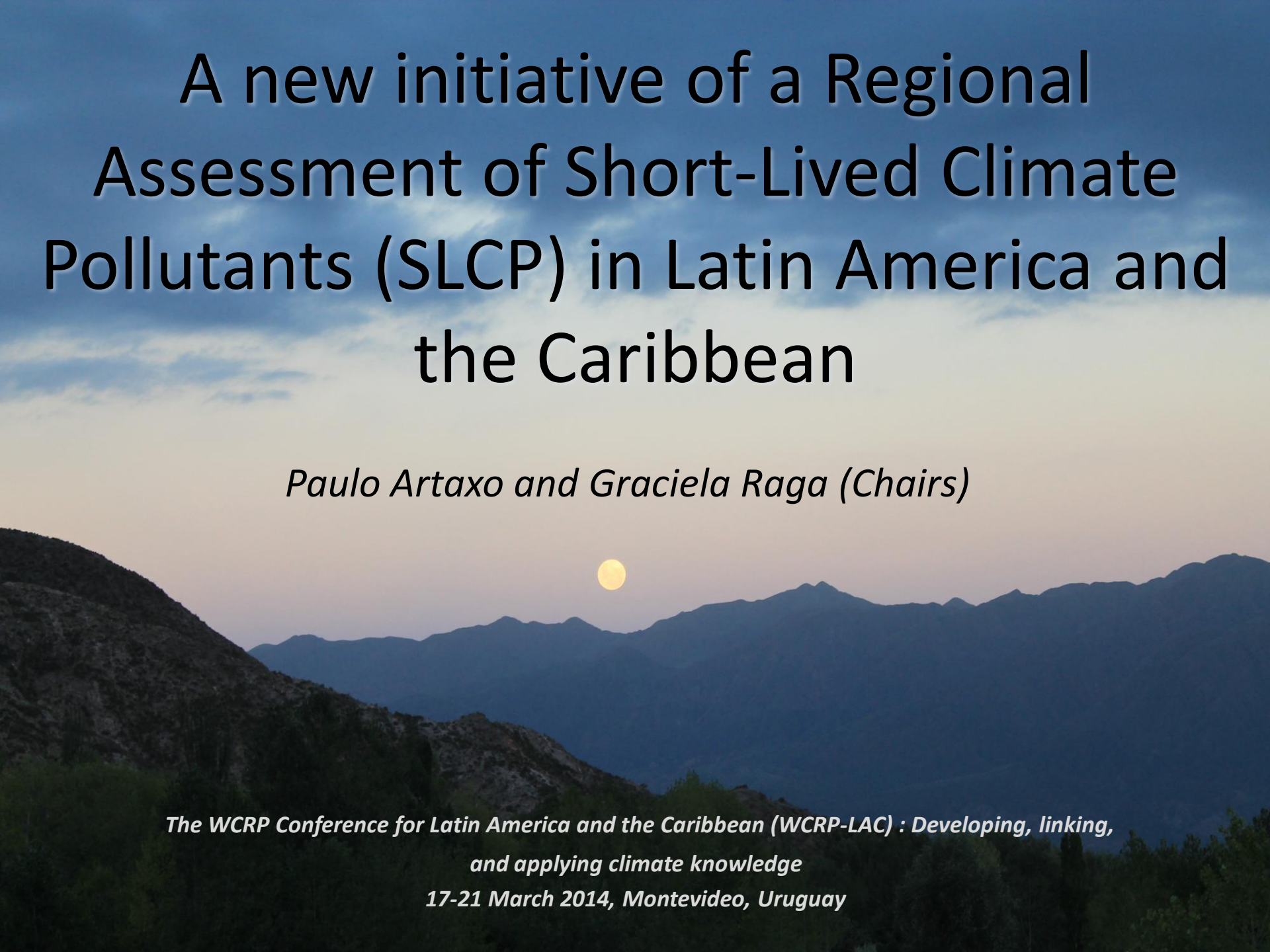
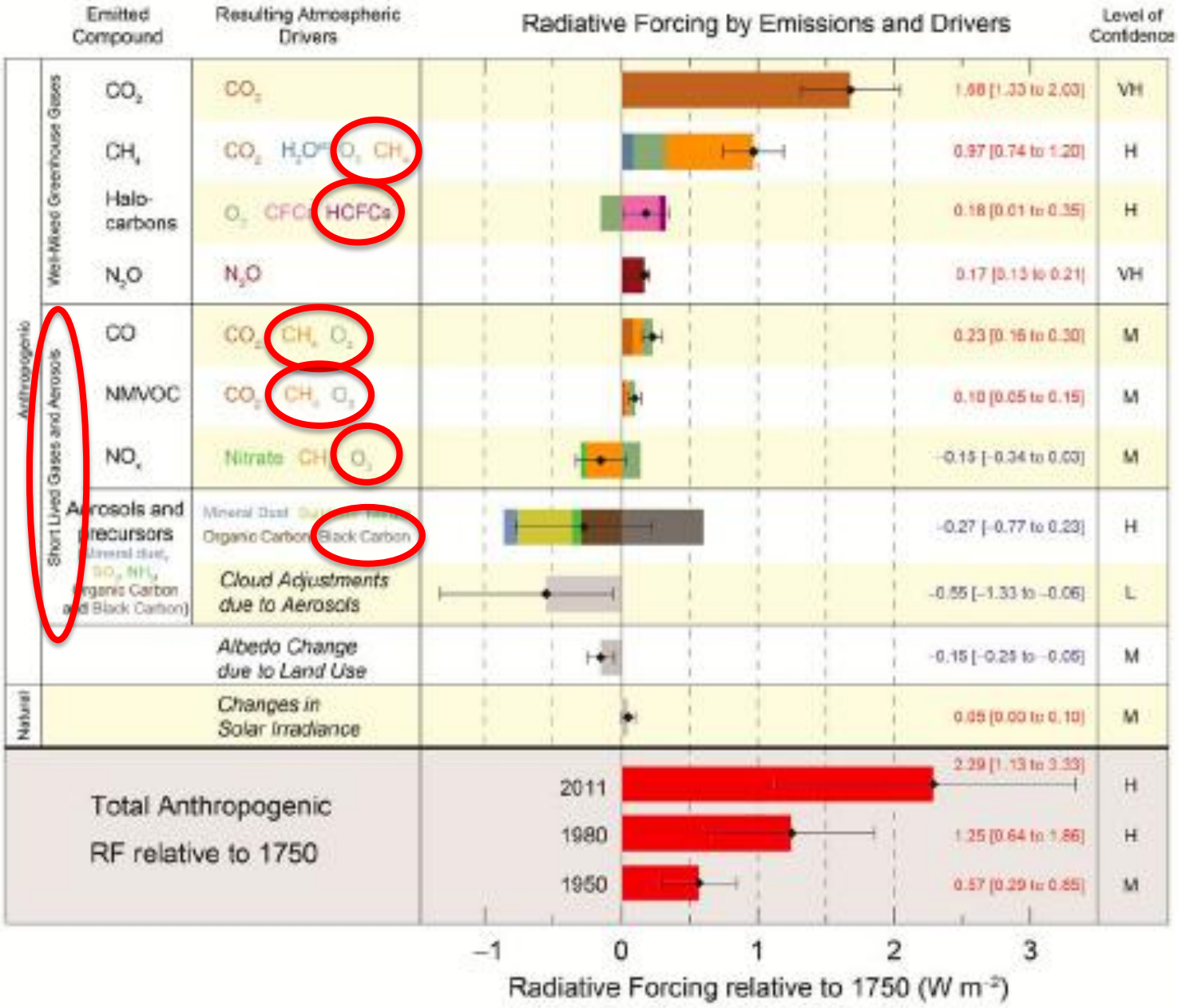
A new initiative of a Regional Assessment of Short-Lived Climate Pollutants (SLCP) in Latin America and the Caribbean

