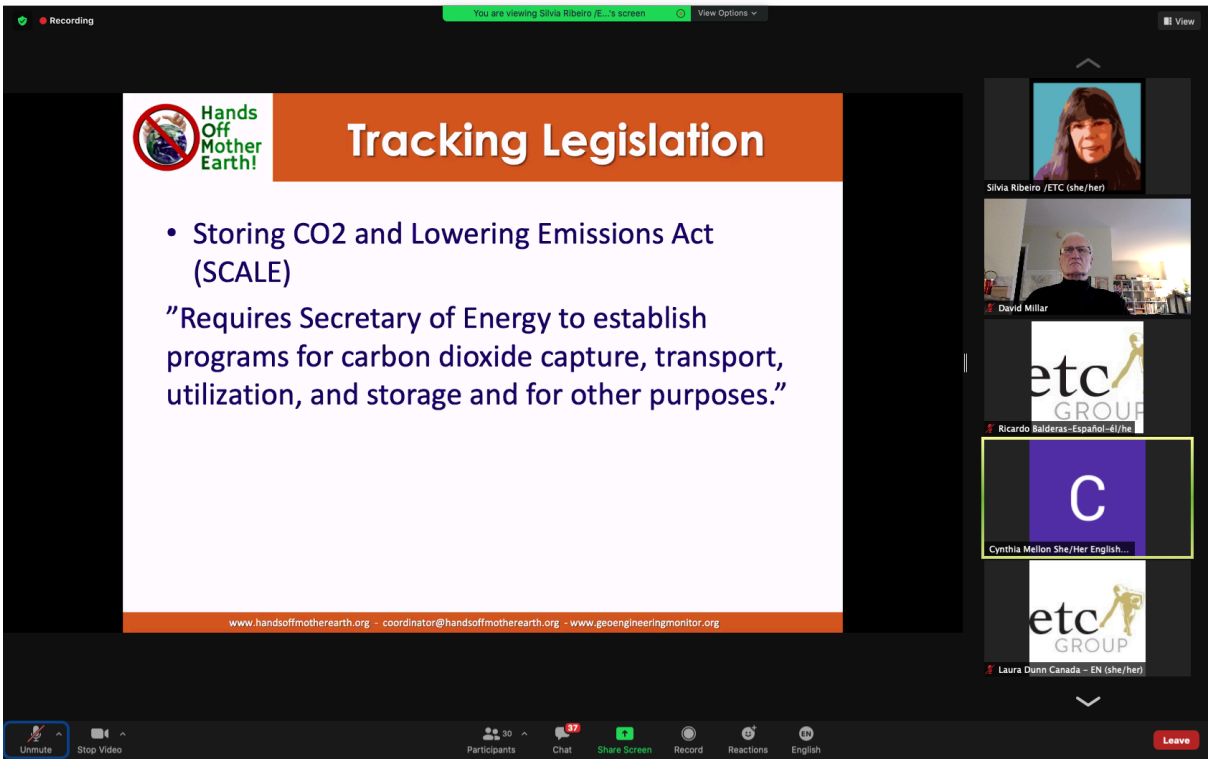

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Hands Off Mother Earth!
Regional Activities
North American Working Group on Geoengineering led by Climate Justice Alliance
https://climatejusticealliance.org/geoengineering/
FEATURED WORK
Women on the Frontlines of the Climate Crisis, Are Leading the Fight for Climate Justice
GEOENGINEERING 101
Hacking the Planet
Sub Menu
Welcome to a new feature of CJA's website: Geoengineering 101: Hacking the Planet.
Newsletter Sign Up
www.handsoffmotherearth.org - coordinator@handsoffmotherearth.org - www.geoengineeringmonitor.org
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David Millar
Ricardo Balderas-Español-él/he
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Hands Off Mother Earth!
Regional Activities
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
www.handsoffmotherearth.org - coordinator@handsoffmotherearth.org - www.geoengineeringmonitor.org
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NA Geo Working Group
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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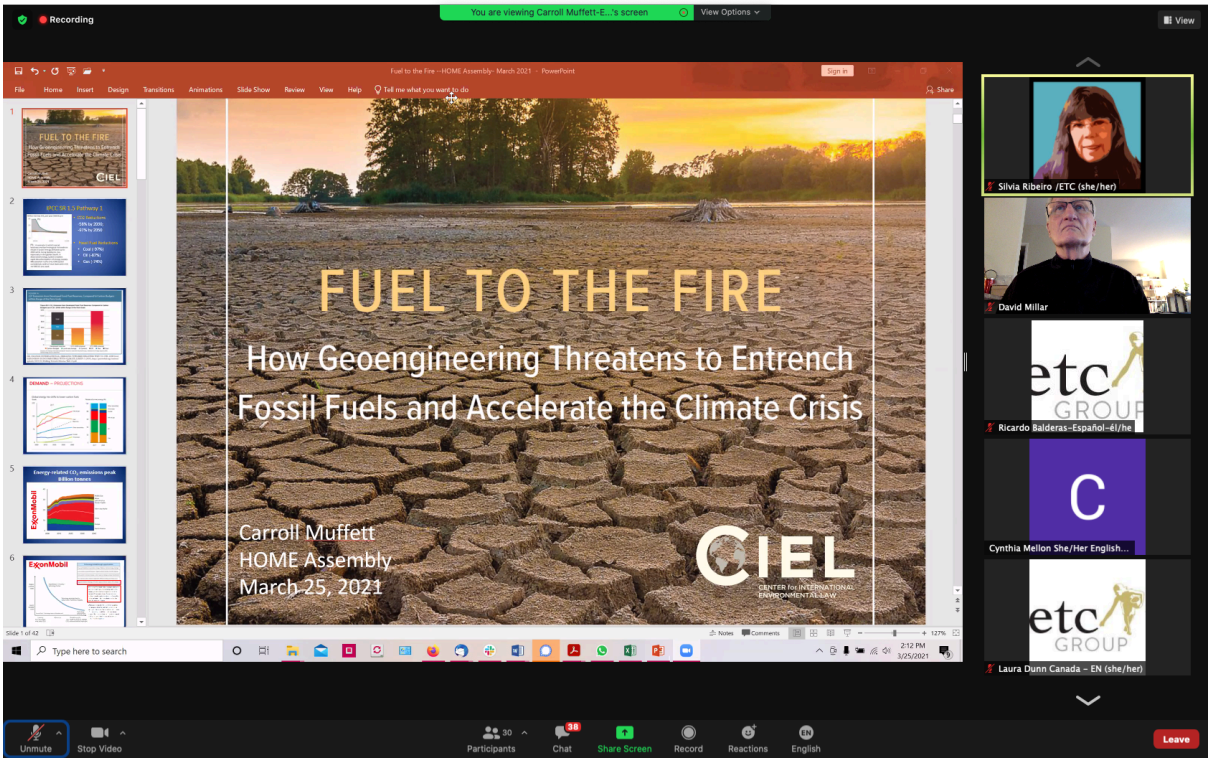

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Hands Off Mother Earth!
Activities & Achievements
Geoengineering 101: Hacking the Planet https://climatejusticealliance.org/geoengineering/
Strategy for exposing unaccountable SCoPEx Advisory Committee
Webinar for national CJA membership
Congressional Briefing on Carbon Capture and Storage (March 2021)
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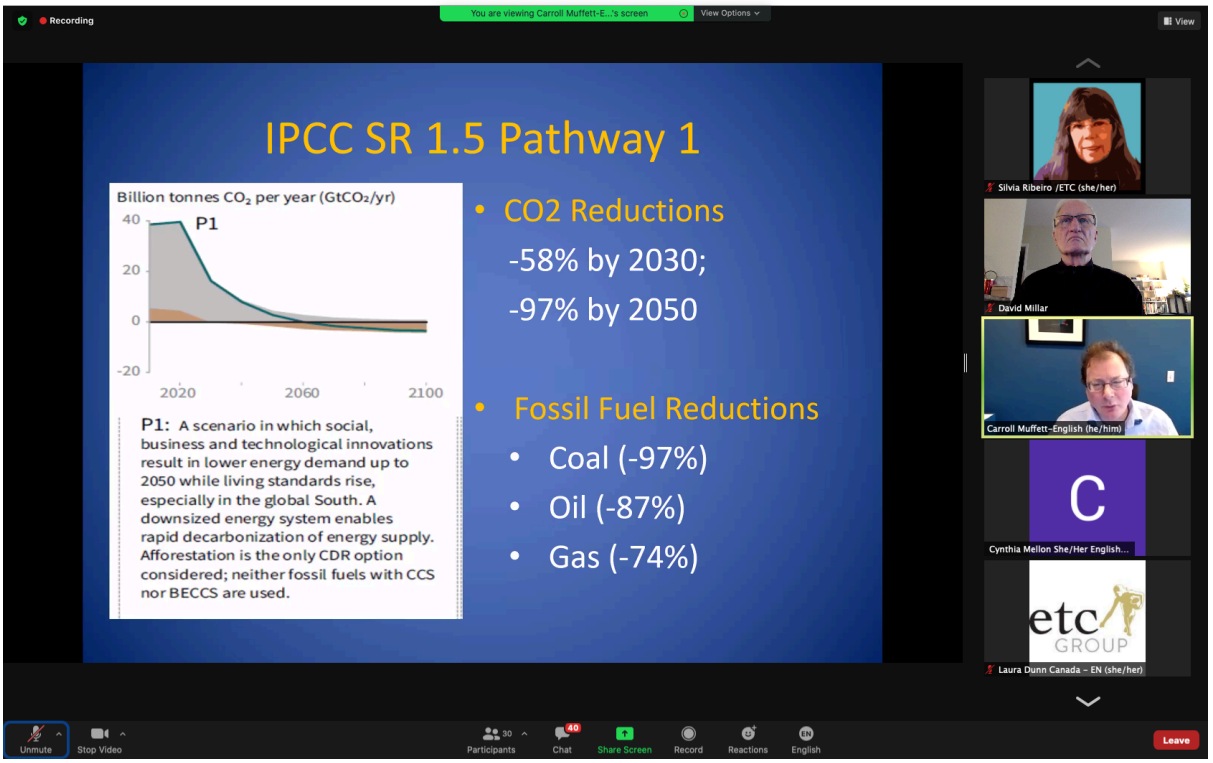

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Hands Off Mother Earth!
Tracking Legislation
• Consolidated Appropriations Act (Pub.L. 116-260/HR 133): Includes Energy Law that promotes CCS and solar geoengineering
• CLEAN Future Act (HR 1512): Promotes CCS and BECCS
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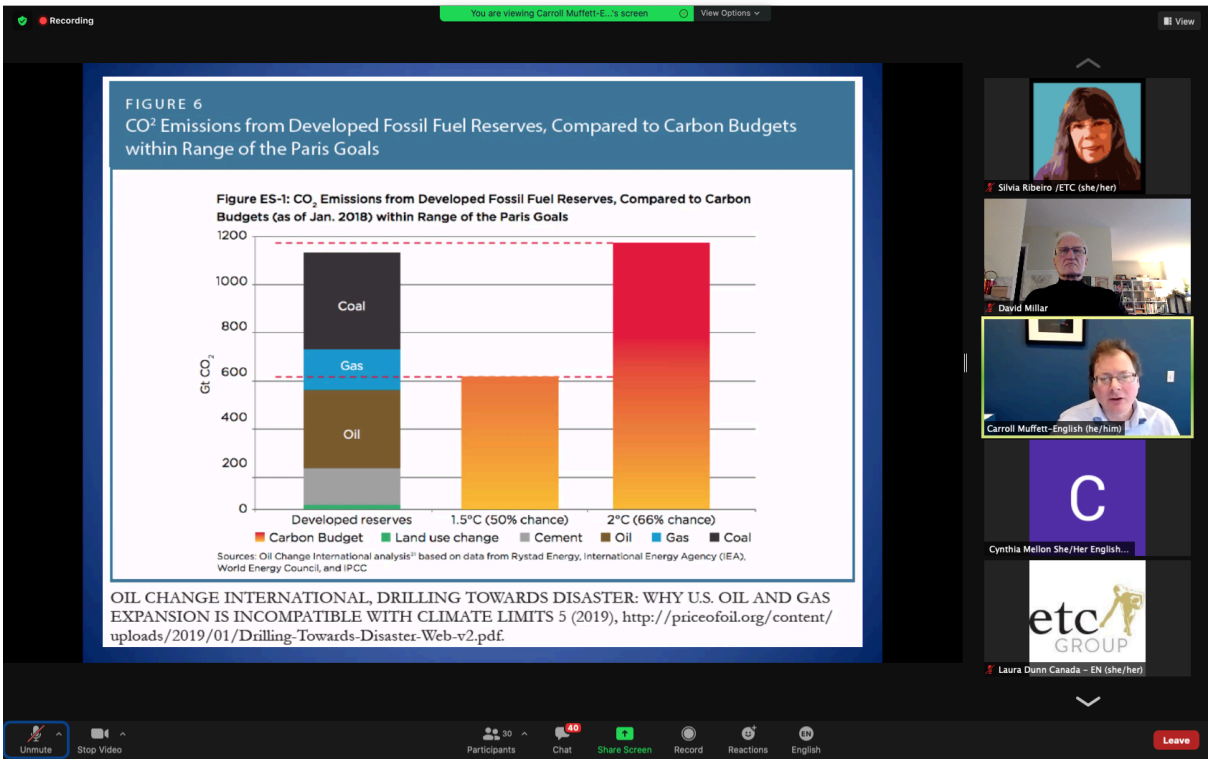

