

Emissions Discussion

HARC Science Advisory Committee

March 30, 2009





Why worry about “Emissions”?

- **Emission inventories are the foundation of a cost effective control strategy.***
- **Emission factors are the cornerstone of the foundation.***

*From NARSTO Emission Inventory Assessment

Motivational Quotes from “2009 TERC Science Synthesis”



- Regarding **Formaldehyde**:
- “Tens of ppb of additional ozone could be formed from uncounted sources of formaldehyde ...”
- “...primary (and therefore potentially controllable) emissions of formaldehyde may responsible for 39% of total atmospheric formaldehyde in Houston.”
- “...formaldehyde directly emitted or formed very rapidly within industrial plumes in the HSC may be more than 30 times the amount reported in the most recently available TCEQ emission inventory.”
- “...Formaldehyde may be associated with HSC emissions of SO₂, the source of which has not yet been identified.
- “Currently uncounted or possibly underestimated emission of formaldehyde, such as releases from flares and or from area sources...should be measured more rigorously.”

Motivational Quotes from “2009 TERC Science Synthesis”



- Regarding **VOC emissions**:
- “...VOC emissions from industrial point sources are likely underestimated by an order of magnitude...”
- “...industrial flare and wastewater emissions of VOCs may be significantly greater than reported by industry to the TCEQ.”
- “[VOC]...emissions from the HSC play a major role in not only the 1-hour exceedances, but also the 8-hour exceedances in the HGB area.”
- “Continued effort is needed to improve mobile, point, and areas source emission factors, as well as methods for future projection of emissions.”
- “The combination of advanced remote sensing and inverse modeling techniques may improve the accuracy and spatial/temporal resolution of emission inventories.”
- “...reported ethene and propene emissions in HGB approximately doubled (in the Special Inventory effort).”

Motivational Quotes from “2009 TERC Science Synthesis”