Paulo Artaxo and Graciela Raga (Chairs)



The WCRP Conference for Latin America and the Caribbean (WCRP-LAC) : Developing, linking, and applying climate knowledge

17-21 March 2014, Montevideo, Uruguay


Emitted Compound
Resulting Atmospheric Drivers
Radiative Forcing by Emissions and Drivers
Level of Confidence
Anthropogenic
Well-Mixed Greenhouse Gases
Short Lived Gases and Aerosols
Natural
CO2
CH4
Halo-carbons
N2O
CO
NMVOC
NOx
Aerosols and precursors
(Mineral dust, SO2, NH3, Organic Carbon and Black Carbon)
CO2
CO2 H2O CH4
O3 CFCs HCFCs
N2O
CO2 CH4 O3
CO2 CH4 O3
Nitrate CH4 O3
Organic Carbon Black Carbon
Cloud Adjustments due to Aerosols
Albedo Change due to Land Use
Changes in Solar Irradiance
1.68 [1.33 to 2.03]
0.97 [0.74 to 1.20]
0.18 [0.01 to 0.35]
0.17 [0.13 to 0.21]
0.23 [0.16 to 0.30]
0.10 [0.05 to 0.15]
-0.15 [-0.34 to 0.03]
-0.27 [-0.77 to 0.23]
-0.55 [-1.33 to -0.06]
-0.15 [-0.25 to -0.06]
0.05 [0.00 to 0.10]
VH
H
H
VH
M
M
M
H
L
M
M
Total Anthropogenic RF relative to 1750
2011
1980
1950
2.29 [1.13 to 3.33]
1.25 [0.64 to 1.86]
0.57 [0.29 to 0.85]
H
H
M
−1
0
1
2
3
Radiative Forcing relative to 1750 (W m-2)

Short-lived climate pollutants (SLCPs)

Gases:

Methane

Tropospheric ozone

HCFs

Aerosol particles:

Black carbon

- They are relatively short-lived in the atmosphere;

  BC and trop-O_3: days-weeks, CH_4: ≈ 10 years
- Most of them are air pollutants with important impacts on public health (BC and trop-O_3) and food security (crop damage by trop-O_3)
- They are one of the main causes of global warming

Air pollution and Public Health: unfinished business on the sustainable development agenda

Outdoor air pollution

Urgent issue in most large urban areas

About 90.000 premature deaths each year due to outside air pollution in LAC.

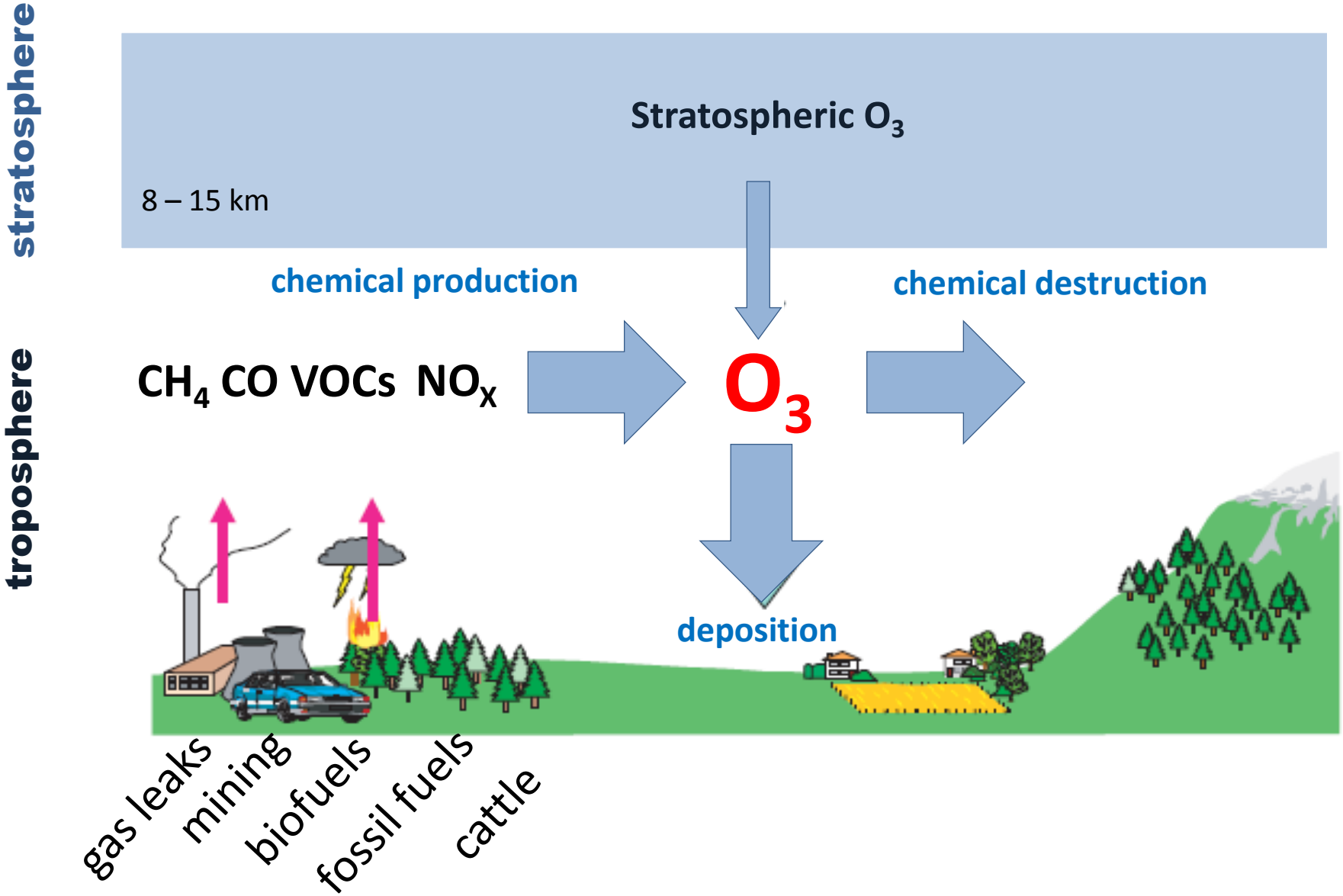
Indoor air pollution

"Indoor air pollution from particulate matter continues to have major health impacts, particularly on women and children."