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Hands Off Mother Earth!
Tracking Legislation
• Storing CO2 and Lowering Emissions Act (SCALE)
"Requires Secretary of Energy to establish programs for carbon dioxide capture, transport, utilization, and storage and for other purposes."
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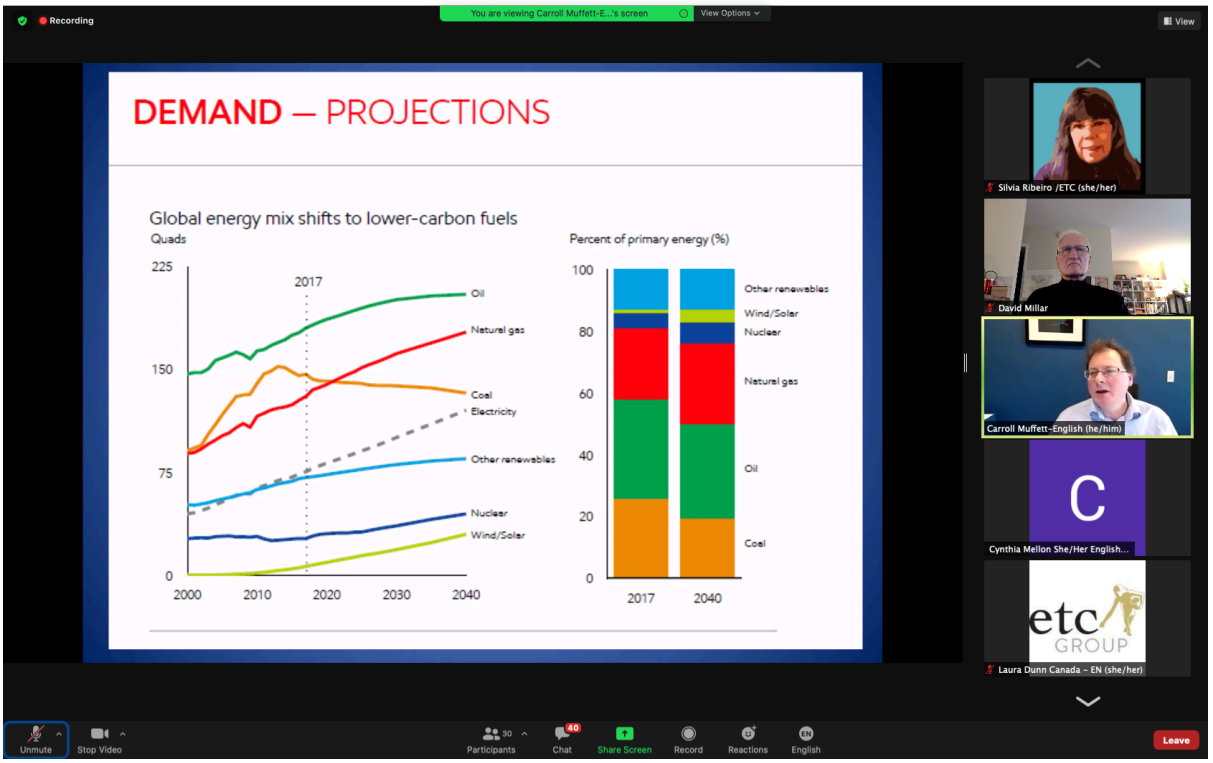


