ORGANIZATIONAL POLITICAL ECONOMY AND GREENHOUSE GAS EMISSIONS: A MULTILEVEL ANALYSIS OF THE U.S. ENERGY SECTOR

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Macro-Level Analysis

- This line of research maintains that environmental degradation is linked to economic growth and development (Dunlap and Catton 1979; Catton 1980; Schnaiberg 1980; O'Connor 1998; Buttel 2004; Foster, Clark and York 2010).

- A variation on this macro-level focus is ecological modernization theory, which maintains that decentralizing government power and encouraging corporate self-policing (i.e. market solutions) will result in lower environmental pollution (Mol 1995).

Community-Level Analysis

- Environmental justice/environmental inequality research focuses primarily on toxic emissions from production facilities and shows that the adverse effects of pollution has greater affects on disadvantaged communities: those with high poverty levels and/or a large portion of minorities (Bullard 1994; Pellow, Weinberg and Schnaiberg 2001; Freudenburg 2005; Saha and Mohai 2005; Downey 2007).

Meso-Level (Organizational) Analysis: Plants

- Organizational sociologists Charles Perrow brought attention to organizations as polluters when he published an article that identified ‘organizations as the most intensive and effective environmental polluters’ (1997:66).
- Perrow’s paper was followed by research that focuses on plants/facilities:
  1. The effects of organizational characteristics of production facilities on toxic emissions (Grant et al. 2002; Grant and Jones 2003).
  2. Combinations of community and facility characteristics effect toxic emissions (Grant, Trautner, Downey and Thiebaud 2010).
  3. Age, size and location of electrical energy plants in the global economy affect their carbon dioxide emissions (Grant, Jorgenson, and Longhofer 2016).

Meso-Level (Organizational) Analysis: Parent Companies

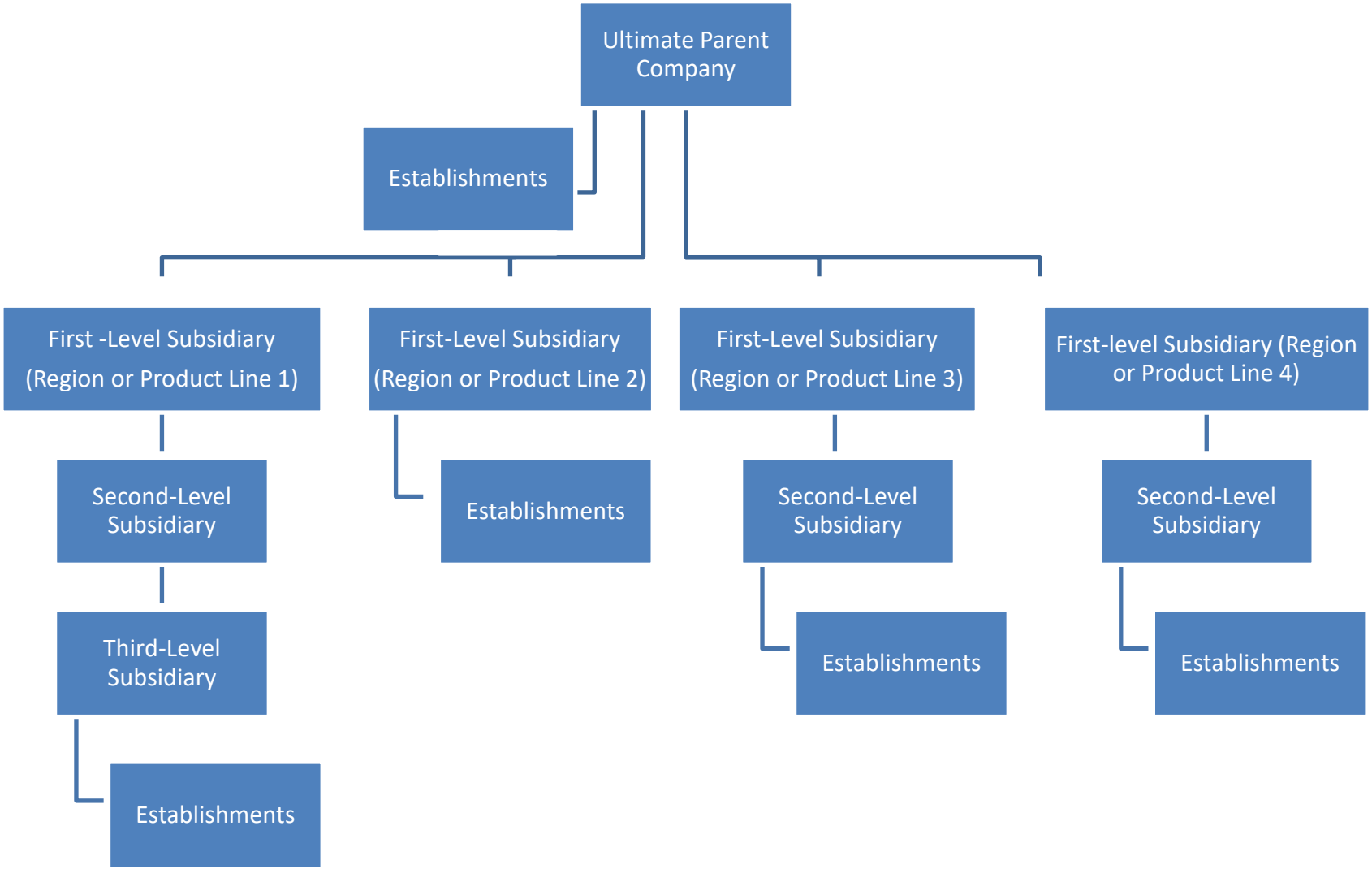
- Parent companies have ownership control over a large number of production facilities directly or indirectly through their subsidiary corporations: entities in which the parent companies owns more than 50% of the stock (Dun and Bradstreet).