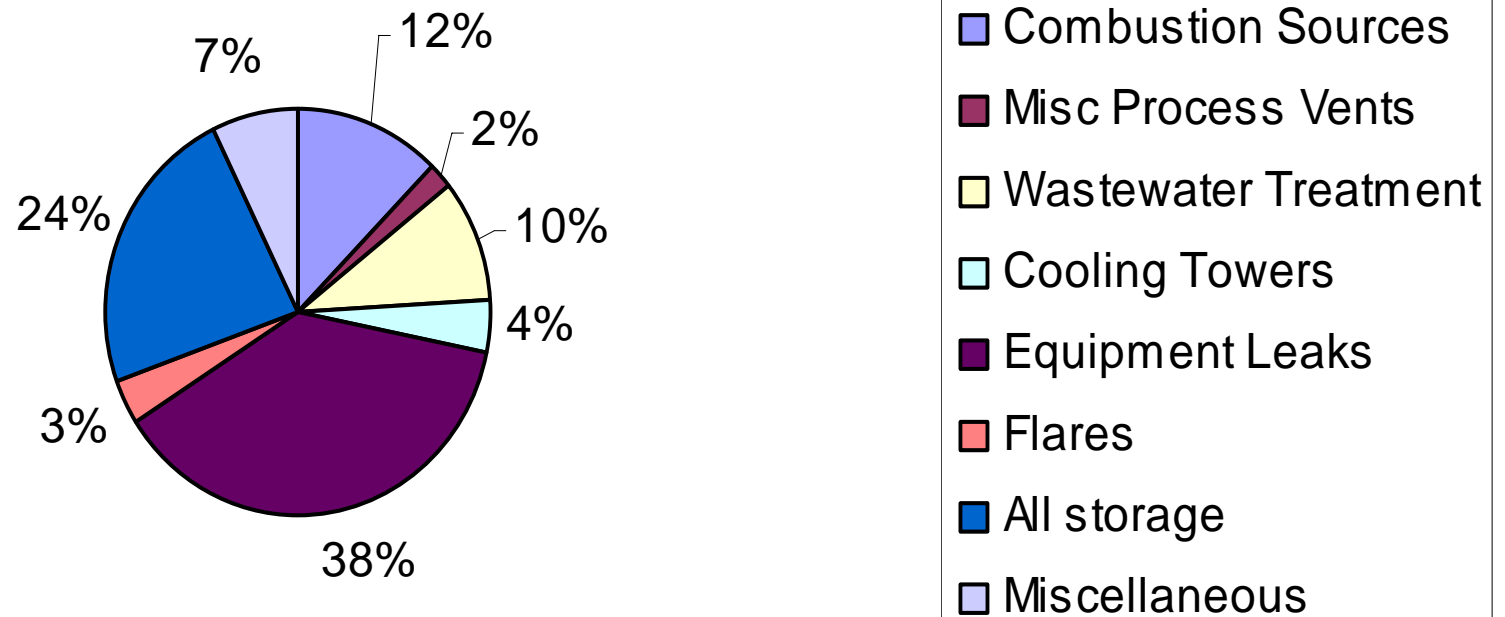


- Regarding **CO, NO_x & SO₂ emissions**:
- “The MOBILE6 model overestimates the ratio of CO to NO_x in mobile emissions by about a factor of three...”
- “The MOBILE6 model used in SIP applications should be improved to correct deficiencies in predicting CO and NO_x emissions.”
- “Emissions of NO_x, SO₂, and CO from commercial marine vessels cannot be neglected in inventories for port regions and possibly for areas.”
- “...emissions of point sources equipped with CEMS are very well known.”



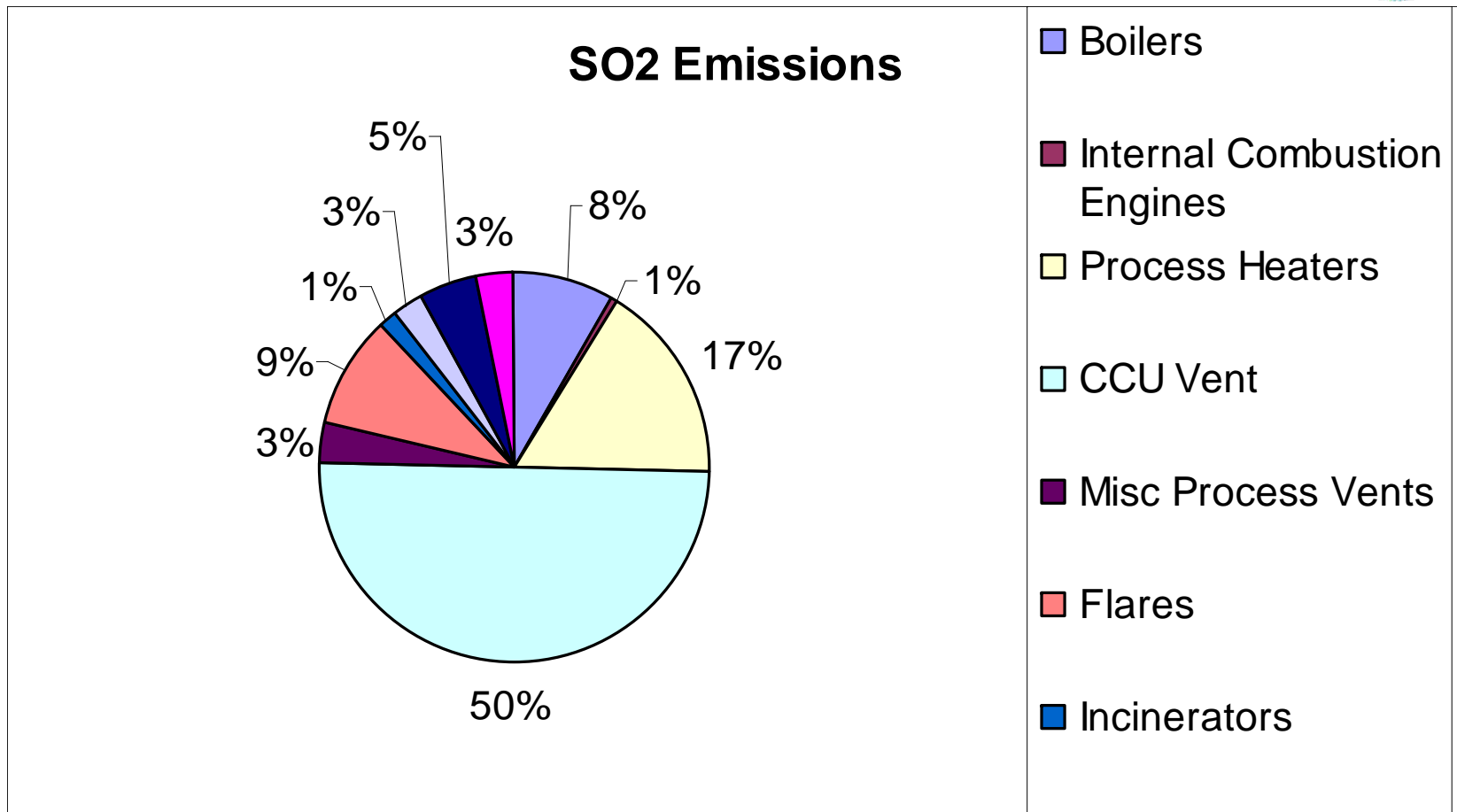
Emissions Summary for Petroleum Refining