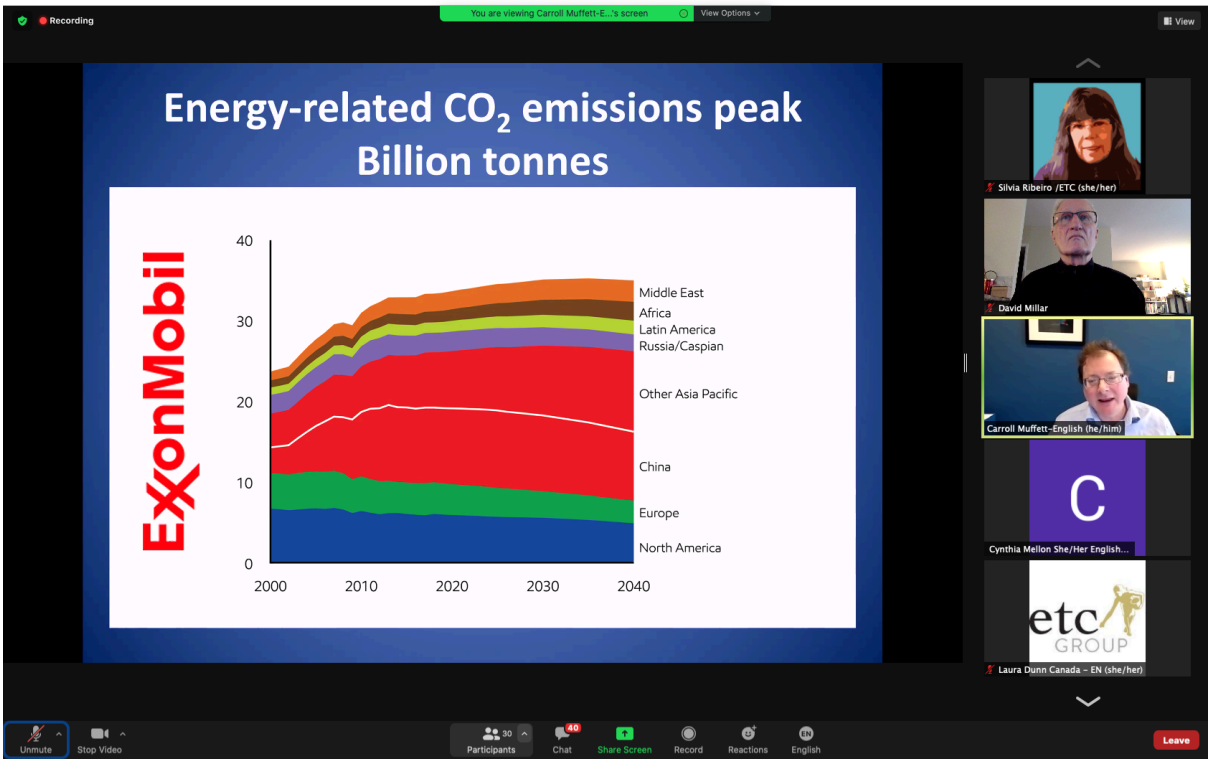
3. By Carroll Muffett of CIEL

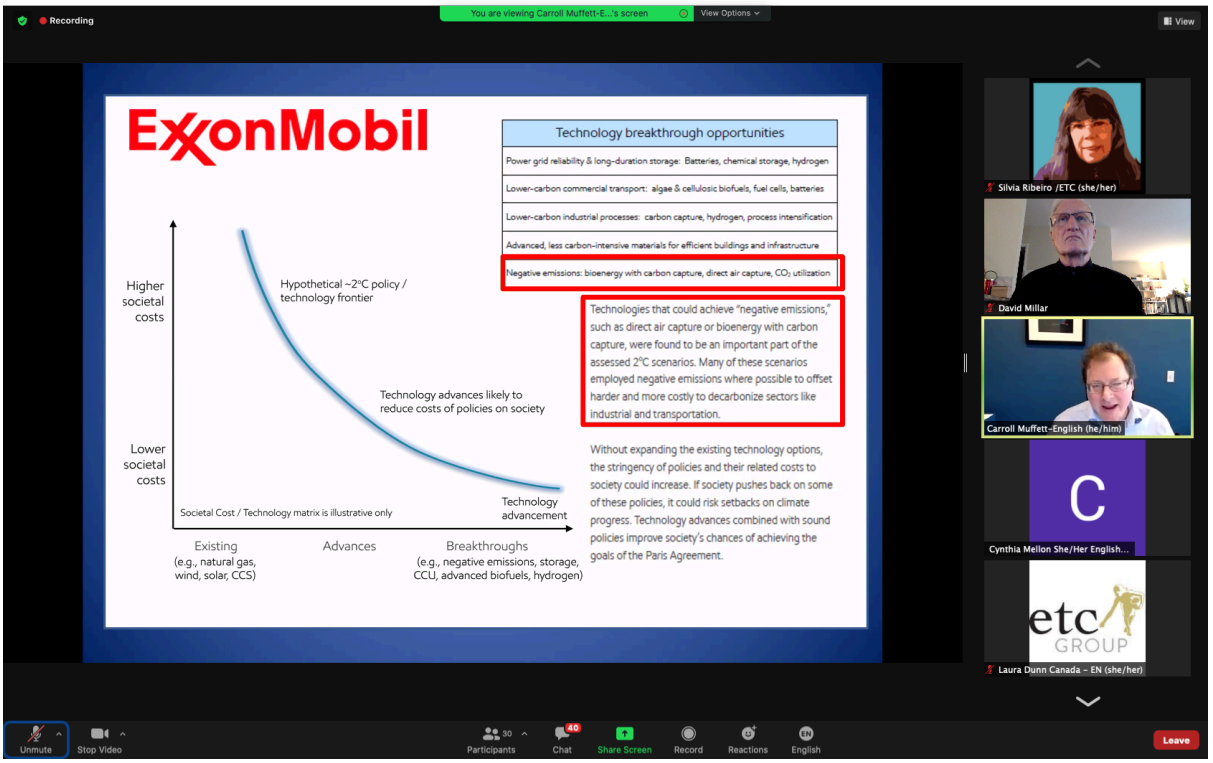


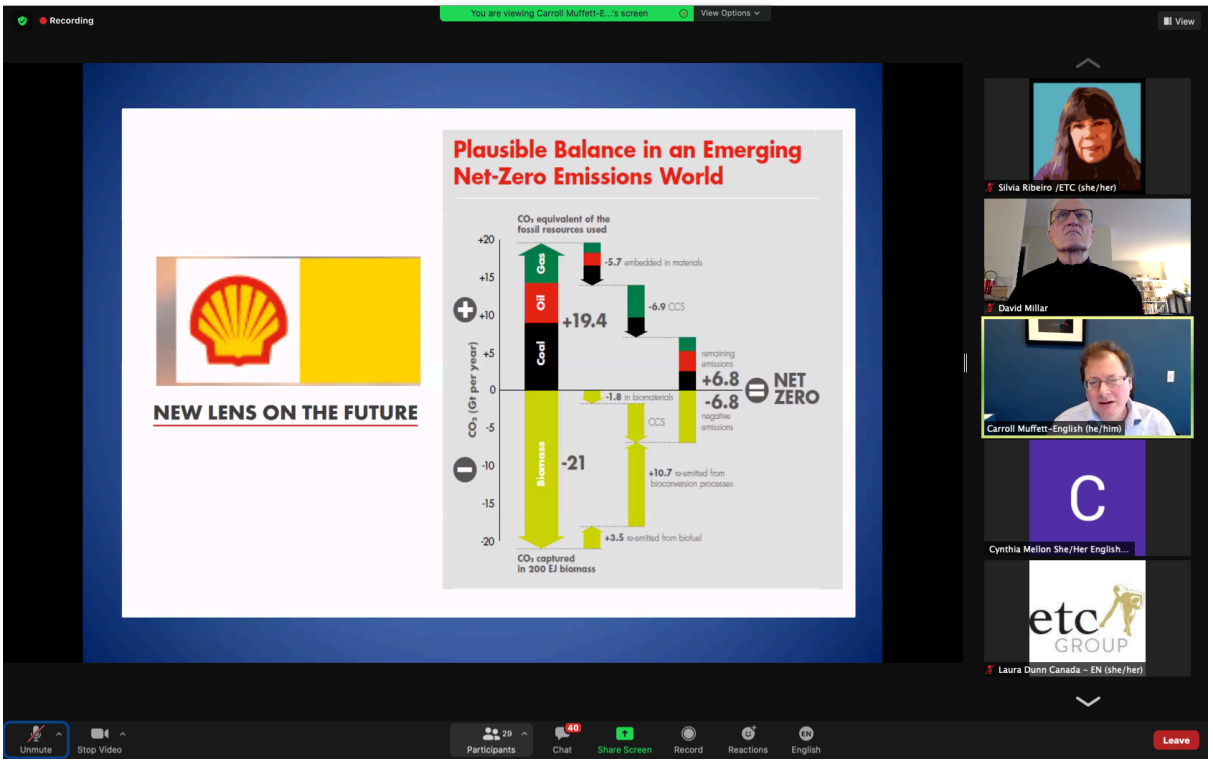

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IPCC SR 1.5 Pathway 1
Billion tonnes CO_2 per year ($GtCO_2$/yr)
P1
40
20
0
-20
2020
2060
2100
P1: A scenario in which social, business and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in 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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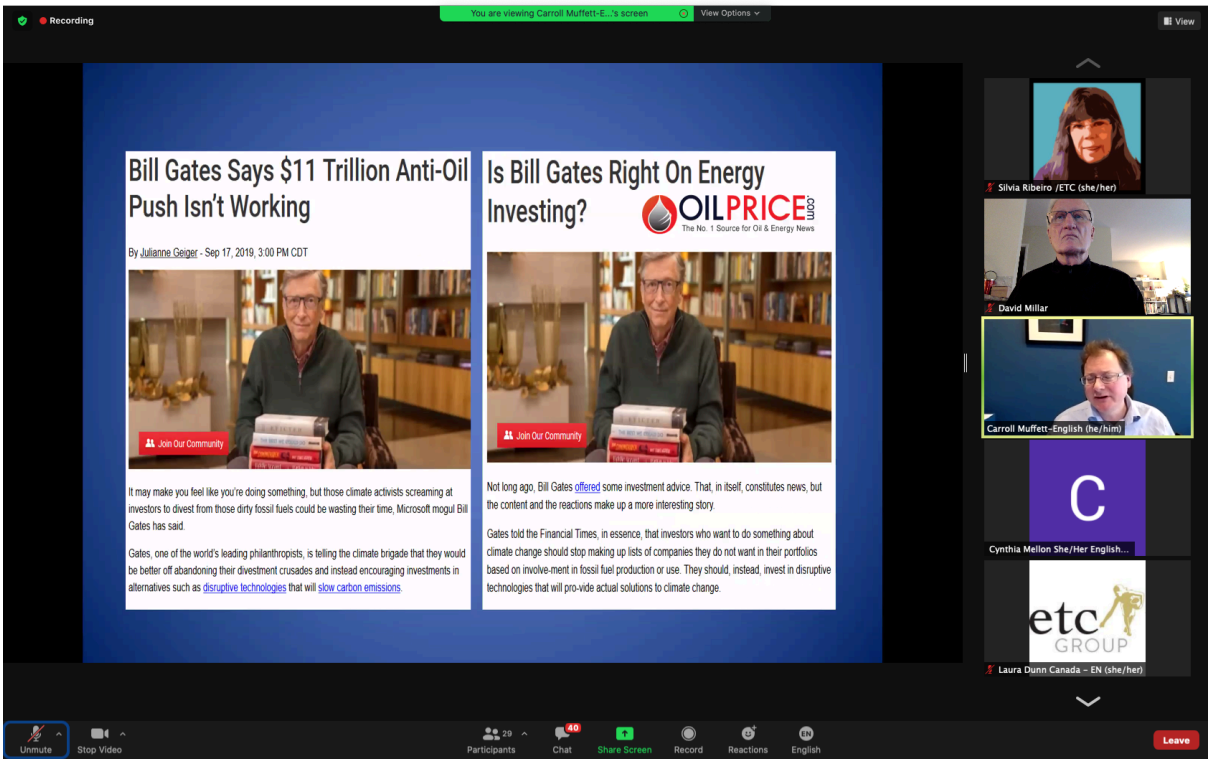

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FIGURE 6
CO^2 Emissions from Developed Fossil Fuel Reserves, Compared to Carbon Budgets within Range of the Paris Goals
Figure ES-1: CO_2 Emissions from Developed Fossil Fuel Reserves, Compared to Carbon Budgets (as of Jan. 2018) within Range of the Paris Goals
1200
1000
800
600
400
200
0
Gt CO_2
Coal
Gas
Oil
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 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://priceofoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v2.pdf.
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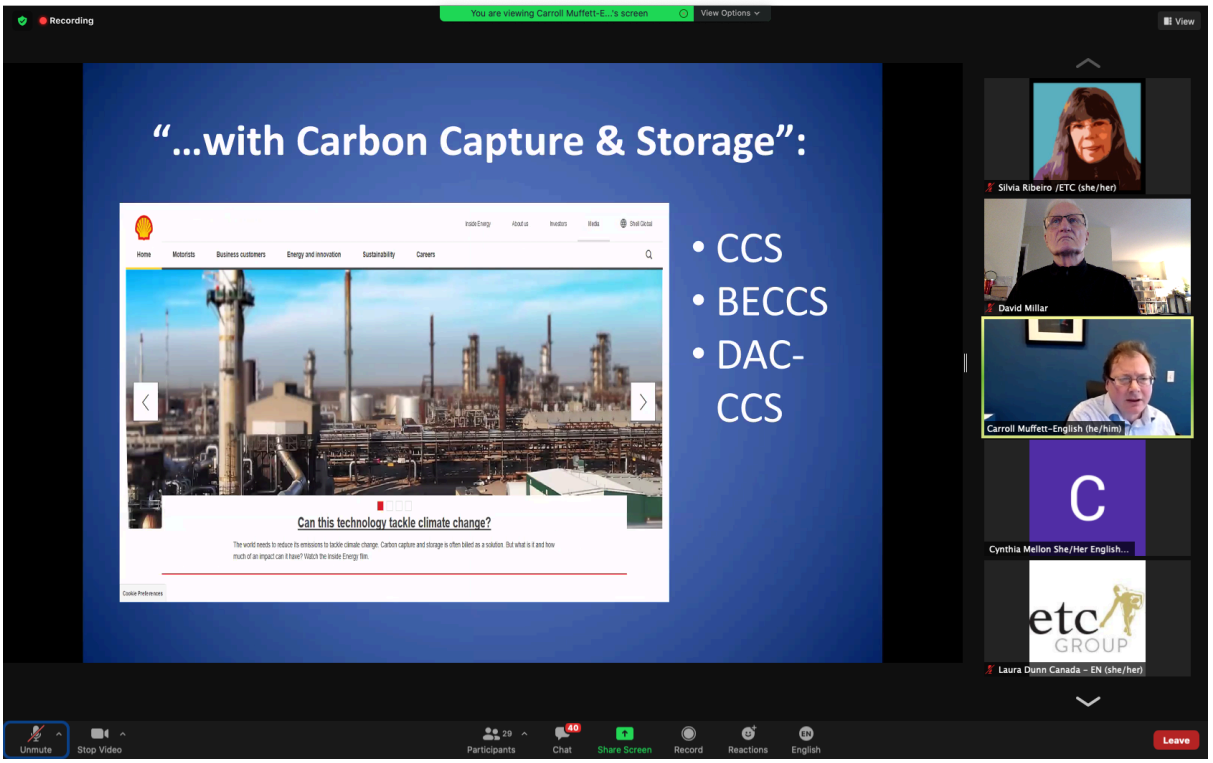

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DEMAND — PROJECTIONS
Global energy mix shifts to lower-carbon fuels
Quads
225
150
75
0
2017
Oil
Natural gas
Coal
Electricity
Other renewables
Nuclear
Wind/Solar
2000
2010
2020
2030
2040
Percent of primary energy (%)
100
80
60
40
20
0
Other renewables
Wind/Solar
Nuclear
Natural gas
Oil
Coal
2017
2040
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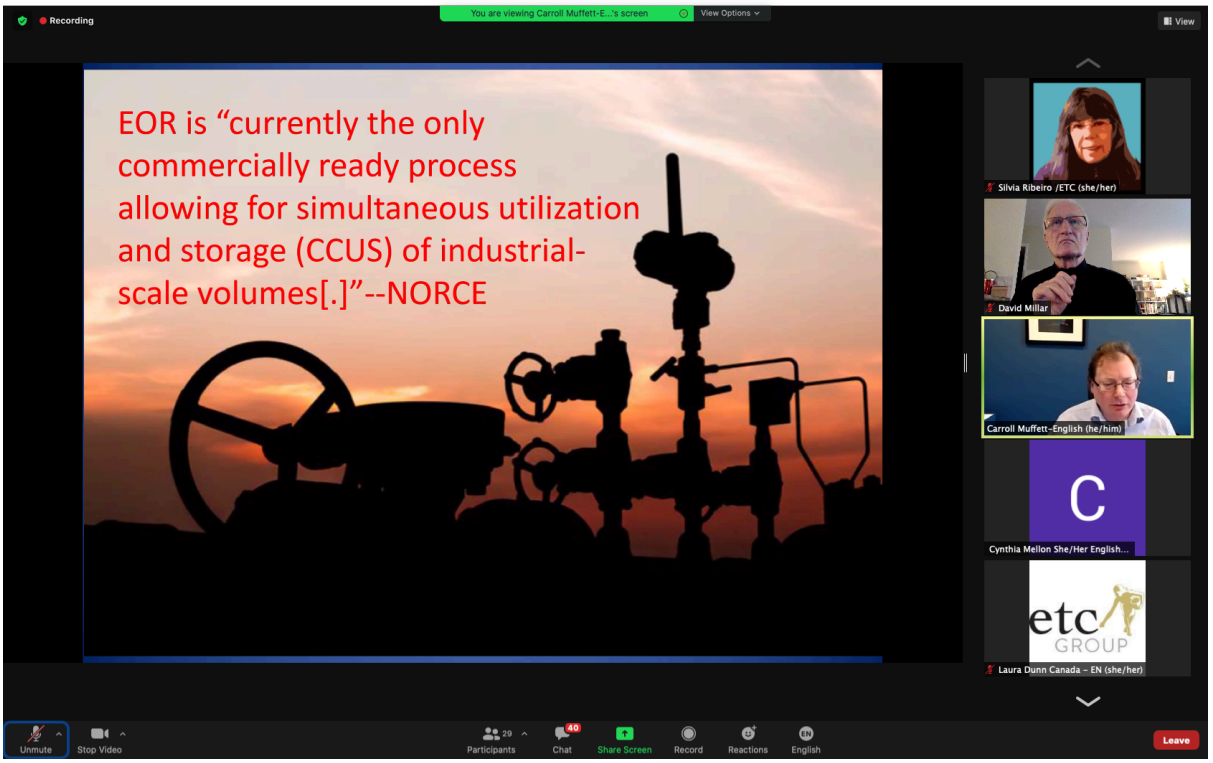

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Energy-related CO_2 emissions peak
Billion tonnes
ExxonMobil
40
30
20
10
0
2000
2010
2020
2030
2040
Middle East
Africa
Latin America
Russia/Caspian
Other Asia Pacific
China
Europe
North America
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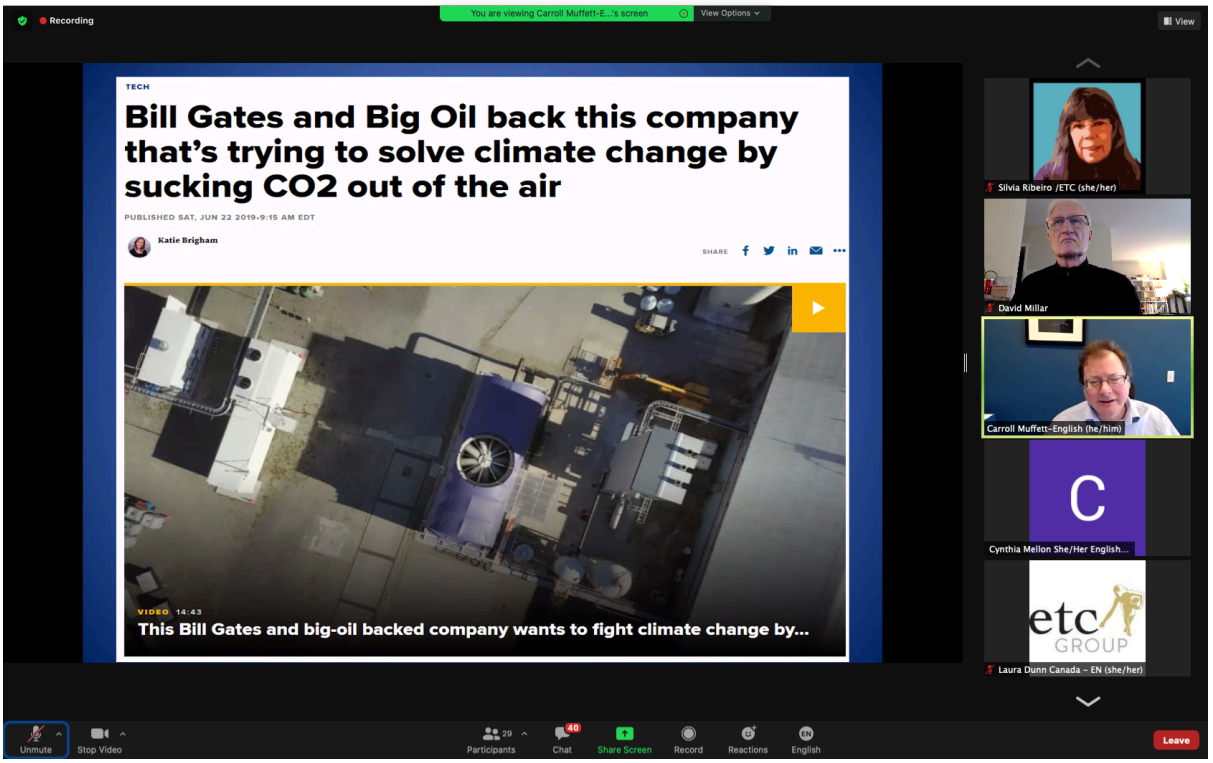

