EPA's Final Exclusion Rule for Petroleum Refining Secondary Materials Going to Gasification

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Outline

- What we did
- Why we did it
- What does it mean to you
- What are the next steps?

- Issued a final rulemaking that revises the RCRA hazardous waste regulations to exclude petroleum refining residuals from the hazardous waste management system if they are destined for gasification.
- The final rule became effective as of February 1, 2008.

EPA's Objective for this Rule

- "This action serves what we believe is a national interest by capturing as much energy from a barrel of oil as possible to maximize production efficiencies at petroleum refineries in an energy constrained world."
- EPA supports increased energy efficiencies via regulatory changes, where possible.

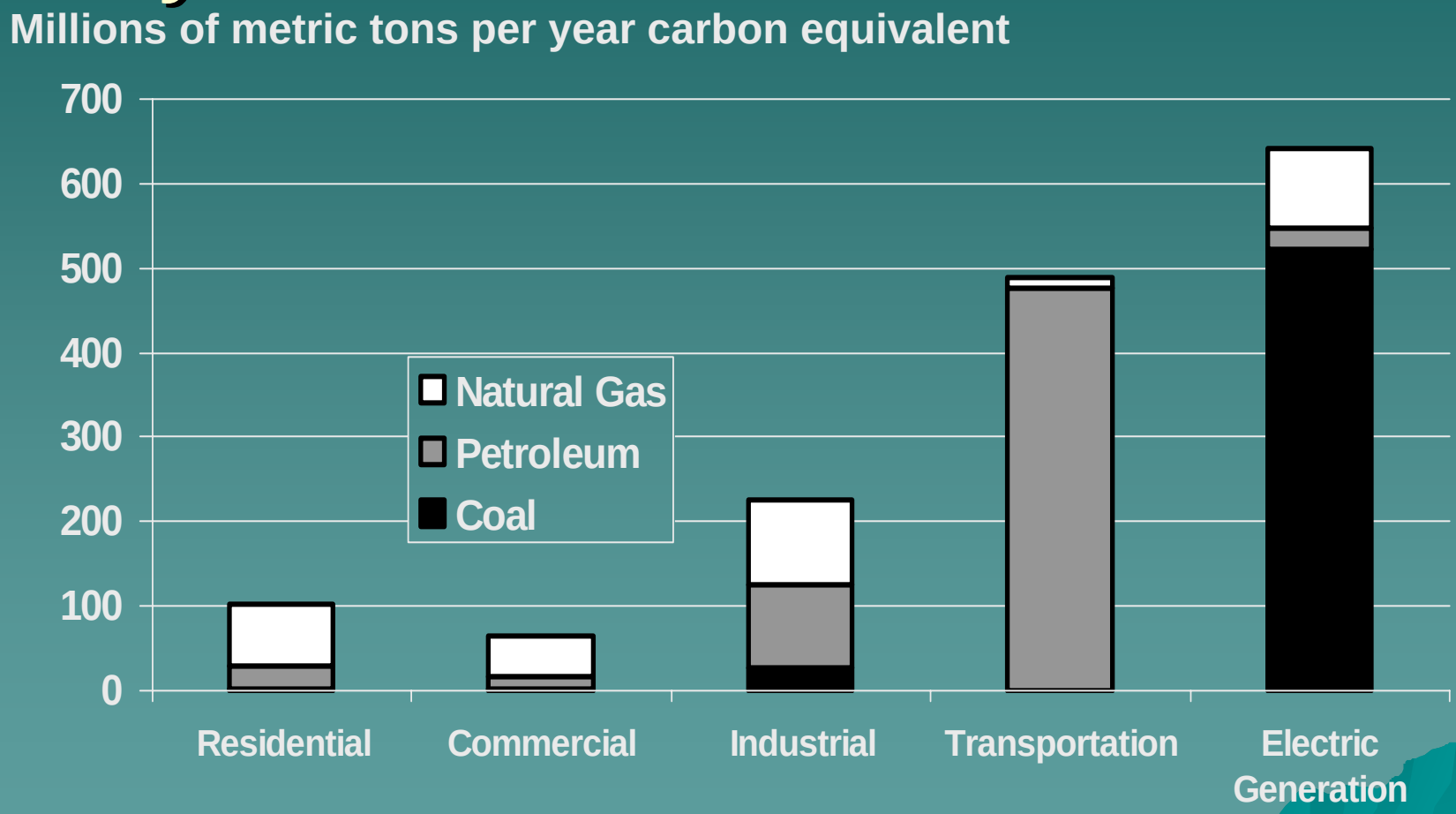
A Primary Focus in EPA Decision Making

- Greenhouse gases (GHGs) and energy efficiency measures are fast becoming a primary and integral part of the process of regulatory decision making.
- One aspect of this gasification rule: gasification has GHG benefits due to energy capture efficiency and CO2 sequestration potential.

