Geneva Beat Plastic Pollution Dialogues | Plastics, Climate and Air Pollution
10 December | 14:00 -15:00 CET

#GENeva #BeatPlasticPollution
 Speakers

H.E. Amb. Miriam SHEARMAN  
Deputy Permanent Representative,  
Permanent Mission of the United  
Kingdom to the United Nations and  
other international organizations

Anare LEWENIGILA  
Deputy Permanent Representative of  
the Republic of Fiji to the United  
Nations in Geneva

Steven FEIT  
Senior Attorney, Climate and Energy  
Program, CIEL

Steve ALLEN  
Microplastics Researcher, University  
of Strathclyde

Deonie ALLEN  
Research Fellow, University of  
Strathclyde

Helena MOLIN VALDES  
Head, Climate and Clean Air Coalition  
Secretariat, UNEP

Jan DUSIK (moderator)  
Lead Specialist, Sustainable  
Development, WWF Arctic Programme
Agenda

Welcome and Introduction
- Welcome/Moderation | Jan DUSIK, WWF Arctic Programme
- Enhanced Ambition to Fight Climate Change and Air Pollution, and Address the Plastics Crisis | H.E. Amb. SHEARMAN
- Enhanced Ambition to Fight Climate Change and Air Pollution, and Address the Plastics Crisis | H.E. Anare LEWENIQILA

Setting the Scene | Plastics, Climate and Air Pollution
- Plastics and Climate | Steven FEIT, CIEL
- Plastics and Air Pollution | Steve and Deonie ALLEN, University of Strathclyde

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- Gaps in Air Pollution and Climate Governance | Helena MOLIN VALEDES, CCAC

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SETTING THE SCENE I Plastics and Climate

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Steven FEIT
Senior Attorney, Climate and Energy Program, CIEL
FOSSIL FUELS, PLASTICS & THE PLANET

GENEVA BEAT PLASTIC POLLUTION DIALOGUE
DECEMBER 2020
STEVEN FEIT, CIEL
The US fracking boom has made natural gas REALLY, REALLY CHEAP.
DRIVING A MASSIVE EXPANSION IN NEW INFRASTRUCTURE FOR PLASTICS AND PETROCHEMICALS
99% of plastics are derived from fossil fuel feedstocks.

Boxes with outlines are processes; boxes without outlines are products.
PETROCHEMICALS ARE LARGEST DRIVER OF GLOBAL OIL DEMAND GROWTH

Chemicals in Driver's Seat
Petrochemicals seen driving oil demand as cars wane

- International Energy Agency demand change forecast to 2040

*millions of barrels of oil equivalent per day
Source: IEA World Energy Outlook 2018
GREENHOUSE GASES ARE EMITTED AT EACH STAGE OF THE PLASTIC LIFECYCLE.
PLASTIC POLLUTION IS A SIGNIFICANT AND GROWING THREAT TO THE EARTH’S CLIMATE.
STOPPING THE EXPANSION OF PETROCHEMICAL & PLASTIC PRODUCTION & KEEPING FOSSIL FUELS IN THE GROUND IS A CRITICAL ELEMENT IN ADDRESSING THE CLIMATE CRISIS.
THE PLASTIC LIFECYCLE

- Fossil fuel extraction & transport
- Production and manufacturing
- Disposal of plastic waste
- Ongoing environmental impact
EXTRACTION & TRANSPORT OF FOSSIL FUELS FOR PLASTIC PRODUCTION PRODUCES SIGNIFICANT GREENHOUSE GASES

METHANE LEAKAGE AND FLARING

FUEL COMBUSTION AND ENERGY CONSUMPTION IN THE PROCESS OF DRILLING FOR OIL OR GAS

LAND DISTURBANCE WHEN FORESTS AND FIELDS ARE CLEARED FOR WELLPAIDS AND PIPELINES.
PLASTICS REFINING IS AMONG THE MOST GREENHOUSE GAS INTENSIVE INDUSTRIES IN THE MANUFACTURING SECTOR, AND THE FASTEST GROWING

CRACKING OF ALKANES INTO OLEFINS

POLYMERIZATION AND PLASTICIZATION OF OLEFINS INTO PLASTIC RESINS

OTHER CHEMICAL REFINING PROCESSES
PLASTIC IS PRIMARILY LANDFILLED, RECYCLED, OR INCINERATED – EACH OF WHICH PRODUCES VARYING AMOUNTS OF GREENHOUSE GAS EMISSIONS.
[Figure VI-2] GHG Emissions from waste incineration with energy recovery (plastic packing only, million metric ton)

Industrial outlook (increased plastic production & incineration)
No growth in the ratio of waste incineration (14%)
BEST Case Scenario (plastic packaging production and incineration halved by 2030, reaching zero by 2050)
0.86 GT ANNUAL EMISSIONS, 189 COAL PLANTS

1.34 GT ANNUAL EMISSIONS, 295 COAL PLANTS

2.80 GT ANNUAL EMISSIONS, 615 COAL PLANTS

Coal plant = 500 megawatts
At current levels, greenhouse gas emissions from the plastic lifecycle could account for 10-13% of the carbon budget to keep global temperature rise below 1.5°C degrees.
Plastic pollution is literally killing our oceans.