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ExxonMobil
Technology breakthrough opportunities
Power grid reliability & long-duration storage: Batteries, chemical storage, hydrogen
Lower-carbon commercial transport: algae & cellulosic biofuels, fuel cells, batteries
Lower-carbon industrial processes: carbon capture, hydrogen, process intensification
Advanced, less carbon-intensive materials for efficient buildings and infrastructure
Negative emissions: bioenergy with carbon capture, direct air capture, CO2 utilization
Higher societal costs
Hypothetical ~2°C policy / technology frontier
Technology advances likely to reduce costs of policies on society
Lower societal costs
Technologies that could achieve "negative emissions," such as direct air capture or bioenergy with carbon capture, were found to be an important part of the assessed 2°C scenarios. Many of these scenarios employed negative emissions where possible to offset harder and more costly to decarbonize sectors like industrial and transportation.
Societal Cost / Technology matrix is illustrative only
Technology advancement
Existing (e.g., natural gas, wind, solar, CCS)
Advances
Breakthroughs (e.g., negative emissions, storage, CCU, advanced biofuels, hydrogen)
Without expanding the existing technology options, the stringency of policies and their related costs to society could increase. If society pushes back on some of these policies, it could risk setbacks on climate progress. Technology advances combined with sound policies improve society's chances of achieving the goals of the Paris Agreement.
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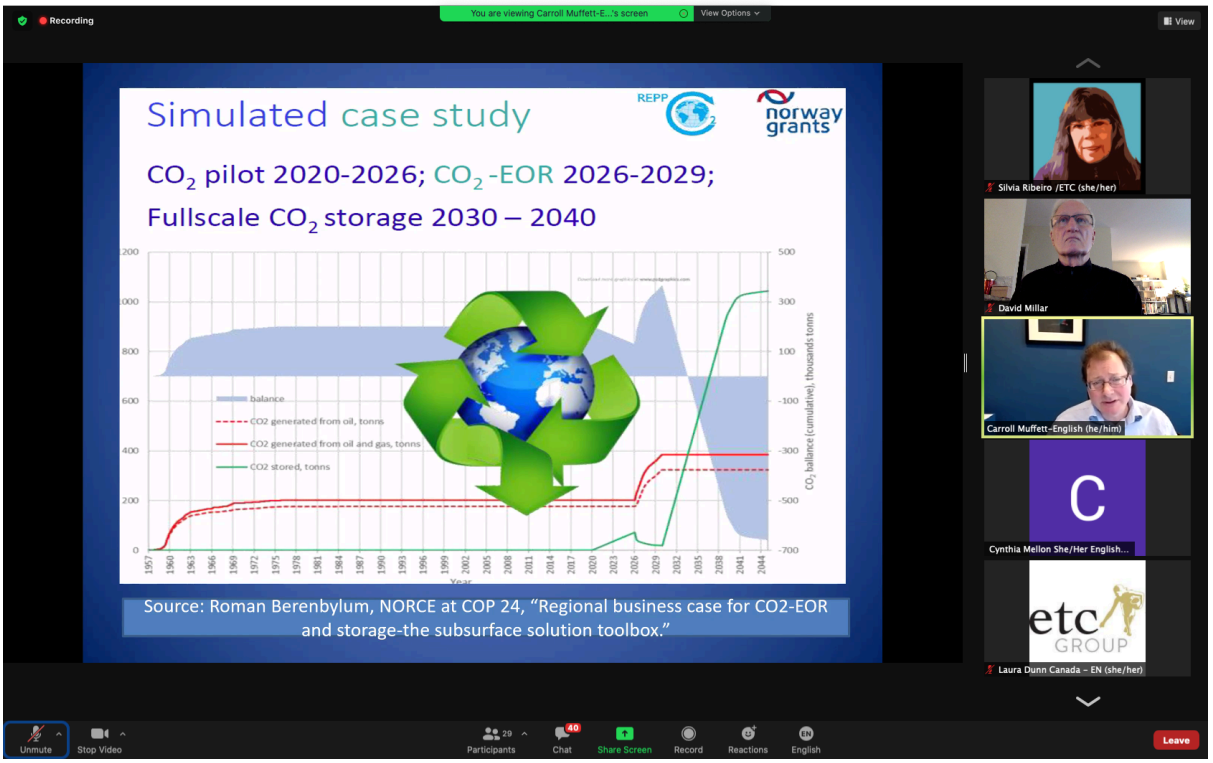

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NEW LENS ON THE FUTURE
Plausible Balance in an Emerging Net-Zero Emissions World
CO2 equivalent of the fossil resources used
Gas
Oil
Coal
Biomass
+19.4
-5.7 embedded in materials
-6.9 CCS
remaining emissions
+6.8
-6.8
NET ZERO
-1.8 in biomaterials
CCS
negative emissions
-21
+10.7 re-emitted from bioconversion processes
+3.5 re-emitted from biofuel
CO2 (Gt per year)
+20
+15
+10
+5
0
-5
-10
-15
-20
CO2 captured in 200 EJ biomass
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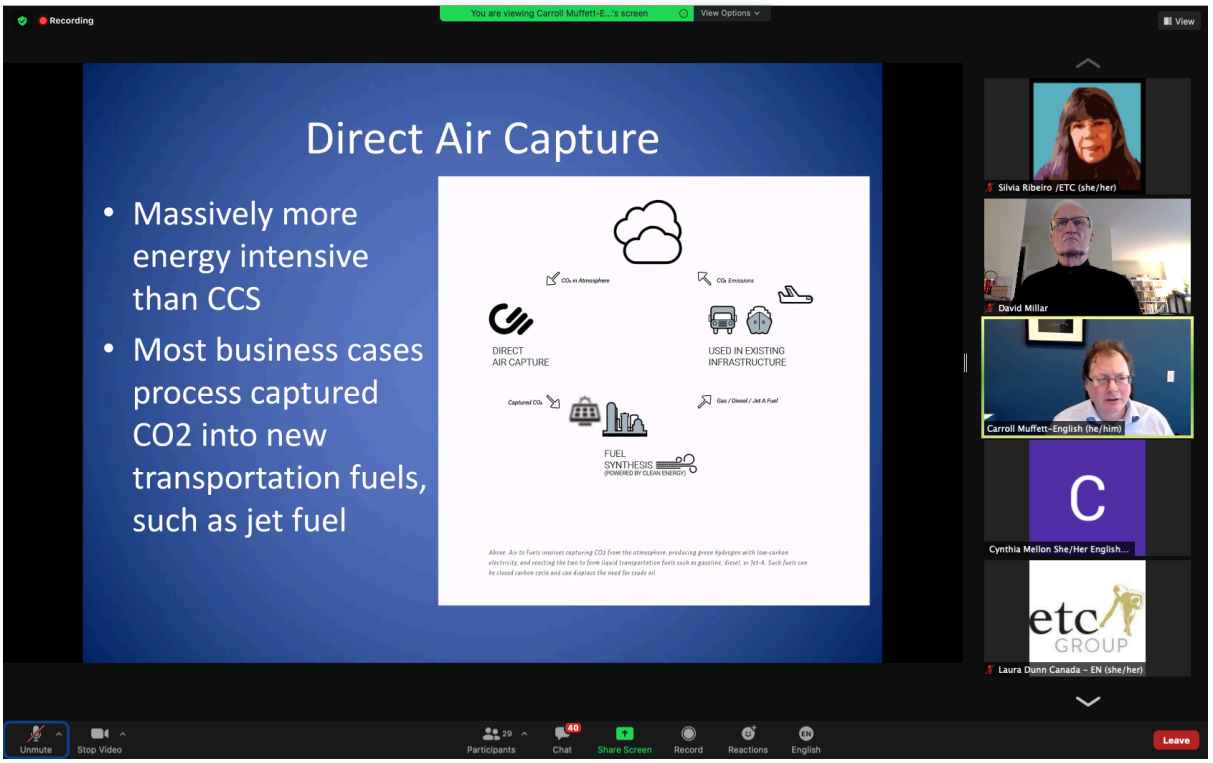

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Bill Gates Says $11 Trillion Anti-Oil Push Isn't Working
By Julianne Geiger - Sep 17, 2019, 3:00 PM CDT
Join Our Community
It may make you feel like you're doing something, but those climate activists screaming at investors to divest from those dirty 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.com
The No. 1 Source for Oil & Energy News
Join Our Community
Not long ago, Bill Gates offered some investment advice. That, in itself, constitutes news, but the content and the reactions make up a more interesting story.
Gates told the Financial Times, in essence, that investors who want to do something about climate change should stop making up lists of companies they do not want in their portfolios based on involve-ment in fossil fuel production or use. They should, instead, invest in disruptive technologies that will pro-vide actual solutions to climate change.
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"...with Carbon Capture & Storage":
Home
Motorists
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 billed as a solution. But what is it and how much of an impact can it have? Watch the inside Energy film.
• CCS
• BECCS
• DAC-CCS
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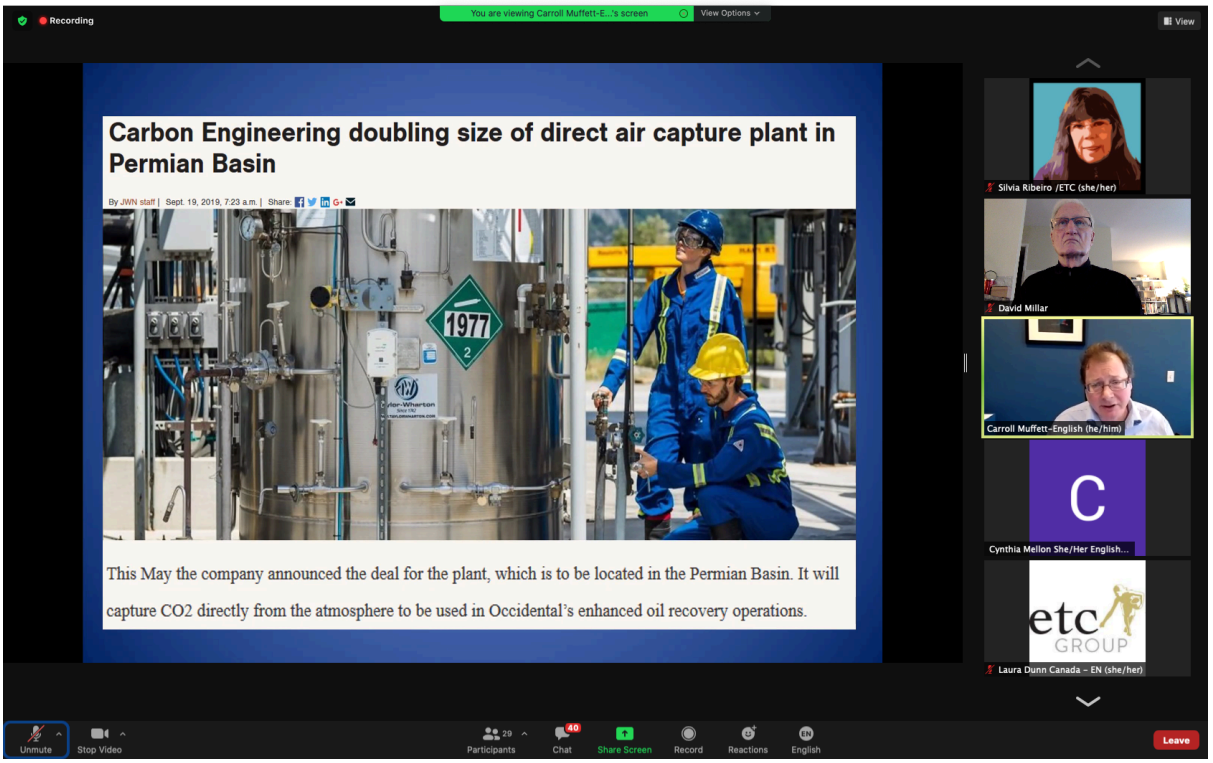