Around 39.000 people die each year prematurely from illness attributable to indoor air pollution in LAC

Source: WHO statistics

Tropospheric Ozone – formed from precursor emissions

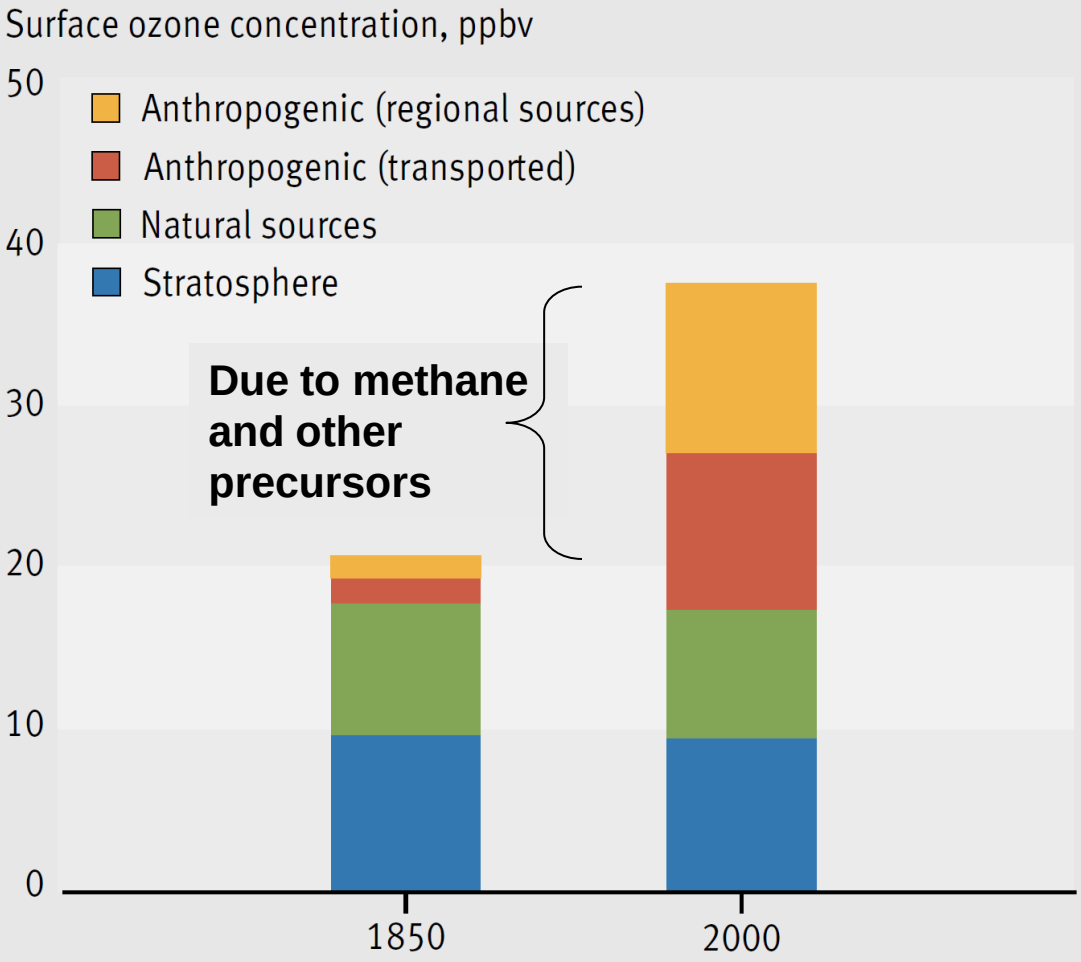


Ground level ozone is increasing

Reducing ground level ozone:

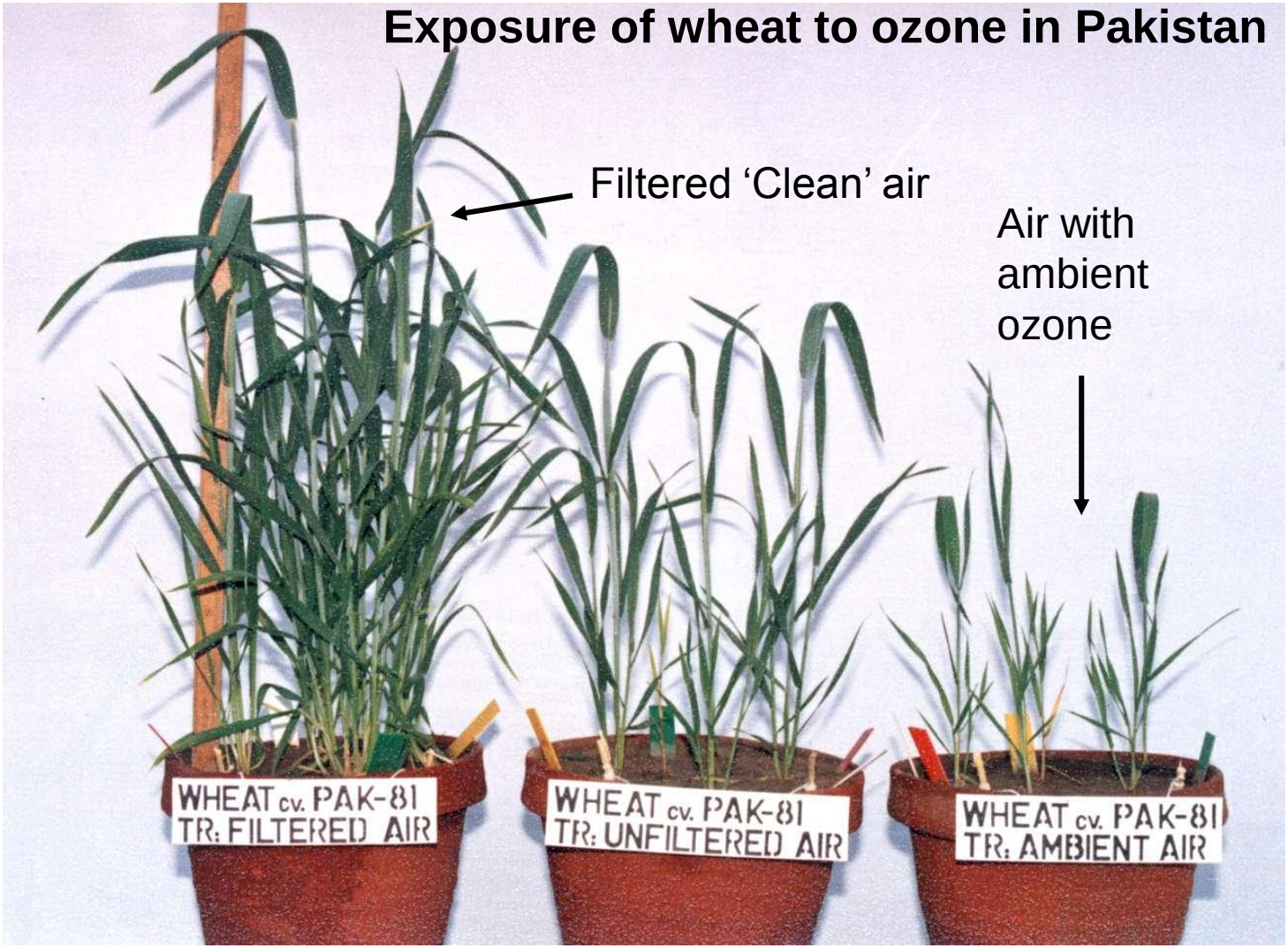
- protects public health
- reduces ozone damage to crops

