

Benoit Delaveau, MS, BEAP, CEM (aka Prof. Ben)
benoit.delaveau@sjsu.edu
Office hours sign-up here: <https://calendly.com/benoit-delaveau>

ENVS 119 - Energy & the Environment

05 - Coal Energy (2), a Transition in Progress

Today

- Coal Power Plants are closing
- Apalachian Basin v. West
- Underground v. Mountain top removal
- Coal Energy Issues
- CCS
- Q/A - Wrap-up



© Photo/Adobe stock - US "Saudi Arabia of Coal"

U.S. Coal Power Plants are Closing

1. from 45% (2006) US electricity to 23% in 2019
2. 500 Coal power plants of 500MW+ (1950s) in the US
3. 50+ units retired in 2015 alone (average age = 54 yrs!)
4. each 500MW coal plant = 3 Million tons CO₂/yr



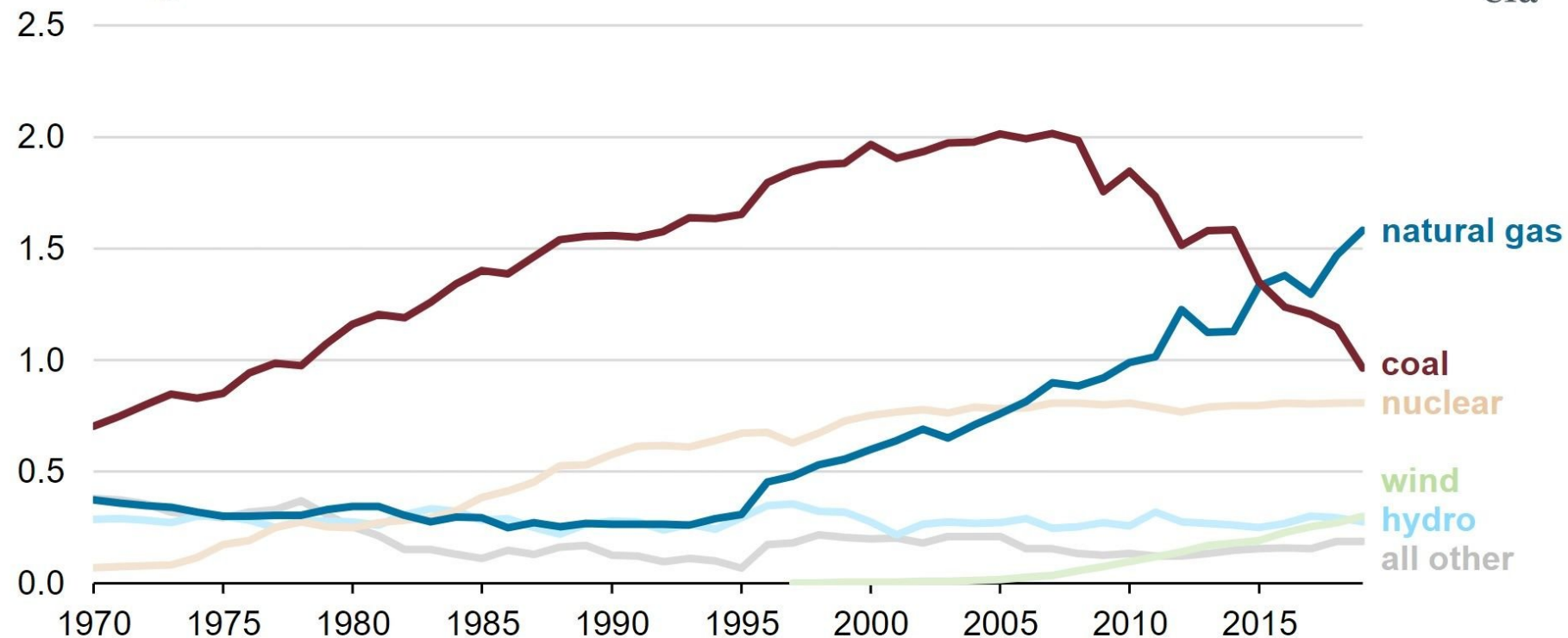
The San Juan coal generating station provides 10% of Santa Clara's electricity through 2017