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EOR is “currently the only commercially ready process allowing for simultaneous utilization and storage (CCUS) of industrial-scale volumes[.]”--NORCE
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TECH
Bill Gates and Big Oil back this company 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
VIDEO 14:43
This Bill Gates and big-oil backed company wants to fight climate change by...
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Simulated case study
REPP
norway grants
CO_2 pilot 2020-2026; CO_2-EOR 2026-2029;
Fullscale CO_2 storage 2030 – 2040
balance
CO2 generated from oil, tonns
CO2 generated from oil and gas, tonns
CO2 stored, tonns
CO_2 balance (cumulative), thousands tonns
Year
Source: Roman Berenbylum, NORCE at COP 24, "Regional business case for CO2-EOR and storage-the subsurface solution toolbox."
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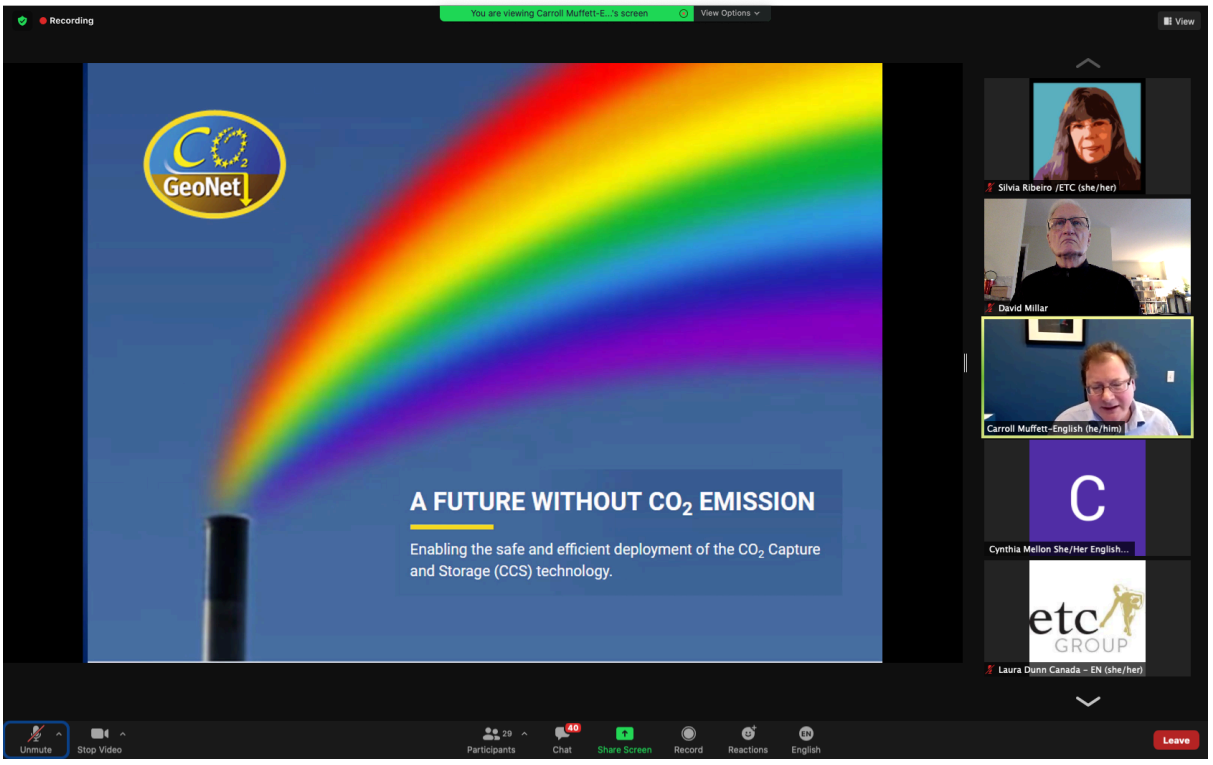

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Direct Air Capture
• Massively more energy intensive than CCS
• Most business cases process captured CO2 into new transportation fuels, such as jet fuel
CO₂ in Atmosphere
CO₂ Emissions
DIRECT AIR CAPTURE
USED IN EXISTING INFRASTRUCTURE
Captured CO₂
Gas / Diesel / Jet A Fuel
FUEL SYNTHESIS
(POWERED BY CLEAN ENERGY)
Above: Air to Fuels involves capturing CO2 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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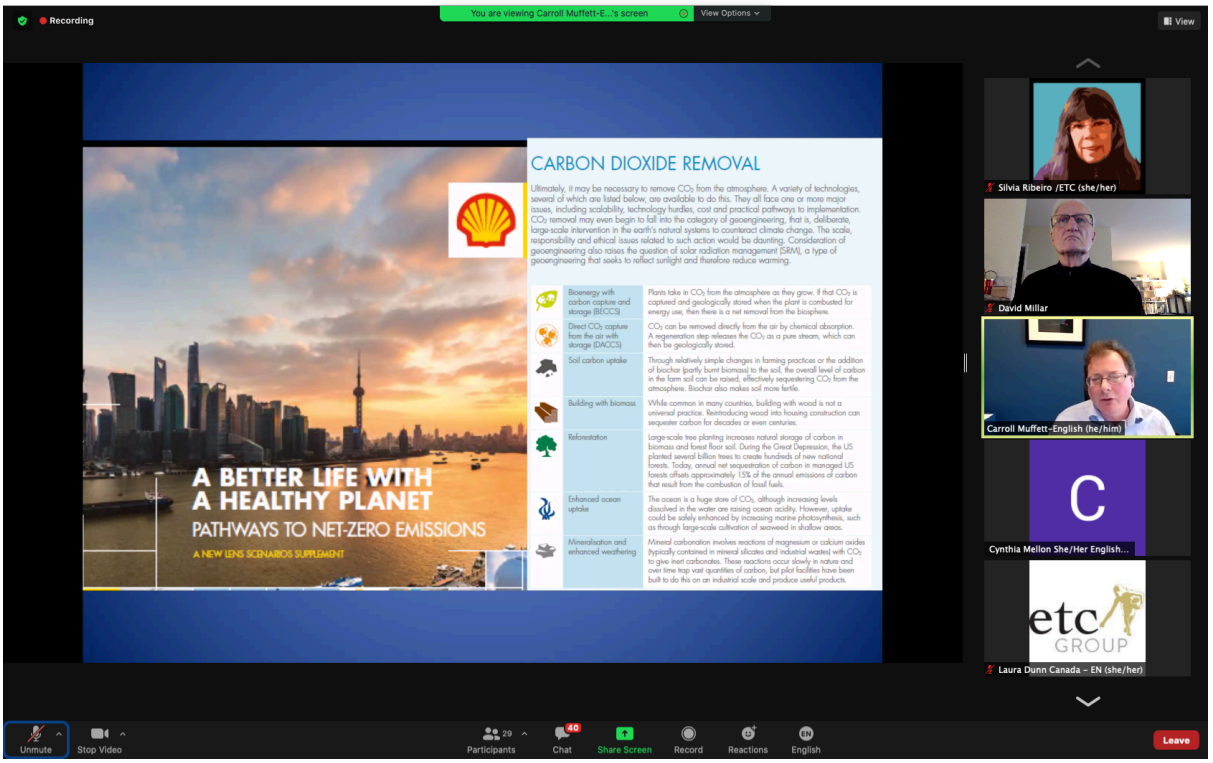

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Chevron's Fig Leaf Part 4: Carbon Engineering's Only Market Is Pumping More Oil
BHP
Chevron
OXY
In recent years, direct oil industry investments in DAC have accelerated, with EOR identified as the key market opportunity.
Source: Michael Barnard, Clean Technica, April 19, 2019
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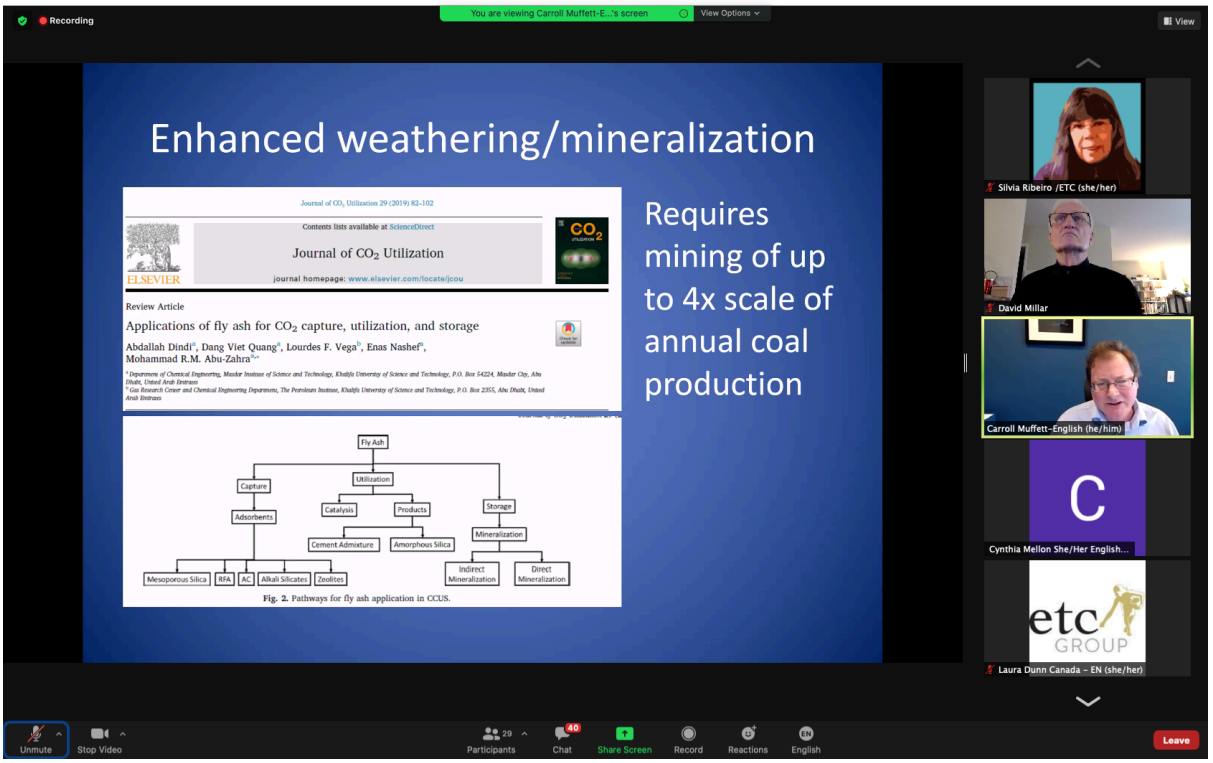