Figure 2.14 Sources of ozone over polluted regions of the northern hemisphere, 1850 and 2000

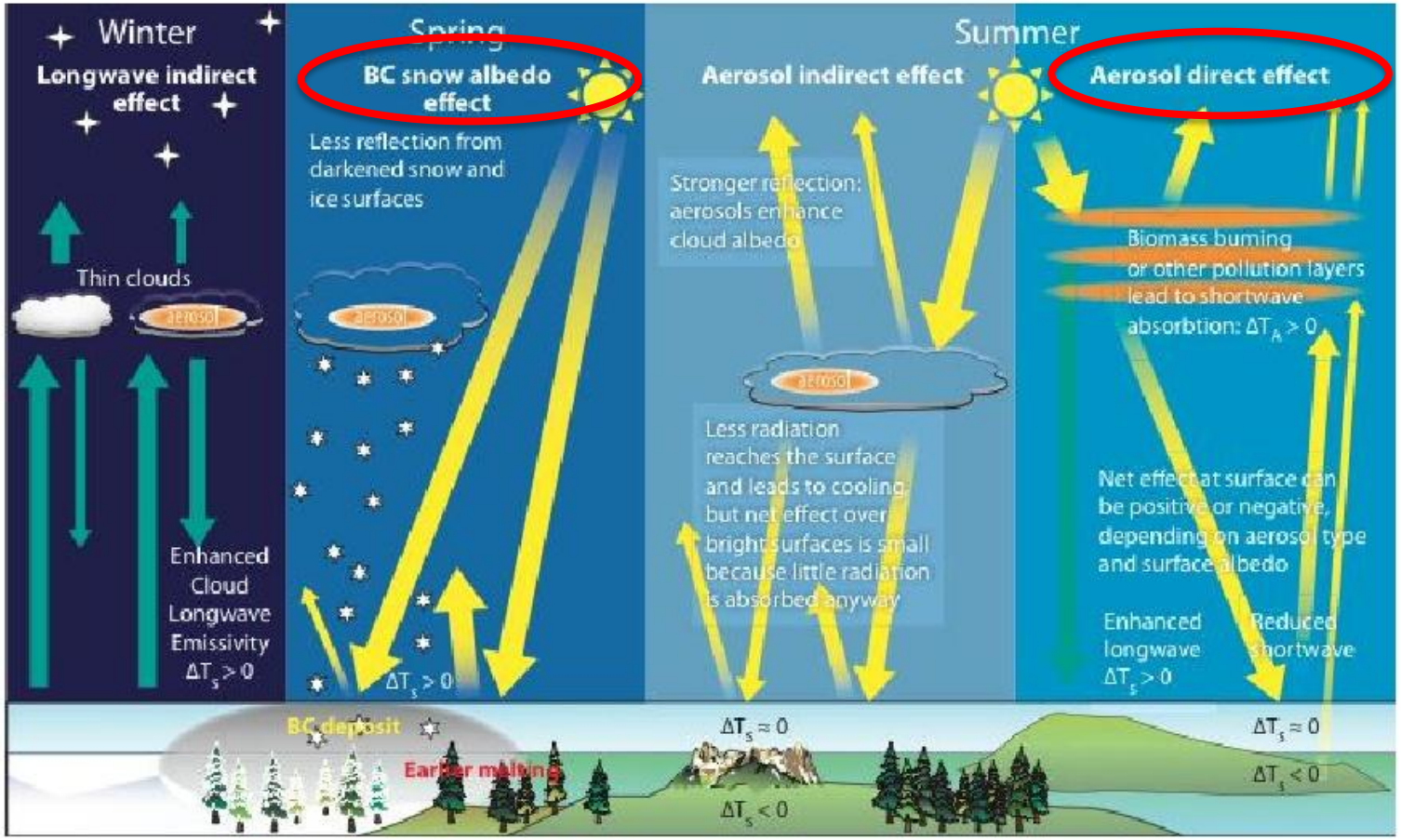


Source: UNEP GEO-5, HTAP

Impact of the Tropospheric Ozone on Crop yields



BC-aerosol Interaction with Radiation



icct
THE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION

Quinn, P., Stohl, A., Arneth, A., Berntsen, T., Burkhart, J. F., Christensen, J., Flanner, M., et al. (2011). *The Impact of Black Carbon on Arctic Climate* (No. 4). *AMAP Technical Report* (pp. 1–74). Arctic Monitoring and Assessment Programme.