U.S. Coal is replaced by NG/Wind/Solar

U.S. coal-fired electricity generation in 2019 falls to 42-year low

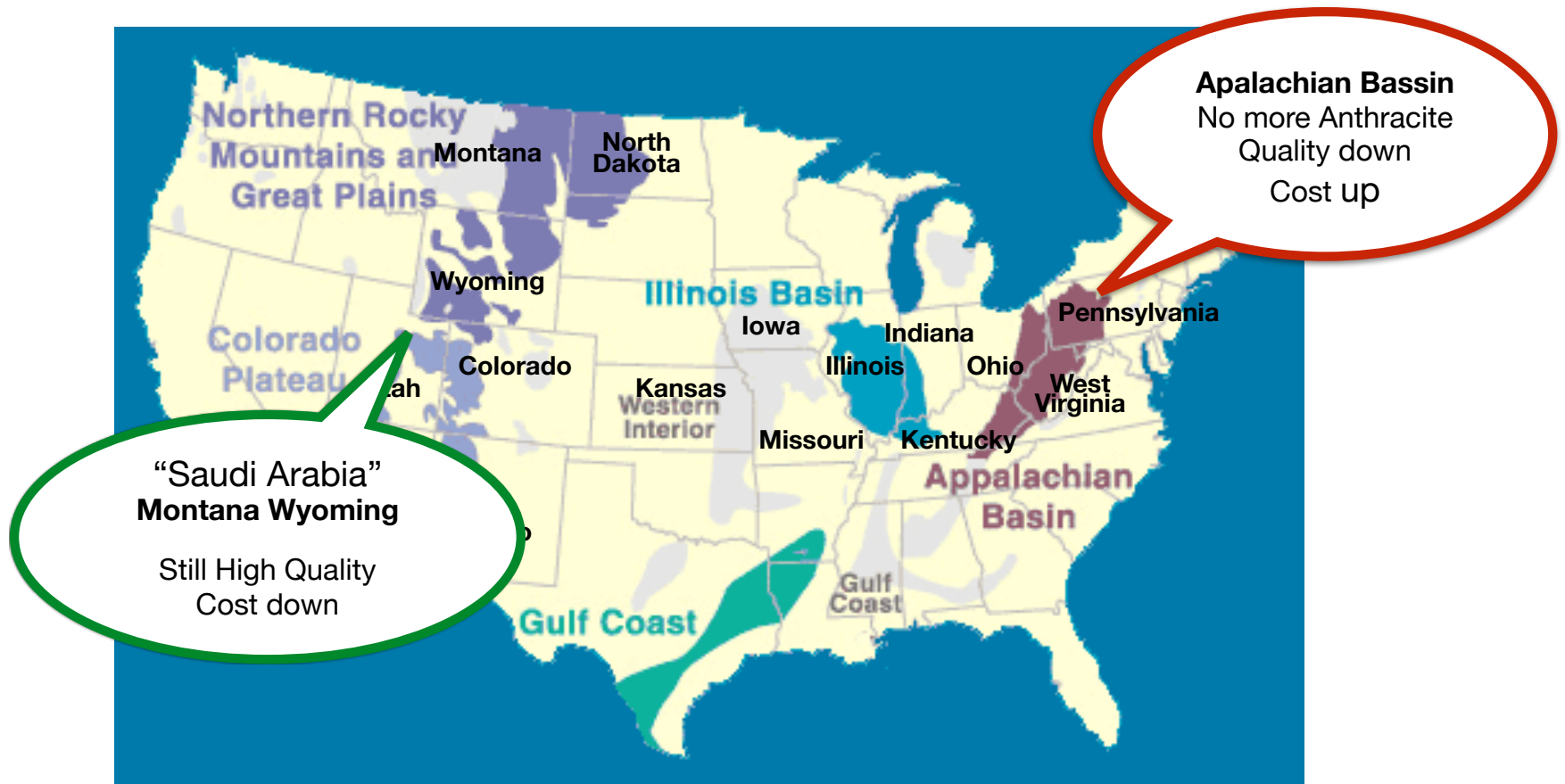
U.S. annual electricity generation by energy source (1970-2019)