- This corporate form spread after changes in 1986 in corporate tax laws.

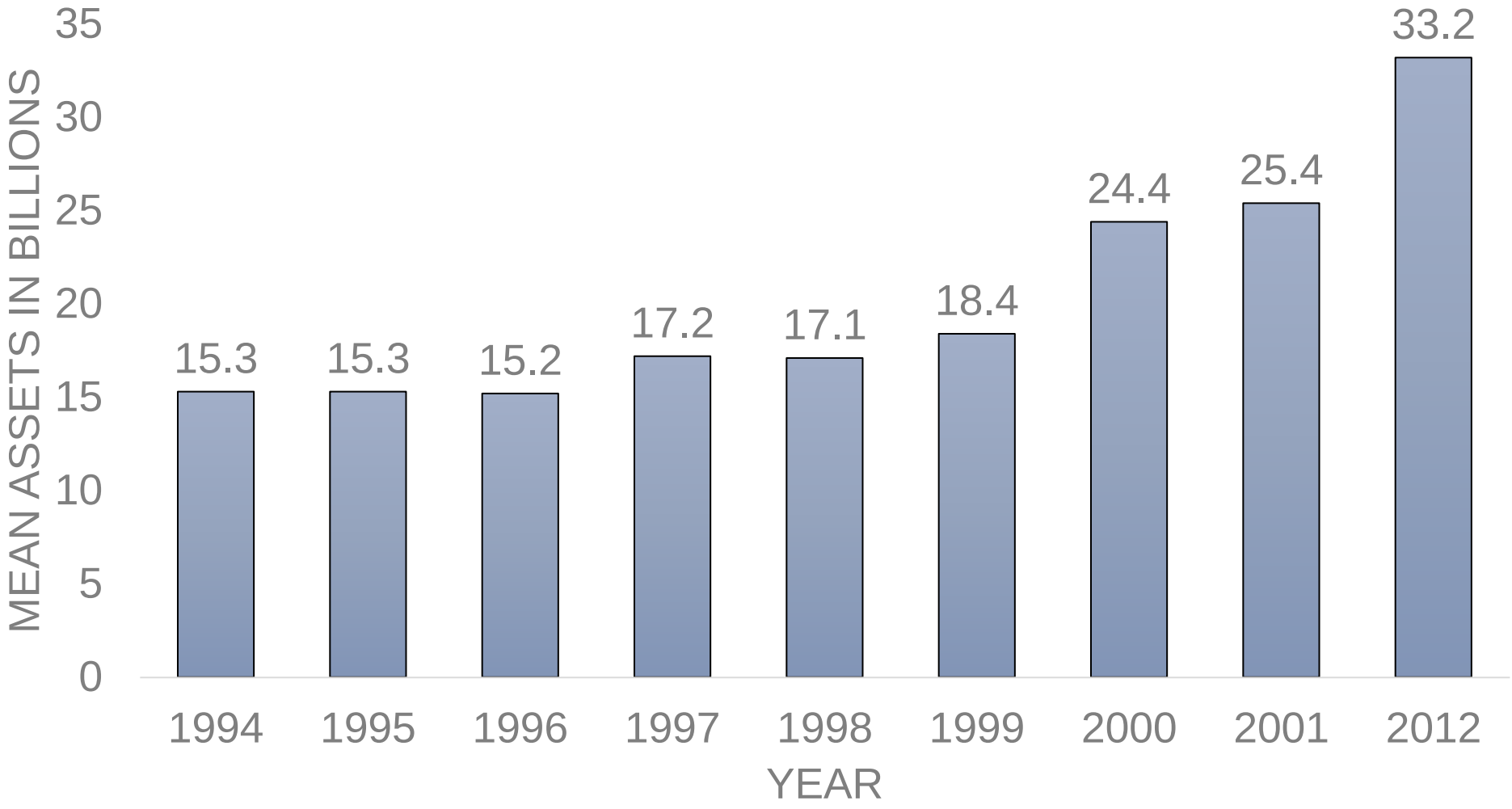
- By 2004, 84.7 % of the 2002 Fortune 500 companies were structured as the multilayer-subsidiary form: one or no divisions and multiple subsidiaries (Prechel and Morris 2010).