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Carbon Engineering doubling size of direct air capture plant in Permian Basin
By JWN staff | Sept. 19, 2019, 7:23 a.m. | Share:
1977
This May the company announced the deal for the plant, which is to be located in the Permian Basin. It will capture CO2 directly from the atmosphere to be used in Occidental's enhanced oil recovery operations.
Silvia Ribeiro /ETC (she/her)
David Millar
Carroll Muffett-English (he/him)
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Cynthia Mellon She/Her English...
etc GROUP
Laura Dunn Canada - EN (she/her)
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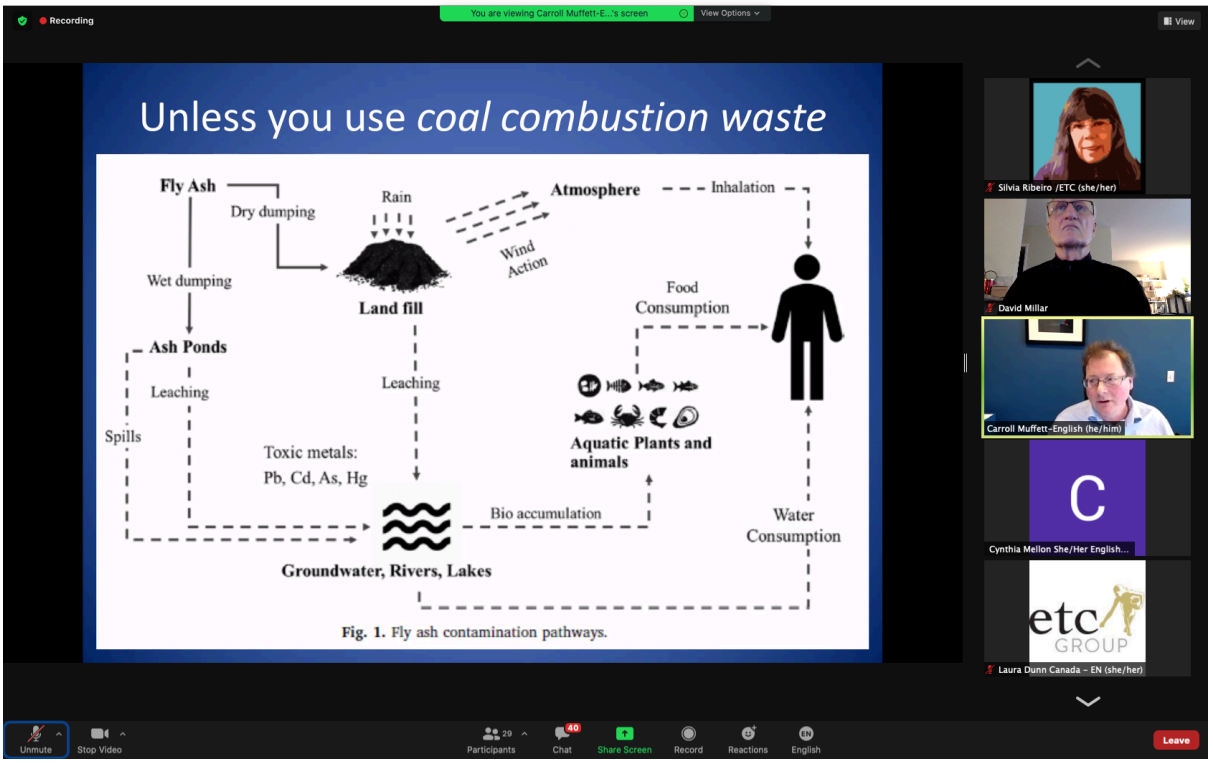

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IEA-GHG
'Unburnable Carbon'
Fossil fuel reserves which cannot be used and their GHG emitted if the world is to adhere to a given atmospheric carbon budget
FINANCIAL TIMES
Bank of England to examine financial risks linked to fossil fuels
IEAGHG Report 2016-05. Contractor: SGI at Imperial College UK
Global CO_2 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'
Silvia Ribeiro /ETC (she/her)
David Millar
Carroll Muffett-English (he/him)
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Cynthia Mellon She/Her English...
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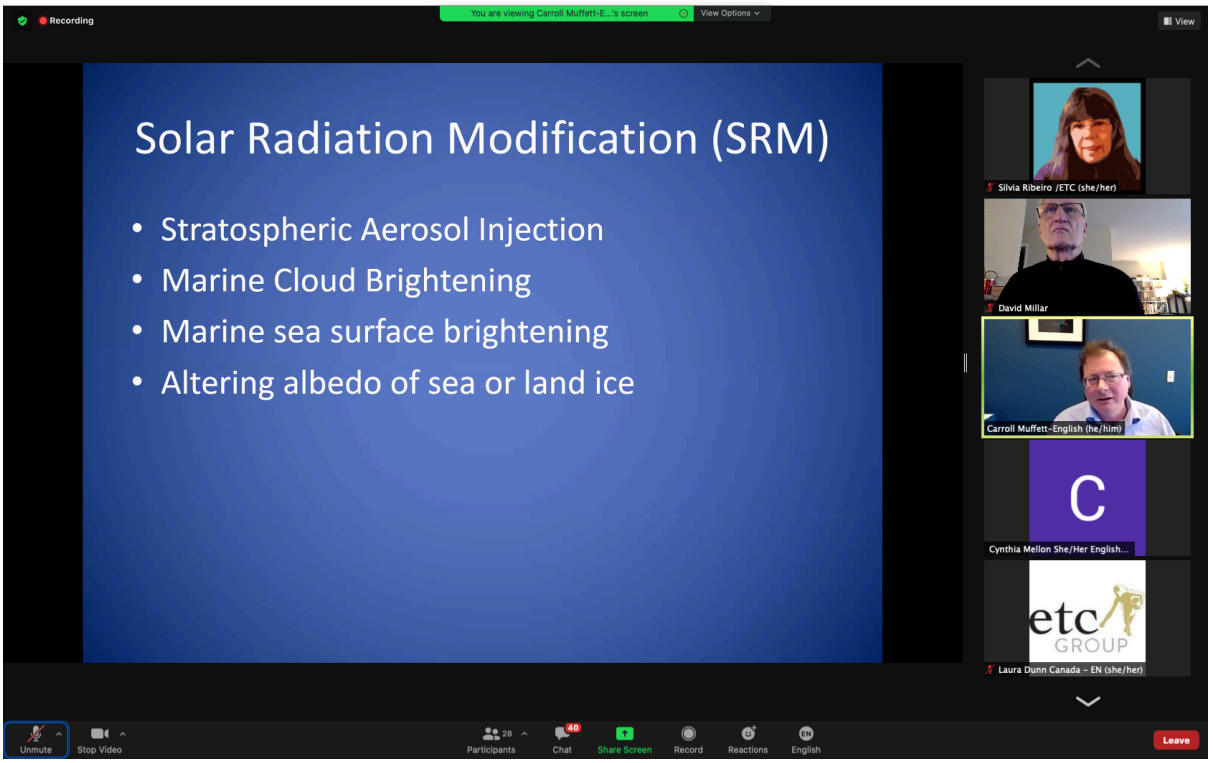

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SOUTHERN COMPANY
Chevron
TOTAL
J-POWER
CIAB
ExxonMobil
EPRI
JÜLICH
equinor
ieaghg
PETROBRAS
Khalifa University
JGC
RWE
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GeoNet
A FUTURE WITHOUT CO_2 EMISSION
Enabling the safe and efficient deployment of the CO_2 Capture and Storage (CCS) technology.
Silvia Ribeiro /ETC (she/her)
David Millar
Carroll Muffett-English (he/him)
Cynthia Mellon She/Her English...
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A BETTER LIFE WITH A HEALTHY PLANET
PATHWAYS TO NET-ZERO EMISSIONS
A NEW LENS SCENARIOS SUPPLEMENT
CARBON DIOXIDE REMOVAL
Ultimately, it may be necessary to remove CO_2 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_2 removal may even begin to fall into the category of geoengineering, that is, deliberate, large-scale intervention in the earth's natural systems to counteract climate change. 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.
Bioenergy with carbon capture and storage (BECCS)
Plants take in CO_2 from the atmosphere as they grow. If that CO_2 is captured and geologically stored when the plant is combusted for energy use, then there is a net removal from the biosphere.
Direct CO_2 capture from the air with storage (DACCS)
CO_2 can be removed directly from the air by chemical absorption. A regeneration step releases the CO_2 as a pure stream, which can then be geologically stored.
Soil carbon uptake
Through relatively simple changes in farming practices or the addition of biochar (partly burnt biomass) to the soil, the overall level of carbon in the farm soil can be raised, effectively sequestering CO_2 from the atmosphere. Biochar also makes soil more fertile.
Building with biomass
While common in many countries, building with wood is not a universal practice. Reintroducing wood into housing construction 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 several billion trees to create hundreds of new national forests. Today, annual net sequestration of carbon in managed US forests offsets approximately 15% of the annual emissions of carbon that result from the combustion of fossil fuels.
Enhanced ocean uptake
The ocean is a huge store of CO_2, 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 cultivation of seaweed in shallow areas.
Mineralisation and enhanced weathering
Mineral carbonation involves reactions of magnesium or calcium oxides (typically contained in mineral silicates and industrial wastes) with CO_2 to give inert carbonates. These reactions occur slowly in nature and over time trap vast quantities of carbon, but pilot facilities have been built to do this on an industrial scale and produce useful products.
Silvia Ribeiro /ETC (she/her)
David Millar
Carroll Muffett-English (he/him)
Cynthia Mellon She/Her English...
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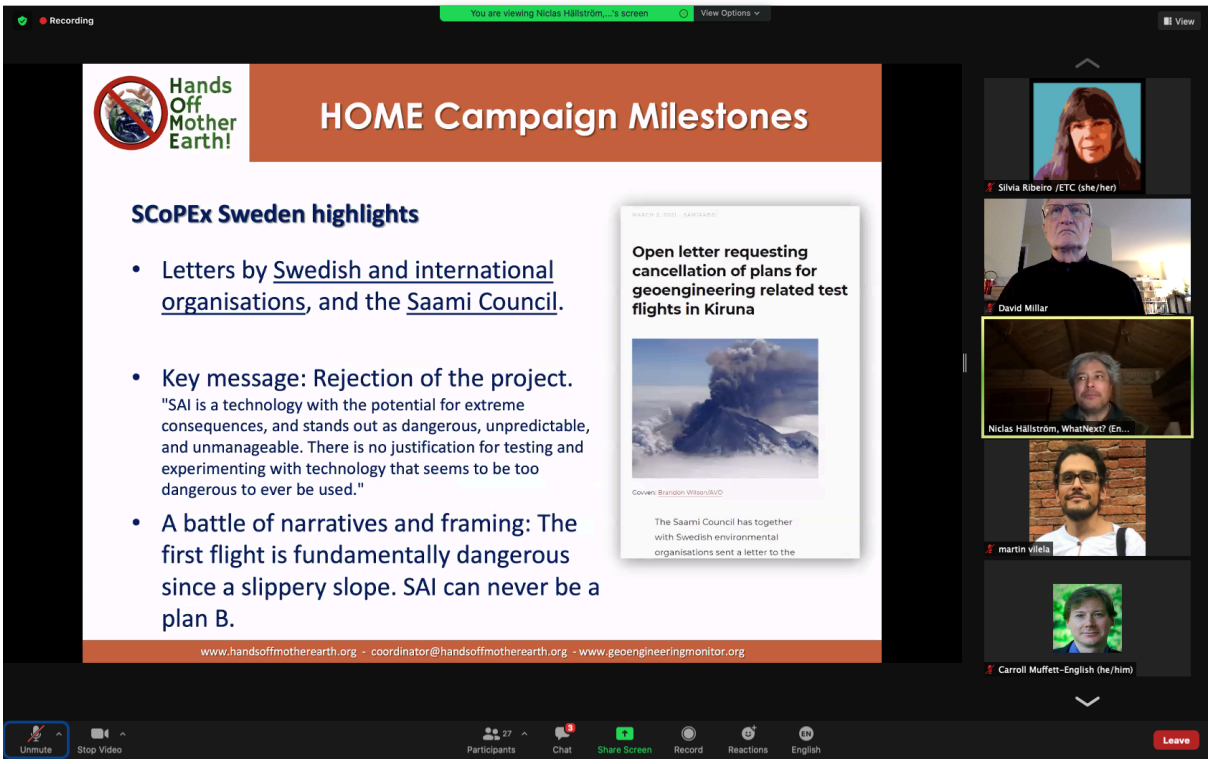

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Enhanced weathering/mineralization
Journal of CO_2 Utilization 29 (2019) 82–102
Contents lists available at ScienceDirect
Journal of CO_2 Utilization
journal homepage: www.elsevier.com/locate/jcou
Review Article
Applications of fly ash for CO_2 capture, utilization, and storage
Abdallah Dindi, Dang Viet Quang, Lourdes F. Vega, Enas Nashef, Mohammad R.M. Abu-Zahra
Fig. 2. Pathways for fly ash application in CCUS.
Requires mining of up to 4x scale of annual coal production
Silvia Ribeiro /ETC (she/her)
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Unless you use *coal combustion waste*
Fly Ash
Dry dumping
Rain
Atmosphere
Inhalation
Wind Action
Wet dumping
Land fill
Food Consumption
Ash Ponds
Leaching
Leaching
Spills
Toxic metals:
Pb, Cd, As, Hg
Aquatic Plants and animals
Bio accumulation
Water Consumption
Groundwater, Rivers, Lakes
Fig. 1. Fly ash contamination pathways.
Silvia Ribeiro /ETC (she/her)
David Millar
Carroll Muffett-English (he/him)
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Solar Radiation Modification (SRM)
• Stratospheric Aerosol Injection
• Marine Cloud Brightening
• Marine sea surface brightening
• Altering albedo of sea or land ice
Silvia Ribeiro /ETC (she/her)
David Millar
Carroll Muffett-English (he/him)
Cynthia Mellon She/Her English...
Laura Dunn Canada - EN (she/her)
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4. By Niclas Hällstätt of WhatsNext, Sweden