- Plastic in the oceans may interfere with the ocean’s capacity to absorb and sequester carbon dioxide.
- The earth’s oceans have absorbed 20-40 percent of all anthropogenic carbon emitted since the dawn of the industrial era.
IMPACT ON OCEANIC CARBON SINK

carbon dioxide

Phytoplankton carbon uptake

Grazing

Zooplankton respiration

Excretion

Physical mixing

Zooplankton migration

Sinking particles

Bacteria decomposition

Zooplankton consumption

Respiration

Excretion

Deep ocean carbon flux

Dissolved organic carbon
EMISSIONS FROM ENVIRONMENTAL PLASTICS

f) Van Sebille microplastic mass [g/km², log10 scale]
HIGH-PRIORITY ACTIONS TO TAKE NOW

**End**
Production and use of single-use disposable plastic

**Stop**
development of new oil, gas, and petrochemical infrastructure

**Foster**
the transition to zero-waste communities

**Implement**
implement extended producer responsibility as a critical component of circular economies

**Adopt and enforce**
ambitious targets to reduce greenhouse gas emissions from all sectors
STOPPING THE EXPANSION OF PETROCHEMICAL AND PLASTIC PRODUCTION AND KEEPING FOSSIL FUELS IN THE GROUND PROVIDES THE SUREST AND MOST EFFECTIVE PATH TO REDUCING THE RISING CLIMATE IMPACTS OF PLASTICS.
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Steve ALLEN
Microplastics Researcher, University of Strathclyde

Deonie ALLEN
Research Fellow, University of Strathclyde

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Plastics and Air Pollution

Dr Steve Allen
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Dr Deonie Allen
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Remote area and atmospheric transport research

- Remote mountain atmospheric microplastic research
- Atmospheric plastic transport modelling
- Ocean to air exchange
- Atmospheric nanoplastic prevalence and transport
Atmospheric MP studies to date

- Atmospheric deposition (passive sampling)
- Atmospheric + other pollution
- Airmass sampling
Air plastic quantities

- Up to 5700 MP/m³ in mega city air (outdoor)
- Indoor air 0.04 - 60.0 MP/m³
- 0.66 MP/m³ found in remote, high altitude mountain air
- 19 MP/m³ from ocean – to – atmosphere exchange
- Arctic snow and ice (up to 14.4x10³ MP/L)
- Brake and tyre wear, laundry, landfill and waste management, soils … many sources

Inhalation
>41,000 MP/year

Vianello et al. 2019
Cox et al. 2019
Toxicity and leachate from plastic

Known endocrine disruptors and estrogenic such as: PFAs

- DEHP, MEHP, BPA, BPB, Dinch …..

PLA and PBAT bioplastic have been shown to be as toxic, and often more toxic than traditional plastic.

Growing concern for human health … inhalation of particles and of the plastic chemicals

- MP and nP show inflammation similar to many non viral diseases (e.g. Crohn’s disease, COPD, cardiovascular diseases and cancer)
Atmospheric plastic sees no boundaries

Annual total (wet and dry) deposition

- PM2.5 TWP: 28.4 kt
- PM10 TWP: 283.7 kt
- PM2.5 BWP: 97.1 kt
- PM10 BWP: 142.3 kt

Global brake and tyre wear microplastic transport and deposition

Microplastic particles arriving in the Tibetan Plateau from India, Africa, Europe and China

Zhang et al. 2020
Evangelou et al. 2020
By air MP is reaching our remote natural wilderness reserves

- MP is reaching remote areas, wilderness areas …
- … the Arctic and Antarctic … Mount Everest
- It’s important because wilderness areas are our biodiversity reserves
- We know that MP and nP are toxic to biota
- Biodiversity at risk: Potentially catastrophic consequences.
An interagency advisory body of the United Nations System
established in 1969

MISSION STATEMENT

To provide authoritative, independent, interdisciplinary scientific advice to organizations and governments to support the protection and sustainable use of the marine environment
Atmospheric Plastic and SDGs
Science and Policy on atmospheric plastic

- Policy based on informed evidence and science
- Move towards effective plastic waste management
- Move towards circular economy of plastic to minimize plastic use and production
- Open access and understanding of plastic ingredients list and toxicity
- Emission prevention to the air
- Acknowledgment that once its is in the air it is nearly impossible to remove
- International movement to address plastic pollution beyond borders
Atmospheric MP studies to date
Plastics and Air Pollution

Thank you
Questions?