CO2

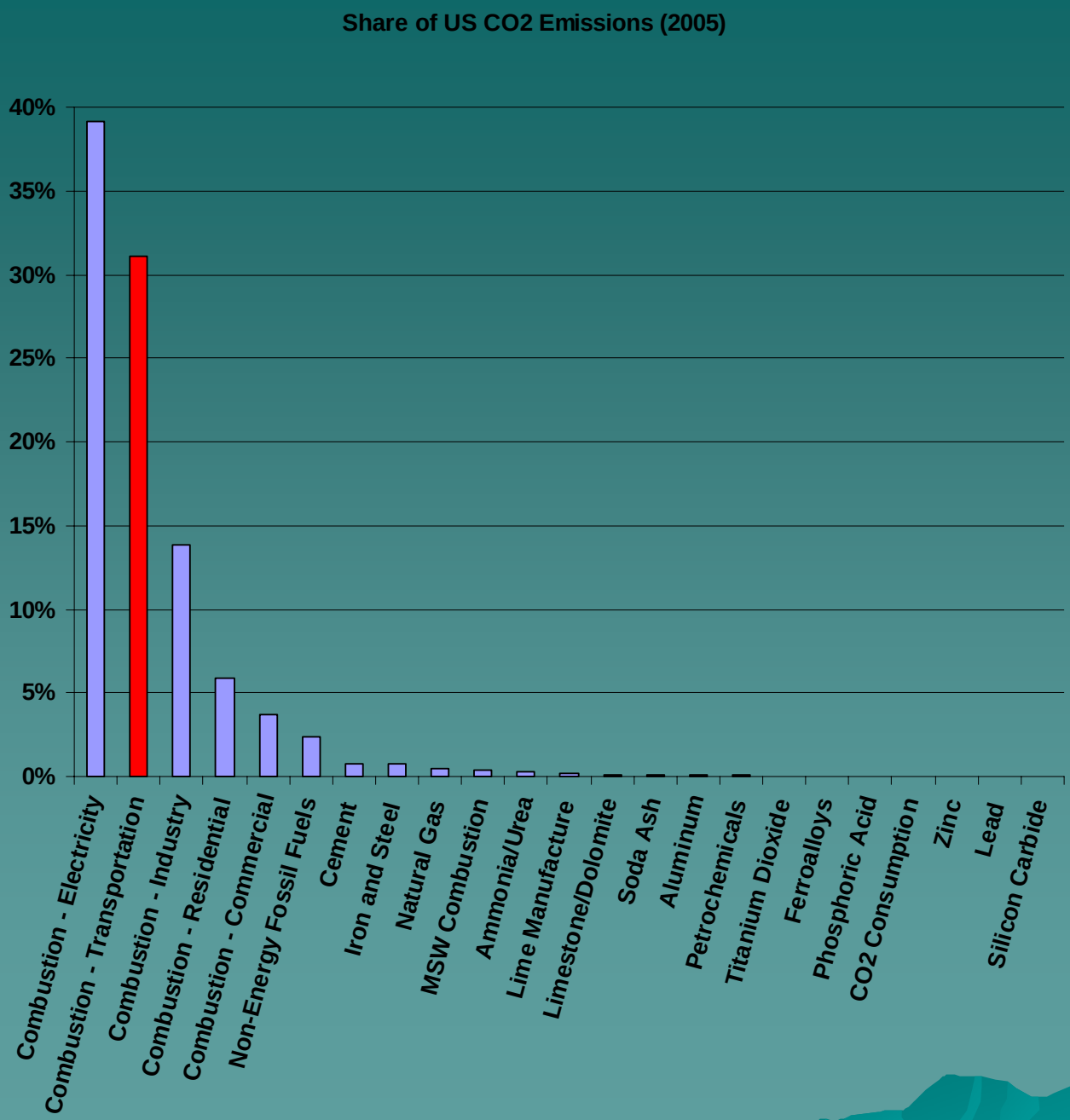
- 2005 total U.S. greenhouse gas emissions were 7,260 Tg CO2 Eq or about 22% of the world's total CO2 emissions from human activities.
- Total U.S. emissions rose 16.3 percent from 1990 to 2005, while U.S. gross domestic product rose 55 percent.