billion megawatthours

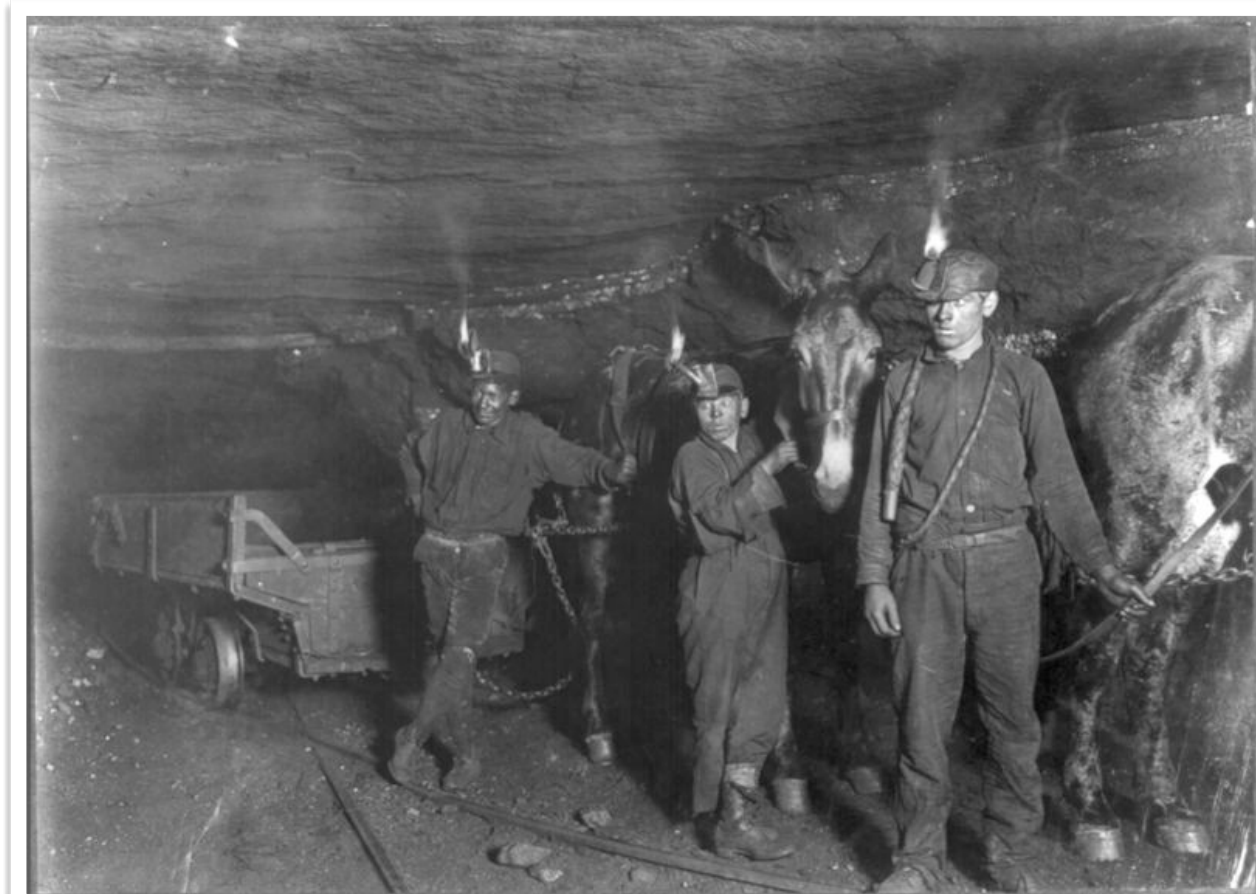


Source: U.S. Energy Information Administration, [Monthly Energy Review](#)