- By 2004, the mean number of subsidiaries among the 2001 Fortune 500 was 39. 37 of these companies had more than 100 subsidiaries that were hierarchically structured in up to 8 levels. Of these 37 companies with more than 100 subsidiaries, 10 had more than 200 subsidiaries and 2 had more than 300 subsidiaries.

Proto-Typical Multilayer-Subsidiary Corporate Form



Mean Asset Value of Parent Companies in the U.S. Electrical Energy Industry (2001 values)



*Compustat, 1994-2001, Fortune 500, 2012

Operating Hypothesis

- The organizational characteristics of parent companies is an outcome of the history of their strategic decisions, which affect the polluting behavior of their production faculties.
  - Strategic decisions include capital allocation decisions including whether to invest in pollution abatement technologies and renewable energy sources or implementing diversification strategies.
- Previous research on the energy industry shows that parent company organizational complexity (e.g., number of subsidiaries) and subnational state environmental strengths and weaknesses affect toxic emissions (Prechel and Zheng 2012; Prechel and Istvan 2016) and CO_2 emissions (Prechel in progress).

Conceptual Focus

- Dimensions of the social structure are intertwined and cannot be understood in isolation from one another (Weber 1921 [1978]; Polanyi 1944 [2001]).
- Social structures are critical components of the shift from fated risks in traditional societies to created risks in modern society (Beck 2009:25; Giddens 1999).
- We are interested in whether:
- 1- parent company characteristics, and
- 2- plant characteristics
- affect their rate of pollution.

Why Bring this Project into a Federal Statistical Research Data Center?

1. Limited public data exists on facilities/establishments.
2. We hope to link our public data to restricted use data on establishments (e.g., foreign ownership, management operating programs).
3. Eventually, we plan to extending our research to include community characteristics by matching plants to the communities in which they are embedded (using geographic overlays).
4. Compiling this data set will permit us to conduct HLM analysis of 2 and possible 3 levels of the social structure (i.e., parent companies, facilities, communities) to better explain environmental pollution.

