

“In 1989, world governments were prepared to sign an agreement to help reduce GHG emissions worldwide; the United States refused to sign.”

“Loosing Earth”
The New York Times

Why Methane?

Vessels Carbon Solutions Inc.

Climate Change

A Crisis, Not a
Cause



Increased frequency of natural disasters



Increasingly extreme temperatures; longer, hotter summers and shorter, colder winters.



Less rainfall in temperate climates

Climate change is bad for California tourism



Visitors to California spend money and generate local and state taxes. Tourism employs Californians. The industry depends partly on California's beautiful outdoors...



...But as the climate heats up, hiking biking, hunting, and fishing will become more difficult as midday temperatures rise...



...As frost free days in the high mountains increase at about a day a year, the ski season shrinks while mid-season temperature peaks get exceedingly cold...



...And an increased likelihood of dangerous weather patterns will make outdoor sports more dangerous.

Climate change is bad for the people of California



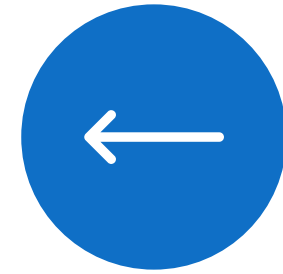
California is a state that values its diverse communities.



Natural disasters are indiscriminate about which communities they hit and whom in those communities will suffer the worst. But one thing is not random – who can most easily recover.



Low income communities will be least able to recover as the frequency of natural disasters grow.



Your cooling, heating, *AND* water bills will go up. This has more effect on the poor and elderly.



Climate change is bad for California industry

- California has a vibrant and multifaceted economy
- Decreased precipitation will effect many sectors of the economy as the cost of water increases.



Climate change is bad for Colorado industry

- Ranching and farming employs approximately 47,807 people directly.
 - It contributes about 6.8 billion dollars to the state economy
 - About 5% of Colorado's GDP
- Oil and gas extraction and transportation employs 12,382.
 - It contributes 31.4 billion dollars to the state economy

Defining Climate Change:

How do greenhouse gases heat the atmosphere?

- Greenhouse gases (GHG) are measured by their potential to **absorb heat from the sun** which is released into the atmosphere over time.
- Each of the many GHGs can absorb a different amount of heat and remains in the atmosphere, dispersing heat, for a varied length of time.

Defining climate change: What does GWP mean?

- GWP, or Global Warming Potential, is the method of measurement for determining how much a given molecule heats up the atmosphere during its lifetime in the atmosphere.
- Molecules are identified as having different GWP based on their heat absorption potential and duration in the atmosphere
- CO₂, or carbon dioxide, has a GWP of 1 and is used as the standard unit of measurement against which all other air molecules are measured.

Defining climate change: What is a SLCP?

- A **Short Lived Climate Pollutant (SLCP)** is a greenhouse gas that spends less time in the atmosphere than CO₂, but has **hundreds or even thousands of times the warming potential**, or GWP, of CO₂.
- SLCPs are less common in the atmosphere than CO₂.
- Because fewer SLCPs creates more heat in less time avoiding their emissions will have **a large impact very quickly**.
- SLCPs account for about half of atmospheric warming. Reducing SLCP emissions takes **a fraction of the effort and cost** of reducing CO₂ emissions.