Competition between US regions

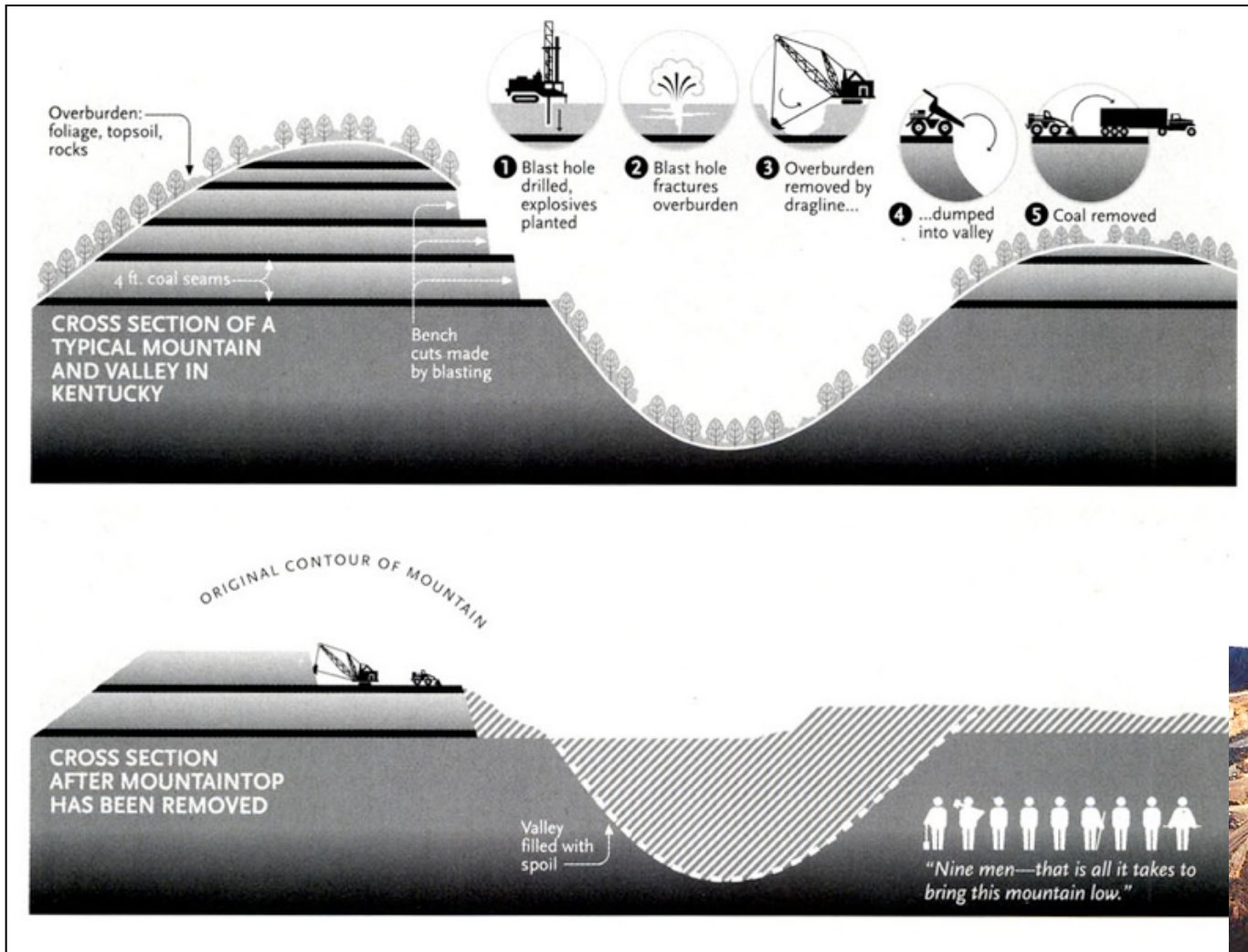


Coal mining technology (1900+ US)



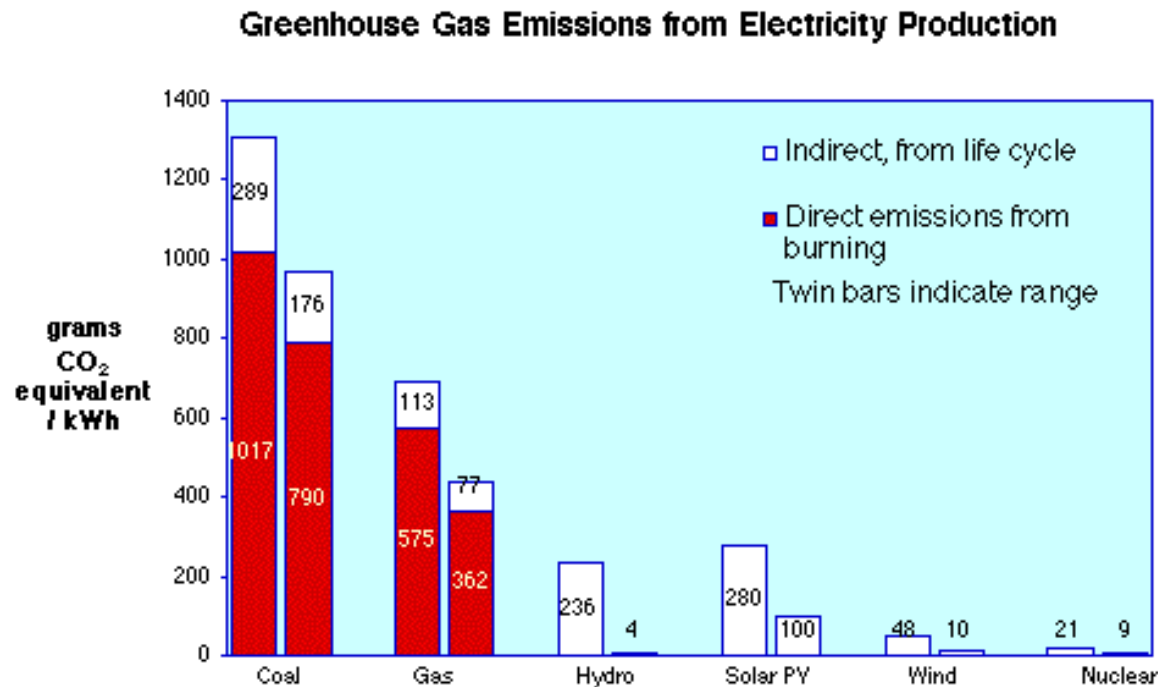
© Photo/Adobe stock - Underground Coal Miners Working Circa 1915