Research Design

- Unit of Analysis: Production facilities that publically traded U.S. parent companies hold ownership control over either directly or indirectly through their subsidiaries.
- Study Group: Facilities primarily involved in electric power generation, transmission and/or distribution (NAICS 2211)
  - We will use 6 digit NAICS to control for industry differentiations and primary type of fuel used by plants
- Statistical Technique: Hierarchical Linear Model
  - Level One: Facility
  - Level Two: Parent Company

Level-One (i.e. facility) Variables

Type	Variable	Measurement	Data Source
Dependent	Greenhouse Gas Emissions	Total Direct Emissions	GHGRP
		Carbon Dioxide (CO_2) Emissions	GHGRP
		Methane (CH_4) Emissions	GHGRP
		Nitrous Oxide N_2O Emissions	GHGRP
Independent	**Size**	**Total Assets**	**SSEL***
		Total Payroll	**SSEL***
Independent	**Age Inertia**	**Age**	**LBD***
Independent	Ownership Control	Percent Ownership by Parent Company	GHGRP

*** FSRDC Restricted Data**

Level-Two (i.e. parent co.) Variables

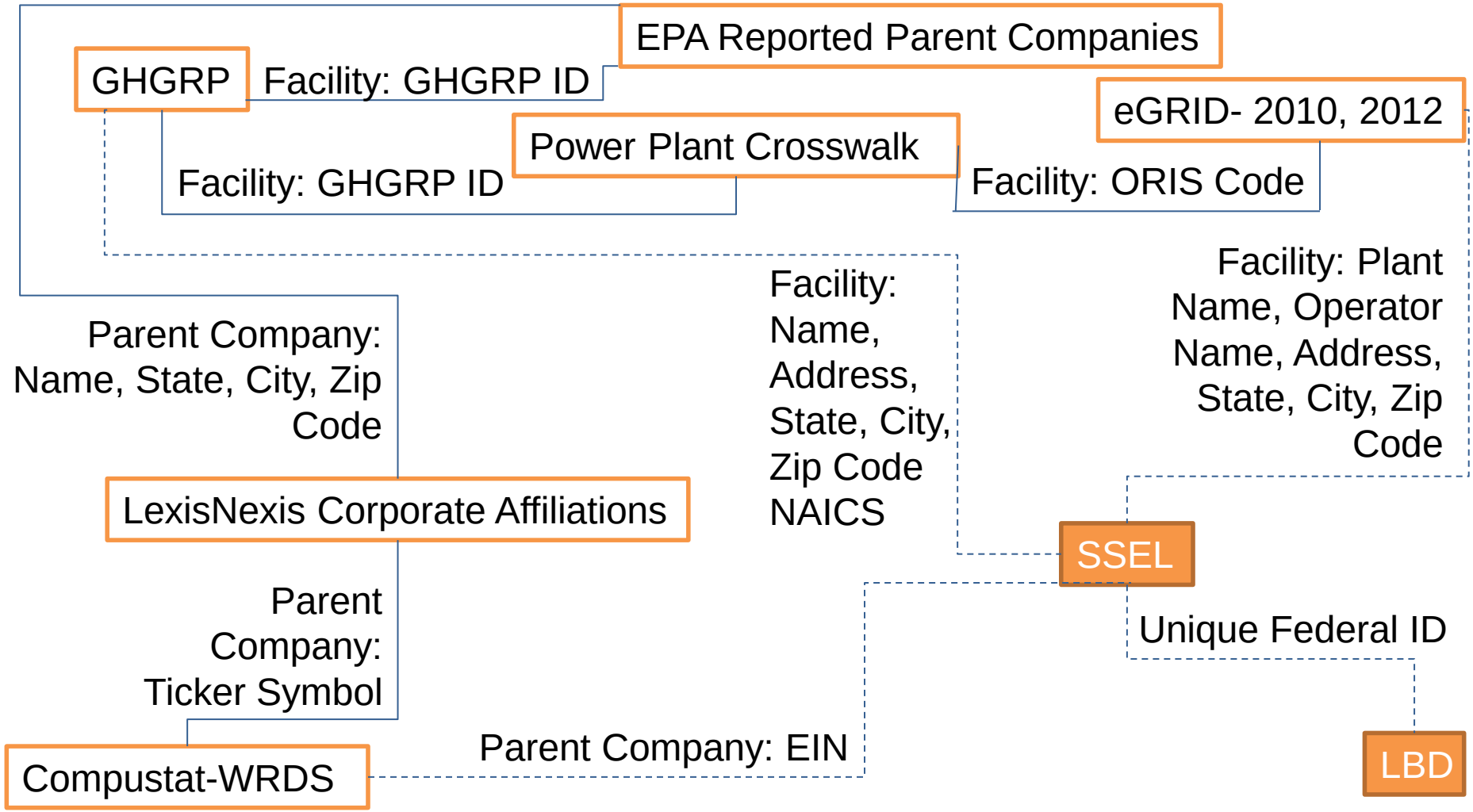
Type	Variable		Data Source
Independent	Size	Total Assets	Compustat
		Total Sales	Compustat
		Total Number of Employees	Compustat
Independent	Resource (i.e. financial) Dependence	Total Debt	Compustat
		Current Debt Due	Compustat
	Access to Capital	Profit Rate (i.e., gross profits/assets)	Compustat
		Return on Equity	Compustat
	Shareholder Value	% of Institutional Investors stock ownership	WRDS
Independent	**Organizational Complexity**	**Number of facilities**	**SSEL***
		Number of subsidiaries	LexisNexis
		Number of subsidiary layers	LexisNexis