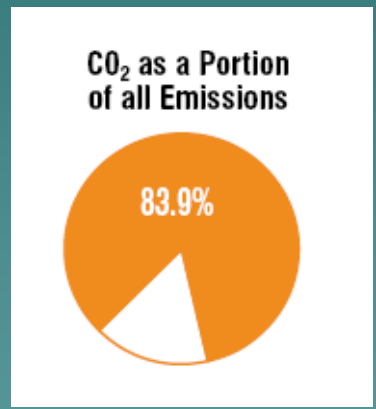
United States CO_2 Emissions by Sector and Fuels in 2001



Source: U.S. EPA Inventory of Greenhouse Gas Emissions, April 2002

US CO_2 Emissions by IPCC Source Categories





Advantages in Gasification

- EPA's rule formally recognizes and describes the benefits of gasification efficiencies and the impact on CO2.
- We see higher efficiencies that "offset" carbon outputs from less efficient systems.
- Gasification systems have lower air emissions per unit of energy produced.

Advantages in Gasification

- Another characteristic of gasification that will become increasingly important is the opportunity gasification provides to sequester CO2.

What we did

1. excluded petroleum residuals if gasified
2. defined “gasification” for the purposes of the rule
3. dropped three of the five conditions proposed in March, 2002
4. suggested we will pursue expanded exclusions in the future

What we did (continued)

- Originally proposed a new exclusion from the hazardous waste regulations for petroleum refinery wastes fed to a gasifier.
- The final rule uses an existing exclusion, 261.4(a)(12), and simply says gasification is a part of the refining process, therefore any listed or characteristically hazardous petroleum residual fed to a gasifier is not a waste.

What we did (continued)

- Proposal had a regulatory definition of gasification, including operational parameters
- Final keeps a definition but simplifies it to:
  - “Gasification is a process, conducted in an enclosed device or system, designed and operated to process petroleum feedstock, including oil-bearing hazardous secondary materials, through a series of highly controlled steps utilizing thermal decomposition, limited oxidation, and gas cleaning to yield a synthesis gas composed primarily of hydrogen and carbon monoxide gas.”

What we did (continued)

- Original proposal also floated the idea of an exclusion for any hazardous waste going to gasification.
- We received much negative comment on this so we didn't include it. The final rule is limited to SIC code 2911, Petroleum Refining.
- One big reason: State regulatory agencies were concerned about including all hazardous wastes. They feared loss of regulatory control based on "intent" to handle a waste

What we did (continued)

- Proposed rule included many conditions that would have had to be met to get the exclusion:
  - Unit meets a regulatory definition of gasification
  - Syngas meets regulatory specifications
  - Residuals meet Universal Treatment Standards for 6 metals limits prior to land placement
  - Materials management requirements (no spec accumulation, no land storage)

What we did (continued)

- Final rule eliminates the syngas spec requirement and the residuals requirements.
  - No RCRA regulatory requirements for syngas.
  - Residuals are “new points of generation” subject only to the standard hazardous waste characteristics tests.
- Only conditions in the final rule are no speculative accumulation and no land placement of residuals prior to gasification.

What we did (continued)

- Refining residuals may be used in on-site gasifiers or can be transported as feedstock to gasifiers at other refineries.
- Can’t be sent to a gasifier not part of a petroleum refining process to qualify for the 261.4(a)(12) exclusion.

Why we did it

- In absence of data on waste gasification, we promulgated a targeted exclusion we felt would survive a legal challenge.
- Decision really based on knowledge gained from observation of sites and calculations of worst case scenarios that showed very low potential for environmental impact.

Why we did it (continued)

- Not a small step for EPA. There have been attempts in the past to process waste materials and call it production. These really were “waste treatment” operations, not legitimate production units.
- Marine Shale, Inc. is one where the company claimed legitimate production but in fact operated a hazardous waste treatment unit.

Why we did it (continued)

- Dropped the syngas specification based on the rationale used for the rule: this is production, syngas is a product, therefore no need to exercise Federal jurisidiction.
- Initial concern that lack of a specification would allow waste treatment to pose as production is moot.

