THINK THEY'LL PAY ATTENTION TO US NOW?

DANGER

Climate Change

Penguin holding a sign saying 'DANGER' and another penguin holding a sign saying 'Climate Change'. A polar bear is on an ice floe in the background. The scene is set in the Arctic, highlighting the impact of climate change on wildlife.
Two knobs

- Warmer
- Cooler

- Off
- Hi
- Med
- Lo
One third
Bending the curve
Climate Implications of Methane

KG FOR KG METHANE TRAPS

84X MORE HEAT OVER 20 YEARS

CO₂

CH₄

About **25 percent of the man-made warming** we are experiencing today is caused by methane.
Anthropogenic methane sources

- Fossil fuels: 85-105 Tg/yr
- Waste decomposition: 65-90 Tg/yr
- Domestic ruminants: 85-95 Tg/yr
- Rice cultivation: 30-40 Tg/yr
- Biomass Burning & Biofuels: 30-40 Tg/yr
5 priorities

1. Put a price on methane
2. Most rapid progress in oil and gas
3. Landfill programs doable
4. Potential in agriculture
5. Better data for all
Two knobs

- Warmer
- Cooler

- Off
- HI
- MED
- LO
Fresh facts on emissions from oil & gas
24 Published Studies Thus Far...


Barnett Coordinated Campaign Papers (July 2015)

13. Overview: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b02305](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b02305)
14. NOAA led Top-down study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00217](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00217)
16. Functional super-emitter study - EDF: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00133](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00133)
17. Michigan airborne study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00219](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00219)
18. WVU compressor study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00163m](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00163m)
19. Princeton near-field study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00705](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00705)
20. Purdue aircraft study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00410](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00410)
21. Aerodyne mobile study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b06352](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b06352)
22. U of Houston mobile study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b063055](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b063055)
23. Picarro mobile flux study: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00099](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00099)
24. Cincinnati tracer apportionment: [http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00057](http://pubs.acs.org/doi/abs/10.1021/acs.est.5b00057)
Lessons Learned from the Studies

1. Oil and gas methane emissions are higher than conventional estimates suggest;
2. Heavy-tailed distributions;
3. Reducing emissions is straightforward and cost-effective; and
4. Regulations work to narrow the range of performance amongst companies.
Anthropogenic methane sources

- **Biomass Burning & Biofuels**: 30-40 Tg/yr
- **Domestic ruminants**: 85-95 Tg/yr
- **Rice cultivation**: 30-40 Tg/yr
- **Fossil fuels**: 85-105 Tg/yr
- **Waste decomposition**: 65-90 Tg/yr
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