*** FSRDC Restricted Data**

Datasets

- Downloaded at https://www.epa.gov/ghgreporting/ghg-reporting-program-data-sets
  - GHGRP, 2010-2013
  - EPA Reported Parent Companies
  - Power Plant Crosswalk
- Downloaded at https://www.epa.gov/energy/egrid
  - All eGrid Files
- From database available through Texas A&M University Libraries
  - Lexis Nexis Corporate Affiliations
- Downloaded from database available through Mays Business School
  - Compustat-WRDS
- Restricted Data
  - SSEL
  - LBD

Data Connection Plan



Progress: Public EPA Data

- GHGRP and EPA Reported Parent Companies: 2010-2013
  - 1,571 unique facilities within NAICS 2211 (5,760 total cases)
    - Problems with 5,760 cases
      - 348 were duplicate facility-years with different emissions data
  - 1,420 unique parent company unstandardized names and locations reported (2,793 total cases)
    - All facilities reported a parent company (100% match using GHGRP Facility ID)
- Comparison to LexisNexis Corporate Affiliations
  - Of 2,793 facility parent company reports
    - 1,137 parent companies are publicly traded in U.S.
      - 590 correctly reported the ultimate parent company
      - 547 did not correctly report the ultimate parent company
    - 1,010 parent companies were not-publicly traded in U.S.
    - 646 parent companies could not be confirmed

Progress: Other Public Data Merges

- LexisNexis Corporate Affiliations and Compustat
  - 100% match using ultimate parent company ticker
  - Of the reports of 1,137 ultimate parent companies publicly traded in U.S., 75 were foreign companies
- GHGRP and Power Plant Crosswalk
  - 98.21% match of facilities in NAICS 2211 using GHGRP Facility ID

    103 of 5,760 did not match
- Power Plant Crosswalk and eGRID
  - eGRID data only available for two (2010 & 2012) of the four years of our study
    - 95.13% match between 2010 GHGRP and eGRID facilities in NAICS 2211
      - 68 of 1,328 did not match
    - 95.80% match between 2012 GHGRP and eGRID facilities in NAICS 2211
      - 61 of 1,452 did not match

Progress: Restricted Data Connections

- In Progress of Matching Public Facility Data with Restricted Data (SSEL)
  - Using name, address, city, state, NAICS
- Problems
  - EPA facilities list plant names rather than operating company names
  - Numerous facilities in restricted dataset have the same location and NAICS
  - Some reported EPA facility physical locations do not match any reported SSEL establishment physical locations

Questions? Suggestions?

- Contact Information
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