Coal Mining Now = Mountain Top Removal

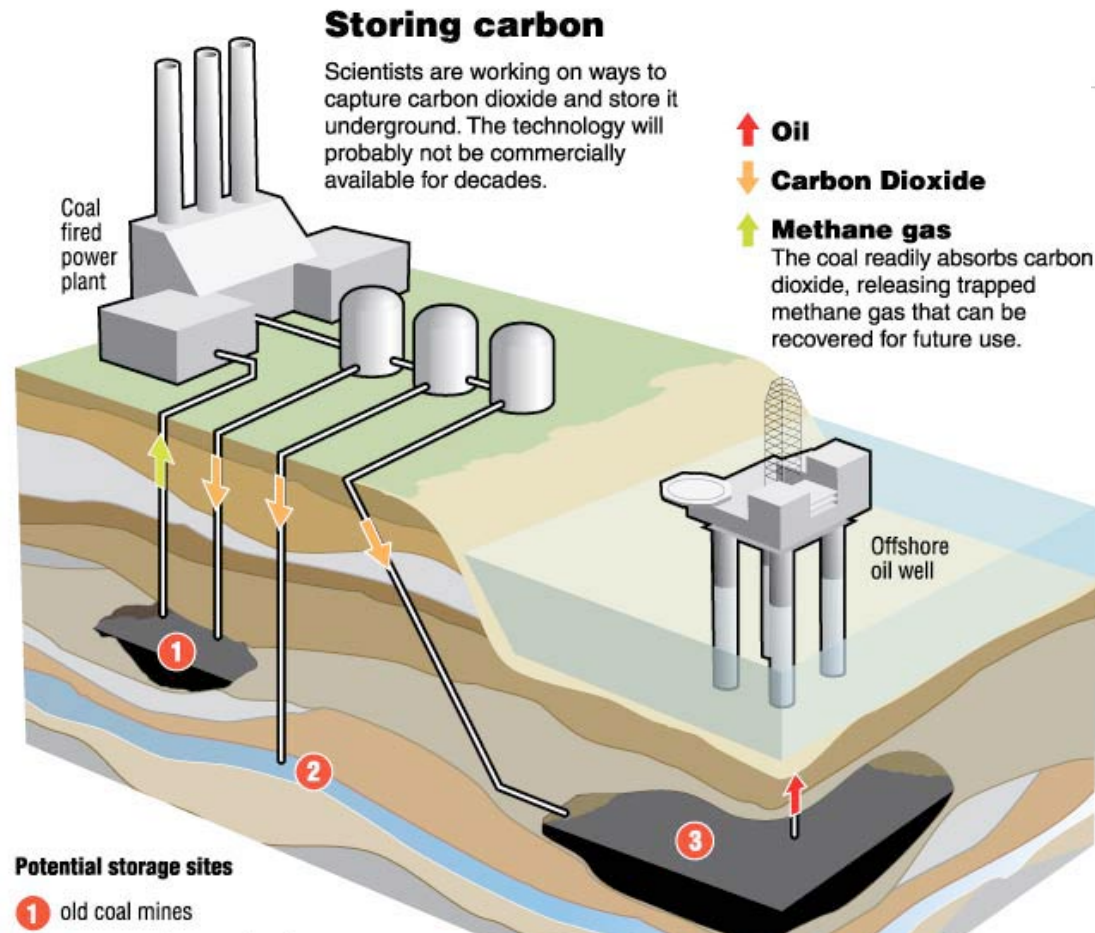


Coal Issues

1. Bring poverty where it is mined (short term eco. dev.)
2. Deadly emissions where it is burned (Mercury, SO_x/NO_x, PM...)
3. Fly-ash long term storage (?)
4. CO₂ Emissions/Climate Change = Most CO₂ per kWh



Solution? “Clean” Coal Powerplants with CCS



CCS - Unanswered Questions

1. Property rights and long-term responsibility
2. Liability for accidents
3. Site licensing & monitoring (CO₂ leaks?)
4. Who pays? transfer long term costs to the public
5. What happen if companies go bankrupt?
6. Fly-ash? Local pollution Mercury/Sox/Nox/PM? = no answers

ENVS/ENGR 119 - Lecture 05

Q/A

End