Dr Steve Allen
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Dr Deonie Allen
deonie.allen@strath.ac.uk
Further information


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- UK | H.E. Amb. SHEARMAN

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- Air pollution and climate governance | Helena MOLIN VALDES, CCAC

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Fiji Addressing Plastics, Climate and Air Pollution

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Deputy Permanent Representative of the Republic of Fiji to the United Nations in Geneva
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United Kingdom Addressing Plastics, Climate and Air Pollution

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International Governance on Climate and Air Pollution and the Plastics Crisis

Helena MOLIN VALDES
Head, Climate and Clean Air Coalition
Secretariat, UNEP

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MEETING THE MOMENT – GOVERNANCE MODEL

CLIMATE & CLEAN AIR COALITION (CCAC)

Helena Molin Valdes
Head of CCAC Secretariat

An action global partnership – voluntary Framework
From 6 to 70 countries,
75+ int orgs & NGOs

More than 100 cities and many businesses
→ Hosted by UNEP
### Short-Lived Climate Pollutants

**Near term response to mitigation**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Anthropogenic Sources</th>
<th>Lifetime in Atmosphere</th>
<th>Impacts/Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Carbon (BC)</td>
<td></td>
<td>Days</td>
<td></td>
</tr>
<tr>
<td>Methane (CH₄)</td>
<td></td>
<td>12 years</td>
<td></td>
</tr>
<tr>
<td>Tropospheric Ozone (O₃)</td>
<td></td>
<td>Weeks</td>
<td></td>
</tr>
<tr>
<td>Hydrofluoro-carbons (HFCs)</td>
<td></td>
<td>15 years (weighted by usage)</td>
<td></td>
</tr>
</tbody>
</table>

### Long-Lived Climate Pollutants

- Carbon Dioxide (CO₂)
  - Rapid, deep, and persistent cuts in CO₂ and other long-lived greenhouse gases are necessary to stabilise global temperature
  - Up to 60% reduction by 2050
  - Up to 50% reduction by 2070

- Black Carbon
  - Rapid, deep, and persistent cuts in Black Carbon and other long-lived greenhouse gases are necessary to stabilise global temperature
  - Up to 60% reduction by 2050
  - Up to 50% reduction by 2070
CCAC APPROACH – HOW WE WORK:

- At the nexus of climate and air quality
- From the ground up, empowering our Partners to achieve their national goals—and from the top down, bringing together ministers and leaders to drive high-level ambition—driven by pragmatism and policy relevant science.
- Enhance capacity in national institutions to integrate air quality and greenhouse gas mitigation policies, and Catalyse action to reduce short-lived climate pollutant emissions in key sectors at scale, that benefit people's lives today locally, while helping to progress on global long-term climate and SDGs.
- We help each other succeed, sharing expertise, actively solving problems. We show the world what is possible and encourage all to join us in our efforts.
Our Vision
is an atmosphere that enables people and the planet to thrive – stabilizing the climate with warming limited to 1.5°C and drastically reduced air pollution.

Driving an ambitious agenda

Advancing Policy-Relevant Research & Analysis

Supporting National & Transformative Actions
Partners, the Driving Force: Initiatives → HUBS
Methane, Black Carbon & HFC actions
GAPS AND LESSONS LEARNT

- Build on scientific evidence – confidence
  - Lack of evidence on plastics and air
- High level commitments – leadership
  - Setting national/regional targets
- Multi stakeholder engagement – influencers
- Government commitments – voluntary vs legally binding:
  - Keep it flexible and nimble
  - Complement to existing legally binding agreements (Paris Agreement, Montreal Protocol, LRTAP) and UN resolutions (Pollution, Air Quality, Chemicals, Waste)
- Campaigns
- Finance
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EVENT | VIRTUAL

**Briefing on the 5th Session of the United Nations Environment Assembly | GENeva UNEA Briefing**
15 DEC 2020 09:00 - 10:00
Online | Webex

- Chemicals and Pollution | Nature | Climate | Green Economy | Health and Environment
- SDG1 | SDG2 | SDG3 | SDG6 | SDG8 | SDG12 | SDG13 | SDG14 | SDG15 | SDG17

EVENT | VIRTUAL

**Chemicals and Waste Briefing | Year in Review and Priorities for 2021**
16 DEC 2020 09:00 - 10:30
Online | Webex
GEN

- Chemicals and Pollution
- SDG3 | SDG12

EVENT | VIRTUAL

**Geneva Beat Plastic Pollution Dialogues | Plastics and Human Rights**
14 JAN 2021 14:00 - 15:00
Online | Webex

- Chemicals and Pollution | Human Rights and Environment
- SDG3 | SDG12
CLIMATE AMBITION SUMMIT 2020
Geneva Beat Plastic Pollution Dialogues | Plastics, Climate and Air Pollution
10 December | 14:00 - 15:00 CET

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