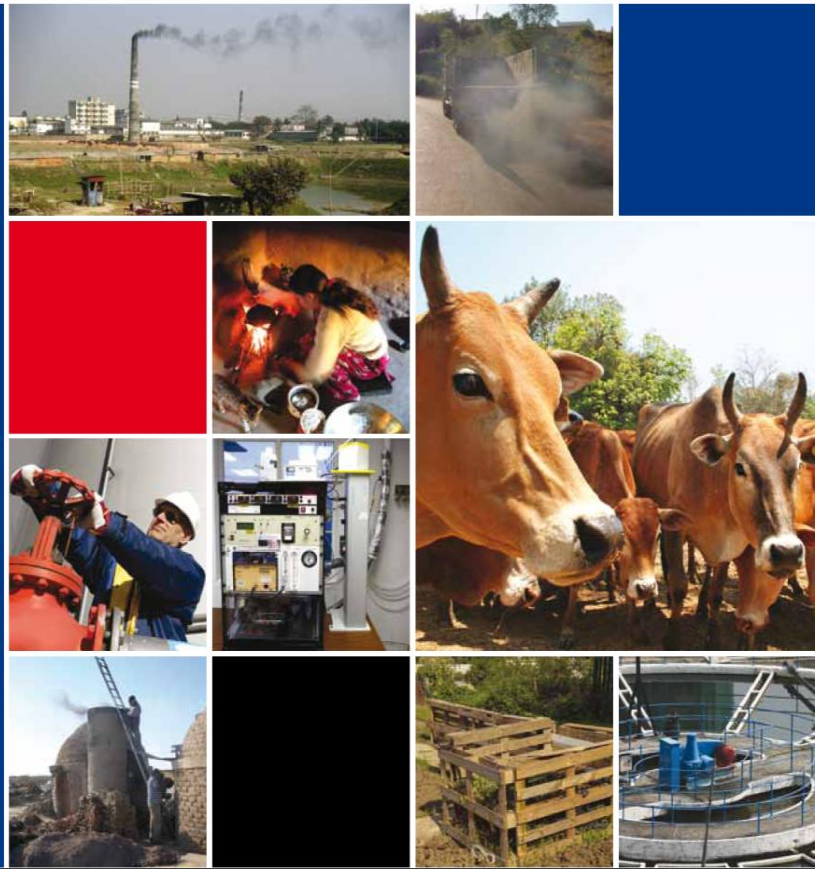
RECENT GLOBAL REPORTS

UNEP

World Meteorological Organization

Integrated Assessment of Black Carbon and Tropospheric Ozone

Summary for Decision Makers



UNEP

Near-term Climate Protection and Clean Air Benefits:

Actions for Controlling Short-Lived Climate Forcers

A UNEP Synthesis Report

A package of 16 measures can substantially reduce emissions and achieve multiple benefits

- Mitigation measures ranked by net climate impact (using GWP) of emission changes
- Considering CO, CH_4, BC, OC, SO_2, NO_X, NMVOCs, and CO_2
- Picked the top measures – about 90% of warming benefit

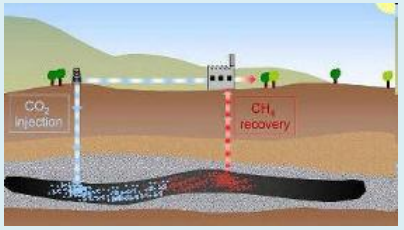
Black carbon measures

- addressing emissions from incomplete combustion

  - BC, OC, methane, CO, NMVOCs

Methane measures

- reducing methane emissions



- **No need for technical breakthroughs**
- **These measures are already implemented in many countries**
- **Cost-effective**

The measures aiming at reducing methane emissions

Intermittent aeration -paddy

Recovery from wastewater

Recovery from oil and gas

Recovery from landfill

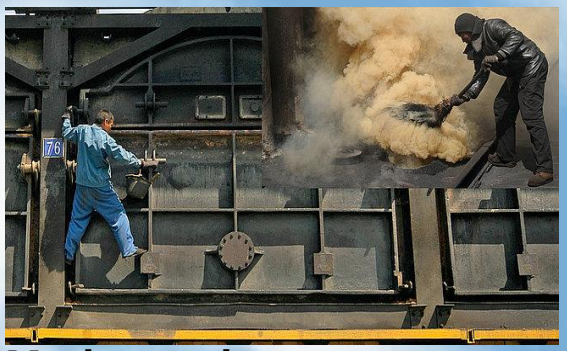
Recovery from livestock manure /change feed