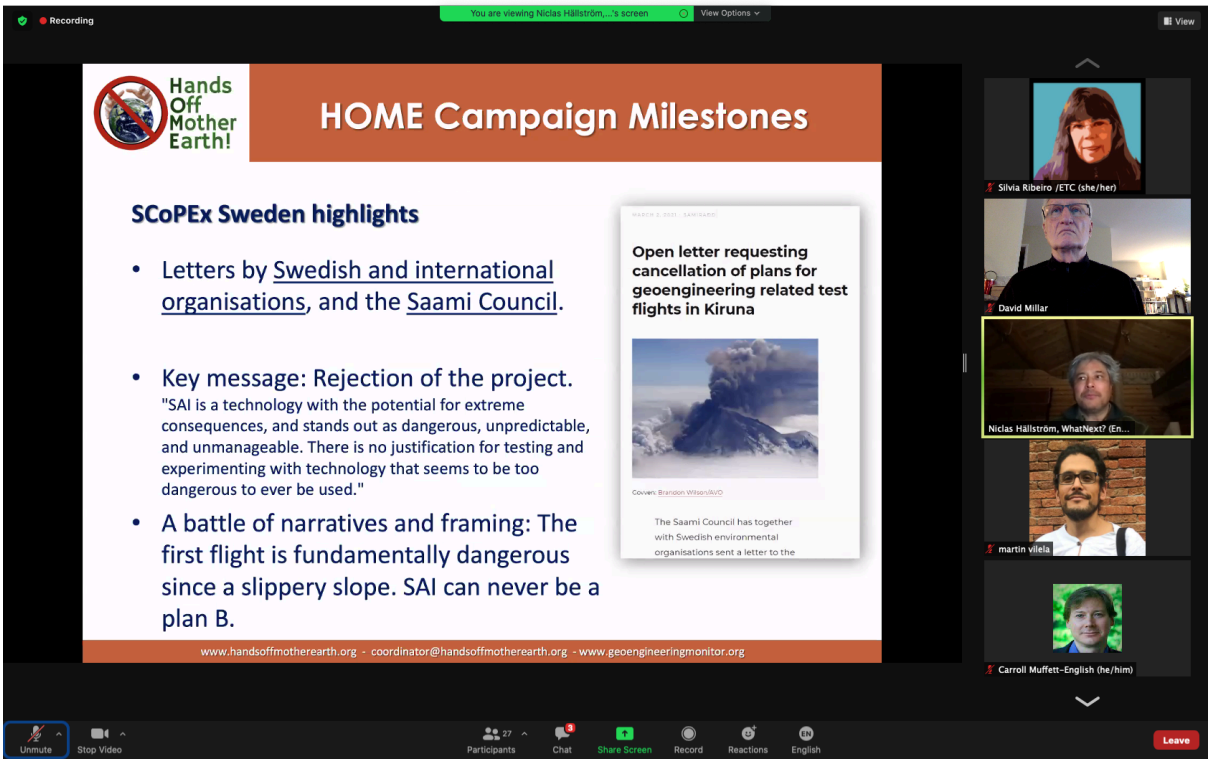




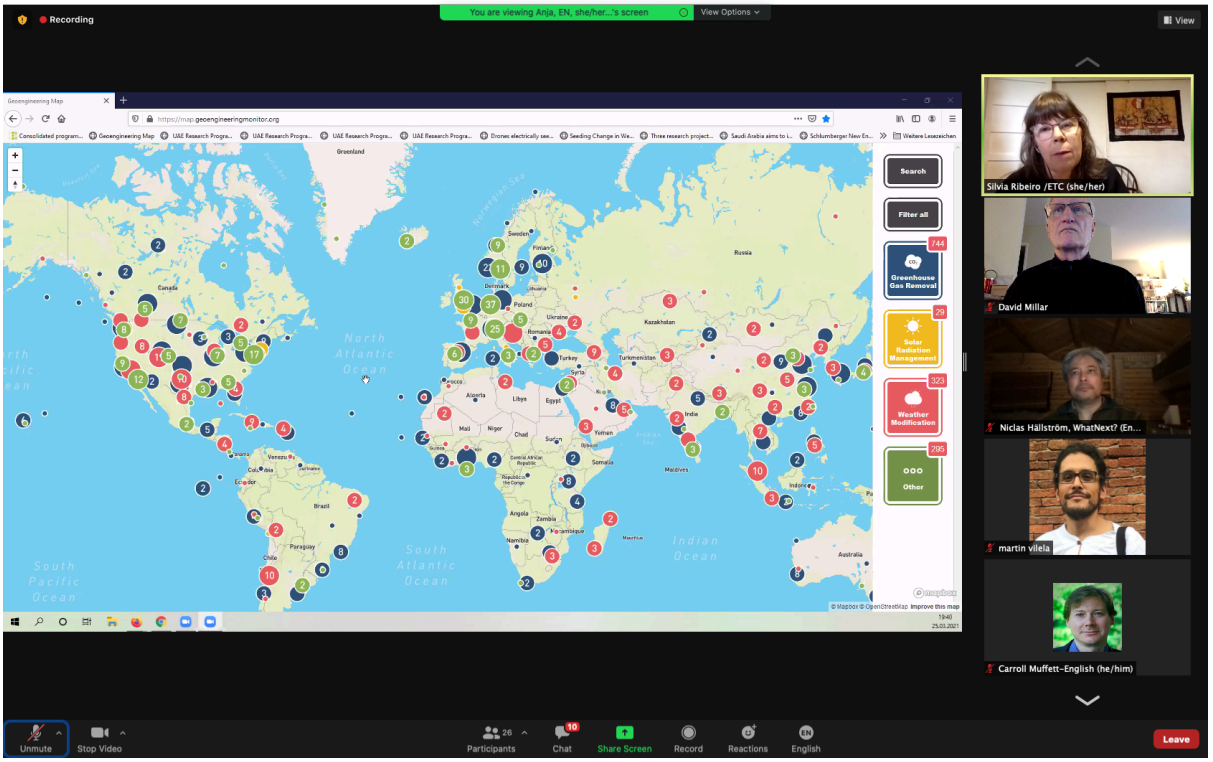




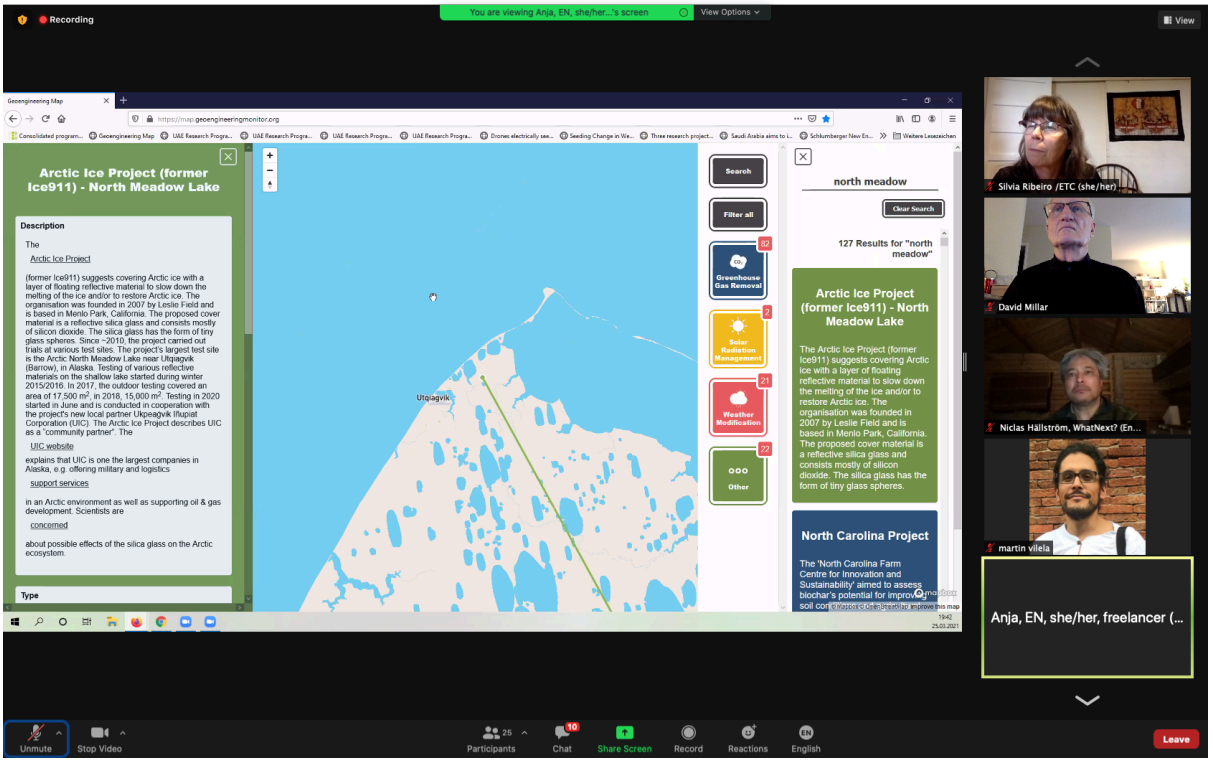
1 Apr 2021 after widespread protests, Swedish Space Corporation has cancelled the balloon test
https://etcgroup.org/content/saami-swedes-and-civil-society-stop-solar-geoengineering-trial-balloon



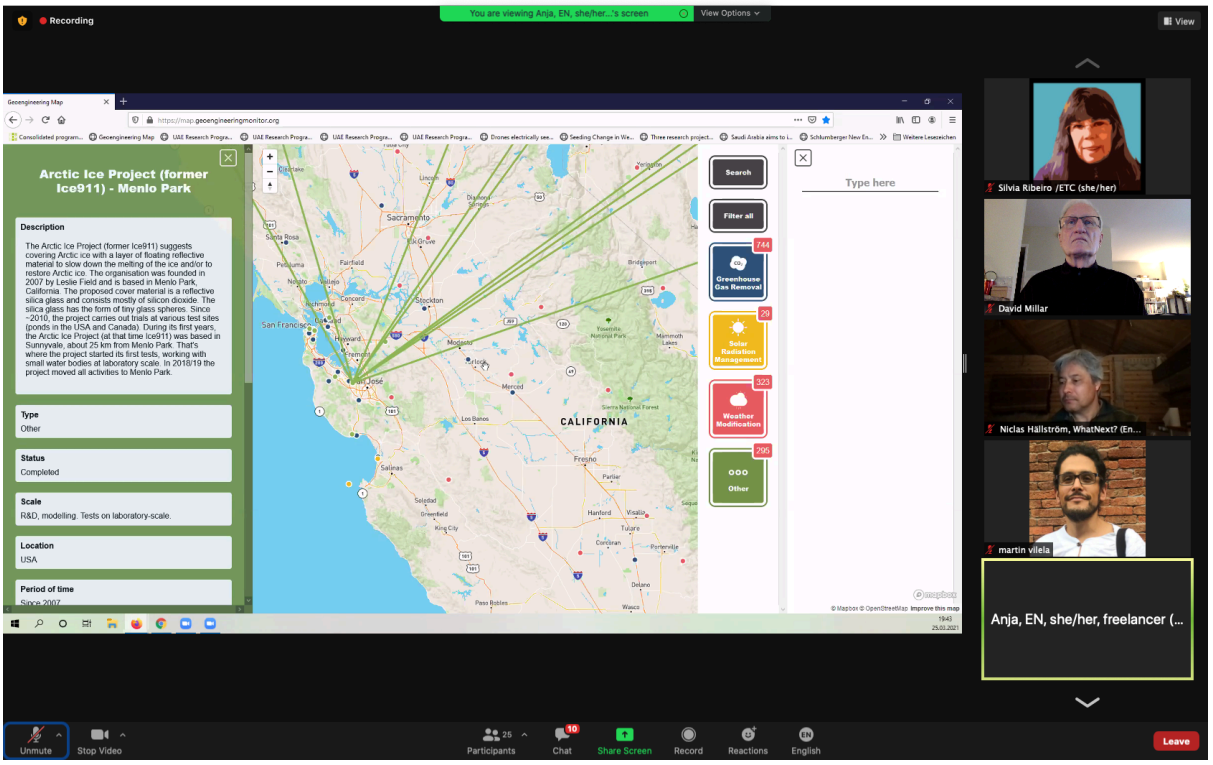
5. Anja Chalman of geoengineeringmonitor.org explains how to use their interactive map system which tracks hundreds of projects worldwide