VOC Emissions





Emissions Summary for Petroleum Refining



Motivational Quotes from “2009 TERC Science Synthesis”



- Regarding **Table ES-2 Summary of Key Science Issues “for Emission Inventories”**:

TOPIC	# of Highs
Plume Inverse Modeling	3
Point Sources	2
Remote Sensing	2
Formaldehyde	2
Area Sources	1
Biogenic Sources	1
Mobile Sources	0
HONO	0

Strawman Research Recommendations (David's)



- Develop, peer review, bless, and post an Emission Inventory for the 2006 intensive period and for the future for all source categories for use in assessment, modeling, and policy analysis activities.
- Utilize latest and greatest source monitoring techniques to improve emission characterization for:
 - Fugitives
 - Flares
 - Wastewater
 - Cokers
 - Tanks
 - Cooling towers
 - Hydrogen plants/steam reforming (formaldehyde?)
 - Barges
- Analyze data from emission and ambient events (including 1200#/day reg) .
- Utilize MOVES for assessing mobile source emissions.

Discussion Topics



Emissions: What do we know, what do we need to know, how do we get there?

- a. How do we reconcile the gap between reported emissions and ambient observations? --
Prioritize emissions inventory/factor needs:
 - i. By pollutant
 - ii. By source type
 - iii. How do top-down monitoring and emissions results inform i. and ii?
- b. What tools are available to fill data gaps?
- c. How can industry be engaged in providing or participating in the collection of emissions data and control efficiencies, and in defining and implementing best practice?
- d. How can emissions inventories be used to prioritize sources needing further control?
- e. How can emissions inventories and emissions factors be used to identify and quantify control techniques that work and are cost effective?
- f. What is the role of public information dissemination (e.g., HARC's Air Research Information Infrastructure) in encouraging the availability of emissions data?

Strawman Research Recommendations (David's)

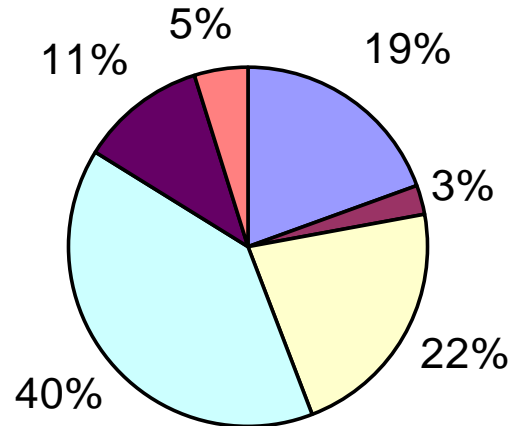


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Emissions Summary for Petroleum Refining

PM2.5 Emissions



- Boilers
- Internal Combustion Engines
- Process Heaters
- CCU Vent
- Cooling Towers
- Miscellaneous



Emissions Summary for Petroleum Refining