Coal mine methane capture

Reducing pipeline leakage

The measures aiming to reduce black carbon emissions

Improved biomass stoves

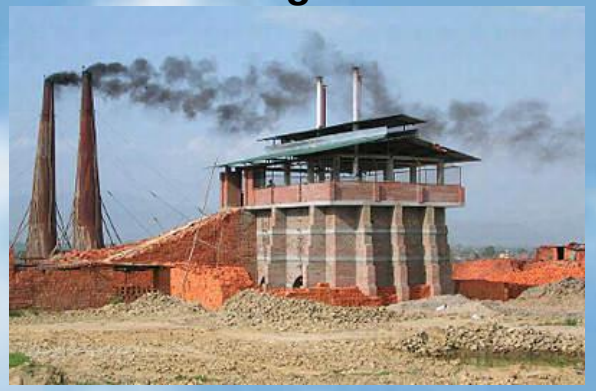


Modern coke ovens

Remove big smokers / DPF

Cooking with clean fuel

Pellet biomass heating stoves



Improved brick kilns

Coal briquettes replacing coal

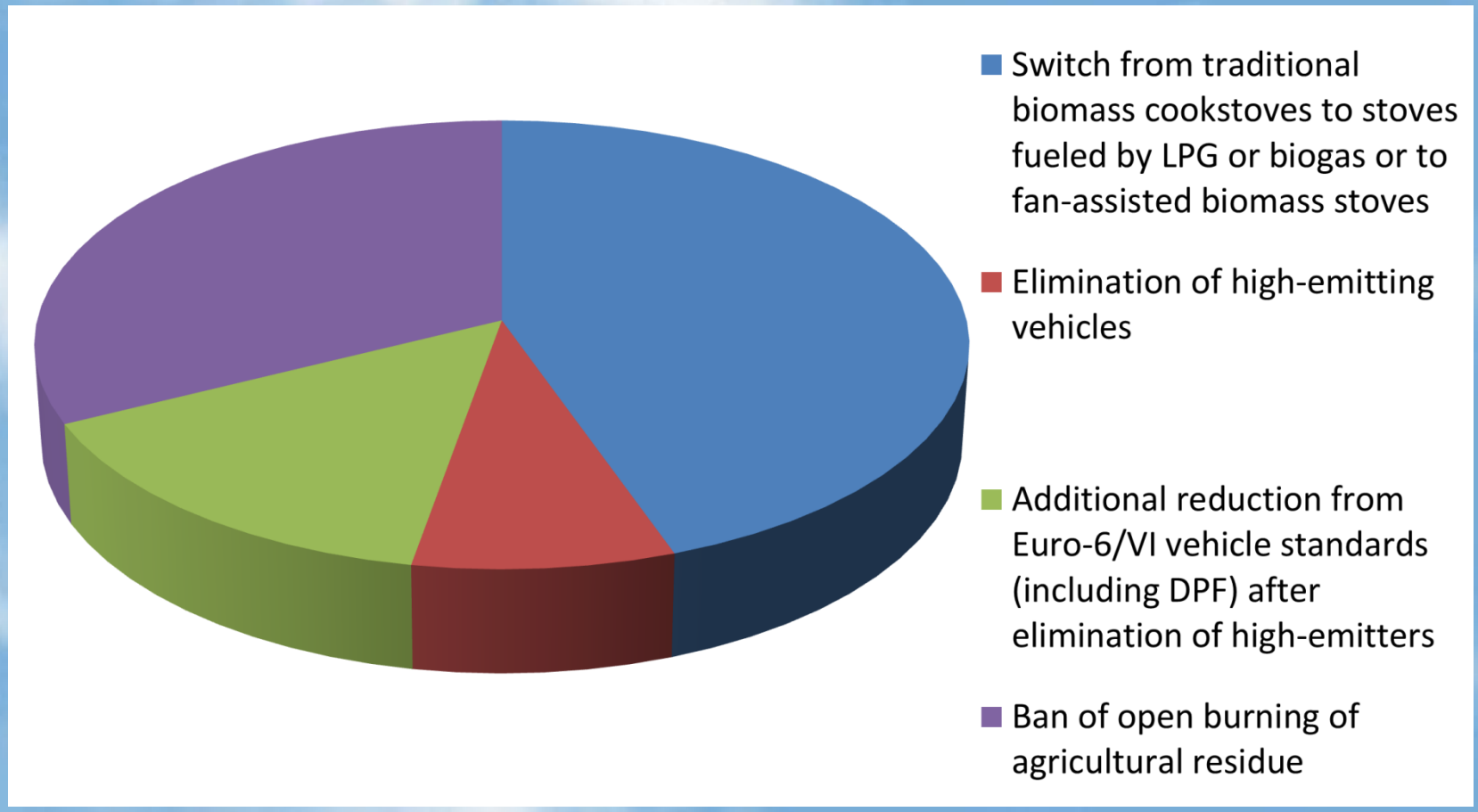
Reduce agricultural burning

Reduce flaring

HEALTH IMPACTS:

Implementing the Black Carbon measures avoids about 2.4 million premature deaths globally each year

In Latin America and the Caribbean about 39,000 premature deaths would be avoided each year