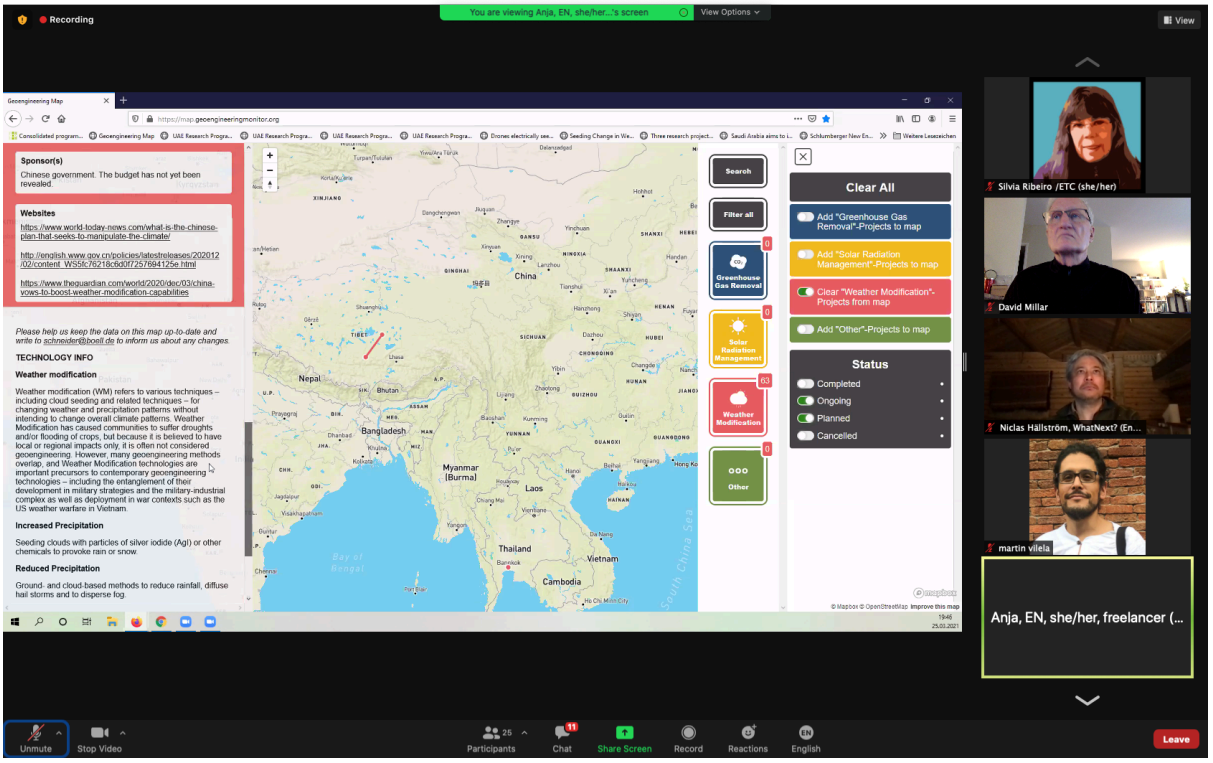
For instance, clock on a button in Alaska. ArcticIce (formerly Ice911) proposes to increase albedo by spreading silica beads on Alaskan sea ice. No consultation with native peoples, risk of pollution, changes to wildlife & ecosystems. Read description of project in lefthand column.



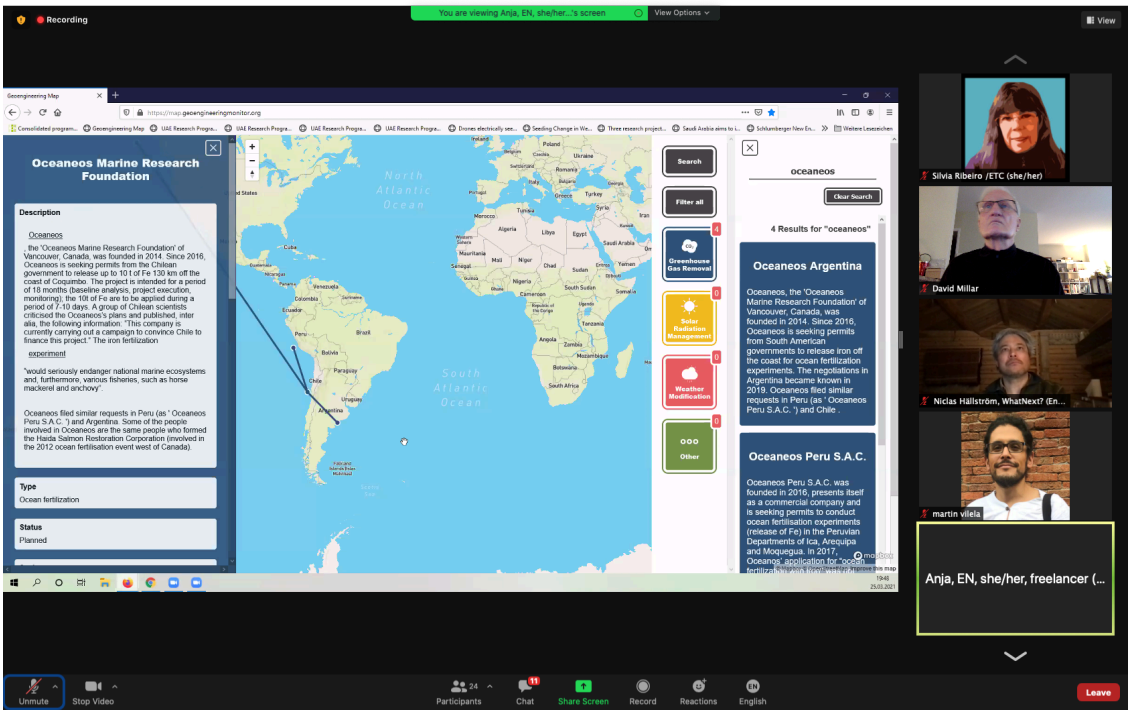
Green lines link to financial and corporate sponsors, lobbyists.



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 C)2. Supposedly stops ocean acidification (due to climate change, increasing nability 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

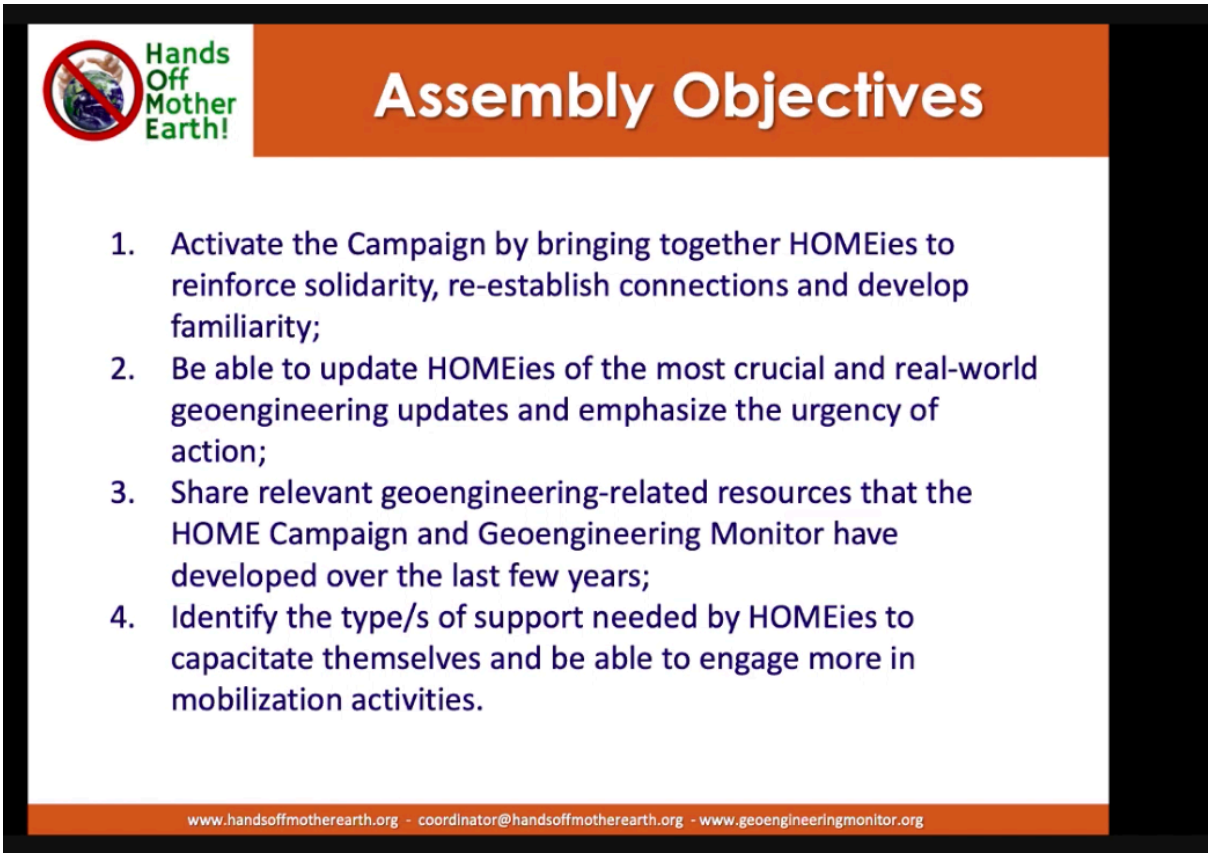
, the 'Oceaneos Marine Research Foundation' of Vancouver, Canada, was founded in 2014. Since 2016, Oceaneos is seeking permits from the Chilean government to release up to 10 t of Fe 130 km off the coast of Coquimbo. The project is intended for a period of 18 months (baseline analysis, project execution, 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

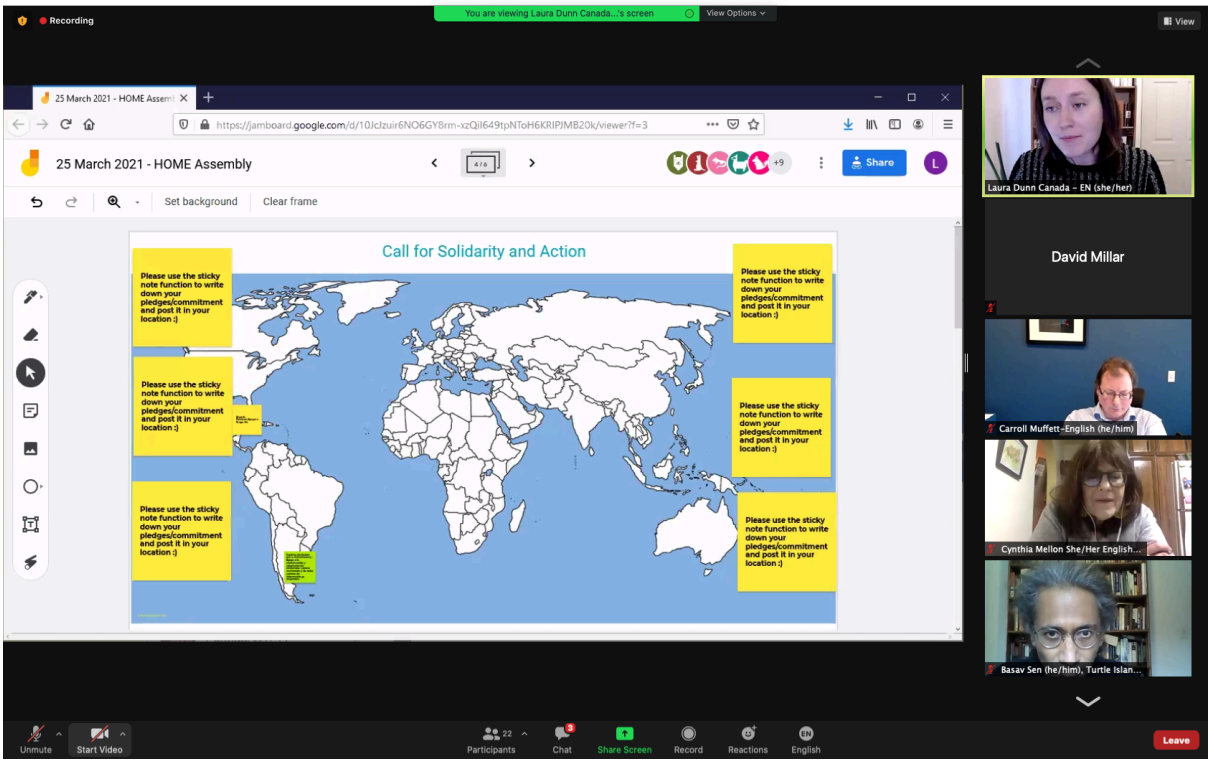
experiment

"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.





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.