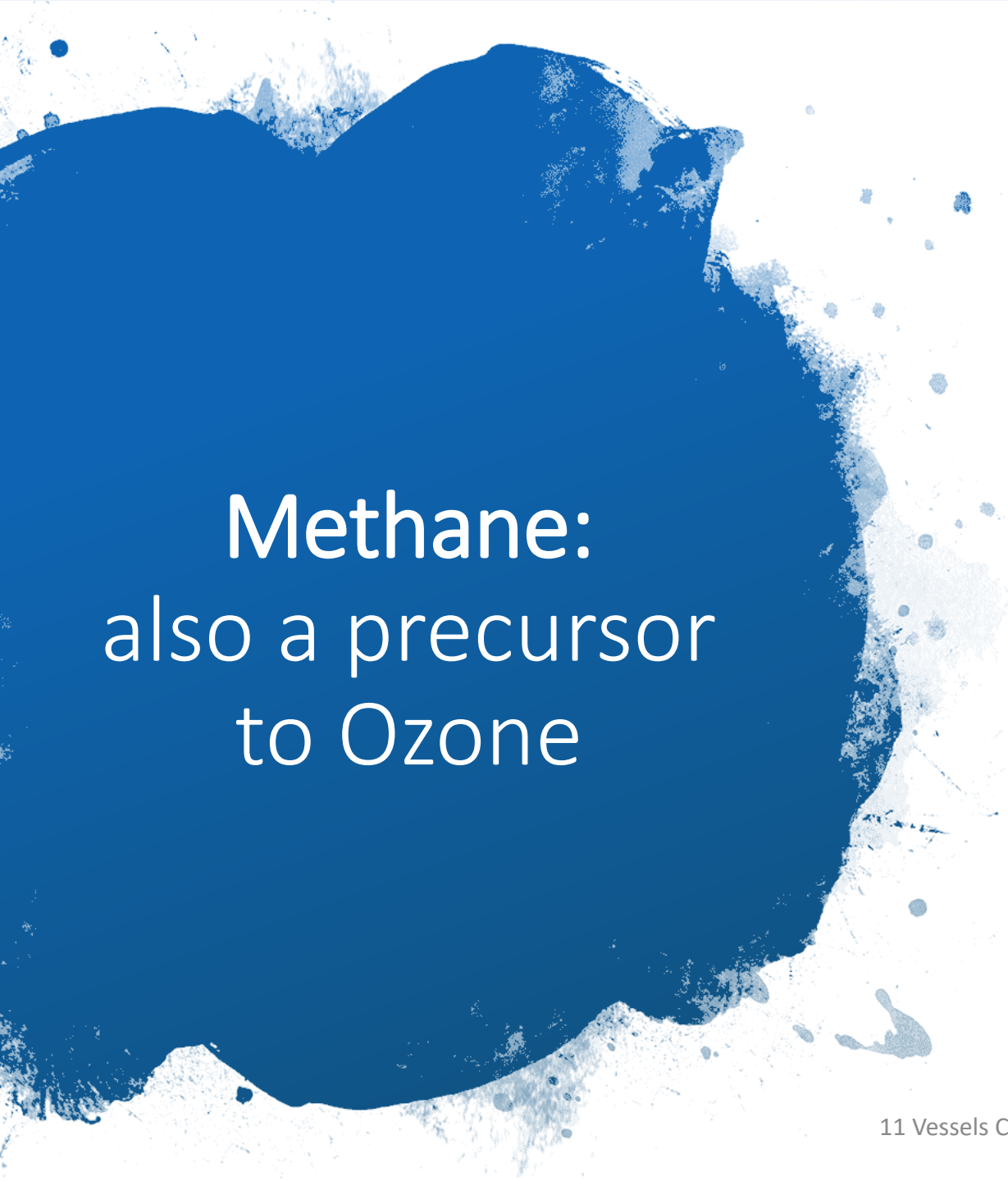
Methane has a GWP of 84

- Over the course of twenty years methane molecules have 84 times the heating potential as CO₂.
- Methane stays in the atmosphere for about 12 years. But in that time it does over a hundred times the heating a CO₂ molecule does in that same time.



Methane: Best Bang for the Buck

- Methane emission sources are numerous and don't always pertain to energy production
- As the arctic tundra thaws methane trapped in the frozen earth will be released into the atmosphere.
- Not all Methane emissions can be stopped so we must stop emissions wherever we can however we can.



Methane: also a precursor to Ozone

- When Methane does finally break down in the atmosphere it reacts with other air molecules like NO_x to form tropospheric Ozone.
- Ozone is toxic and has been linked to respiratory diseases and a reduction in crop yields.

Making this real

Colorado Department of Health and Environment projected that in 2019 average daily methane emissions from within Colorado would be about 220 million cubic feet. That is equivalent to the daily CO2 emissions from **28 million passenger vehicles.**



Bibliography

- <https://www.nytimes.com/interactive/2018/08/01/magazine/climate-change-losing-earth.html>
- USDA 2018