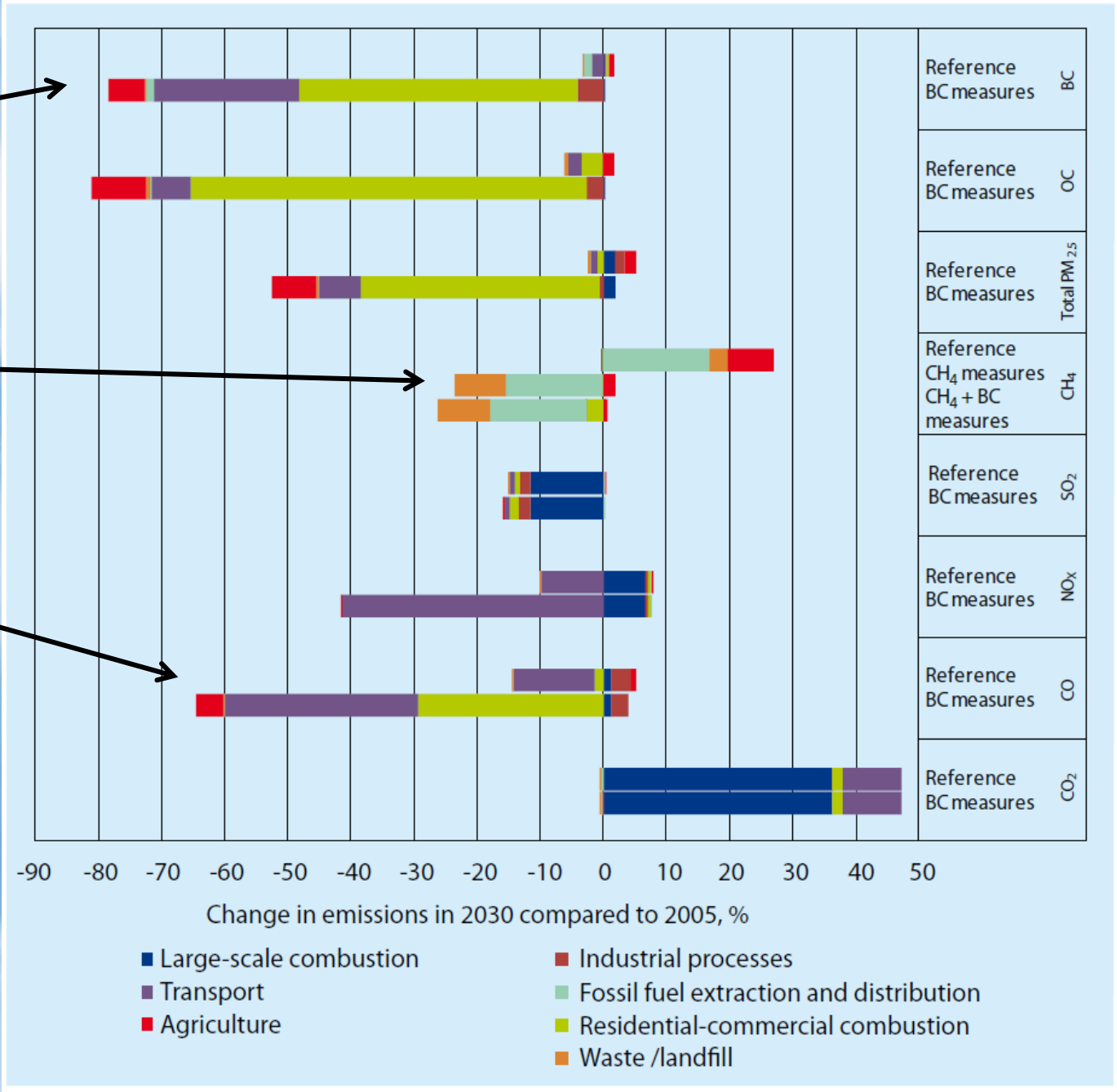


Effect of measures on global emissions projected in 2030 relative to 2005

9 BC measures reduce ~80% of BC

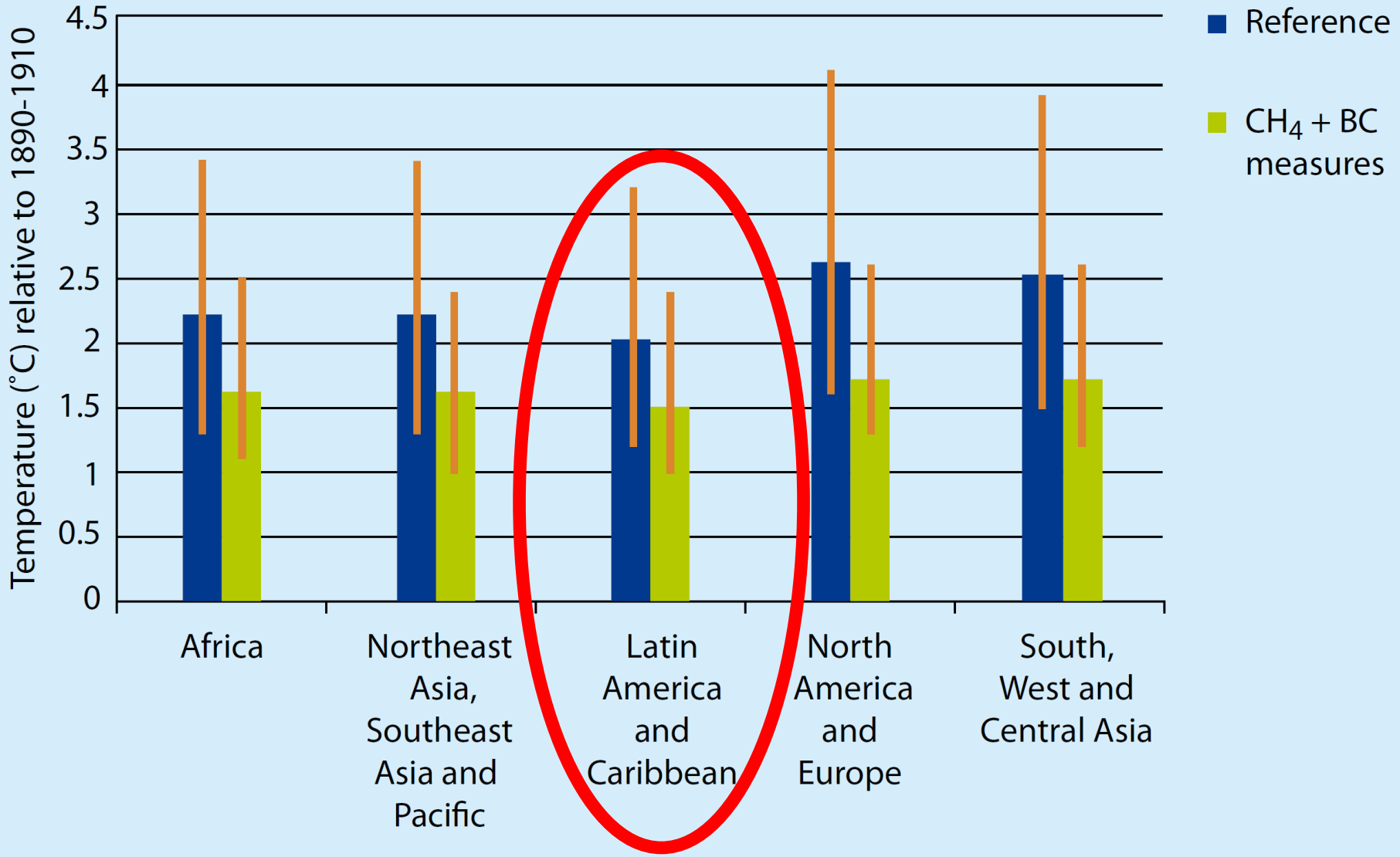
7 CH_4 measures reduce ~25% of CH_4 relative to 2030