Why we did it (continued)

- Dropping the requirement for gasification residuals to meet the Universal Treatment Standard (UTS) based on an analysis of data from the petroleum listing showing low potential for toxic effects, if discarded.
- Note that any waste material from processing residuals prior to gasification are listed hazardous waste, F037.

What does it mean to refineries?

- Practical impact: any refinery can use hazardous oil-bearing secondary materials as feedstocks to any gasifier operating as part of a petroleum refining process. Gasifier must meet the definition.
- The material, the units (including storage), the process, the product, the residuals, no longer would have a “hazardous waste” designation.
- As process “feedstocks”, they are excluded from all hazardous waste management requirements.

What does it mean to States?

- If you have a petroleum refinery in your state, you could get:
  - A notification that oil-bearing secondary materials will be gasified as feedstocks
  - A request to ship oil-bearing secondary materials off site as feedstock to another gasifier
  - A modification of the TRI reporting for a petroleum refinery gasifying secondary materials that were reported as hazardous

Significance of this rule

- The policy implications:
  - Gasification is integral to an industrial process even if it uses previously lower grade materials as feedstocks because it supports national goals involving energy efficiency.
  - Designation of materials within production processes as wastes subject to regulation may be unwarranted where advances in production allow such materials to be recovered as product.

- Gasification of secondary residuals falls within the scope of normal refining operations even when applied to material that has historically been managed as a waste.

- This final rule sets up special regulatory considerations for gasfiers.
- It says that gasification is a technology with benefits from an environmental impact perspective.
- It provides a springboard to other actions.

What are the next steps?

How valuable would it be to continue to expand this exclusion to include additional hazardous wastes that could be used as feeds to gasifiers?

What are the next steps?

- About 7 to 10 million tons of previously hazardous refining residuals might be gasified. Small volumes, relatively.
- Any secondary materials currently held, like Clarified Slurry Oil sediment, can be gasified.
- There are an estimated 35 million tons of non-wastewater hazardous wastes potentially usable as feedstocks for gasifiers.

Potential Next Steps - Options

- We could do nothing, meaning such non-refinery wastes would be required to go to RCRA permitted units only.
- We could re-propose a blanket exclusion for all hazardous wastes with energy content if they are destined for gasification.
- We could propose a modified exclusion that designates other industrial sector's wastestreams as excluded, if gasified.

Options

- We could propose a self-implementing exclusion mechanism. It could:
  - provide individual facilities or companies a process to alert states or EPA that a former hazardous waste would now be fed to a gasifier as feedstock, not as a waste.
  - With certain requirements, such as record keeping, the exclusion would go into effect upon notification. No formal comment required.

Energy Independence and Security Act (EISA) of 2007

- The 2007 energy legislation expands the requirement for “renewable fuels” . EPA calls this the Renewable Fuels Standard 2 (RFS2)

RFS2: 4 Nested Stds

Year	Total Advanced Biofuel			Total Renewable Fuel
	Biomass-Based Diesel	Cellulosic Biofuel		
2007				4.7
2008				9.0
2009	0.5		0.6	11.1
2010	0.65	0.1	0.95	12.95
2011	0.80	0.25	1.35	13.95
2012	1.0	0.5	2.0	15.2
2013	1.0	1.0	2.75	16.55
2014	1.0	1.75	3.75	18.15
2015	1.0	3.0	5.5	20.5
2016	1.0	4.25	7.25	22.25
2017	1.0	5.5	9.0	24.0
2018	1.0	7.0	11.0	26.0
2019	1.0	8.5	13.0	28.0
2020	1.0	10.5	15.0	30.0
2021	1.0	13.5	18.0	33.0
2022	1.0	16.0	21.0	36.0

- Much ethanol production in the U.S. does not have a positive carbon signature. It takes much fossil fuel to make corn ethanol.
- Efforts to improve this problem could involve increased use of power generated by technologies like gasification which have better efficiencies than baseline power production facilities like coal-fired plants.

"Renewable Fuel" - Lifecycle

- Renewable fuels must meet a 20% threshold for lifecycle GHG emission performance relative to the gasoline or diesel fuel they displace
  - 2005 baseline required to be used for gasoline and diesel fuel
    - Presumed to be gasoline and diesel without the renewable content in 2005
  - Requires that we define subgroups of renewable fuel type/feedstock/process for evaluating GHGs
    - Will determine which fuels are valid under RFS2