BC measures reduce CO

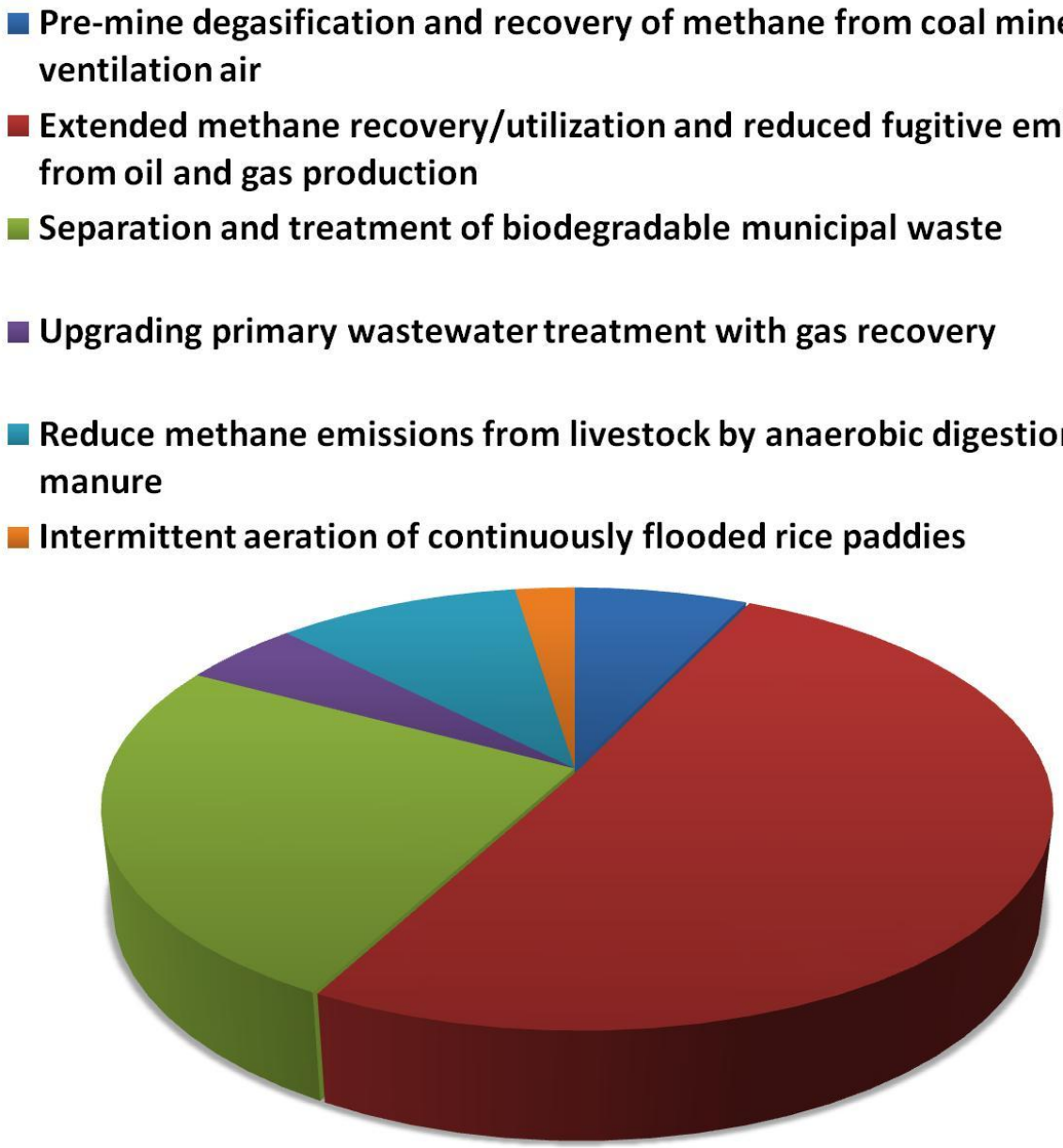


Regional Warming Benefits

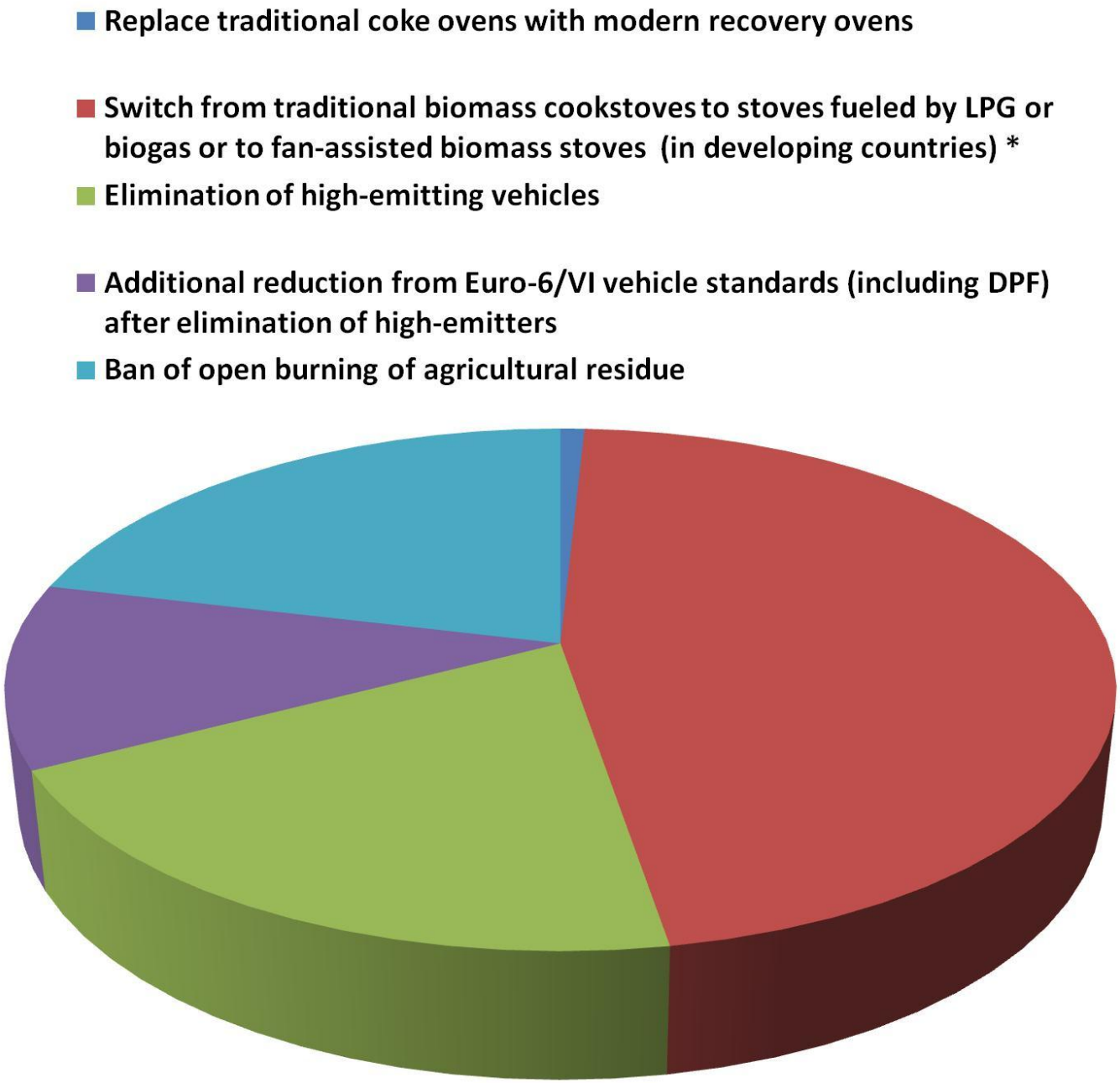
Comparison of regional mean warming over land (˚C) - change in 2070 compared with 2005 for the reference scenario and the SLCP measures scenario.



The Impact of Methane measures implemented in LAC on global temperatures



The Impact of BC measures implemented in LAC on global temperatures



CLIMATE AND CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

www.unep.org/ccac

- **Leverage high-level engagement and political will, and catalyze action to a**ddress SLCPs as a global and collective challenge to protect the environment and public health, promote food and energy security, and address near term climate change
- **Voluntary, Partner-led Coalition**
  - Feb 2012 -> 6 Partners
  - Feb 2014 -> 80 Partners: 36 States, IGOs, NGOs and private sector
- **Science driven, action-oriented**
- **Building on and bringing together existing efforts**
- **Complementary to global efforts to reduce CO2 in particular under UNFCCC**

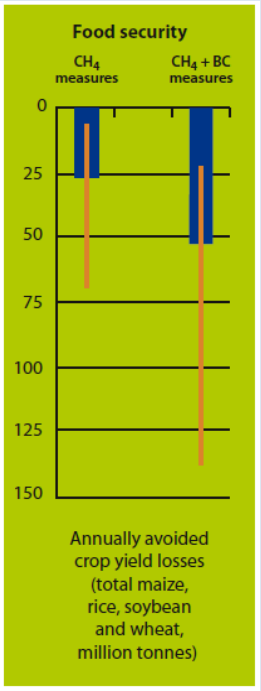
High impact Initiatives

- **Celebrating first success!**
- About USD 50 Million pledged and over USD 15 Million already allocated to specific activities under the initiatives

Regional Assessment of SLCPs

NEWLY APPROVED

- **Goal**: To develop a scientifically robust, policy-relevant integrated assessment of SLCPs for each global region
- First regional assessment for Latin America and the Caribbean (LAC) region is underway with focus to provide justification and support for national SLCP planning.
- **Done and coordinated by the region, supporting rapid actions and involvement of Governments in the region.**
- Chair: Paulo Artaxo (USP), Vice-Chair: Graciela Raga (UNAM)
- **Will be released in 2015**



Conclusions

Develop a scientifically robust policy-relevant integrated assessment of SLCPs for Latin America and the Caribbean

- **Addressing SLCPs is a development issue** – countries reducing emissions will benefit from **improved health and Improve food security**.
- Improved **urban air pollution** increasing efficiency in transportation system, industrial emissions, and other measures
- 16 identified measures, implemented by 2030, would **reduce warming in LAC by 0.5°C** in 2050 halving the rate of warming projected by the Reference Scenario, and reduce some near term climate change impacts on vulnerable areas, such as the Andes.
- Near-term measures would **improve the chance of not exceeding 2°C target**, but only if CO_2 is also addressed, starting now (**complementary strategies**; **not alternatives**).
- SLCP emission reductions IS NOT an alternative to CO2 mitigation.
- Many **measures achieve cost savings** over time, increasing competitiveness.

We now need a tailored LAC integrated assessment to support rapid action!!!