Research Objective:
To identify existing capacity and potential constraints within the U.S. coal distribution network and to estimate the costs and coal price effects of alleviating those constraints under four growth scenarios for coal demand.

Background:

**Coal Demand Growth Scenarios:**

1. **BAU1**
   - Business as Usual (BAU) using projections from EIA for coal use and assuming that all coal plant-time and in the future—are pulverized coal

2. **BAU2** and **BAU2S**
   - Same as BAU1, but assuming that all newly built coal plants will be more efficient integrated gasification combined cycle (IGCC) plants and that all old coal plants will be gradually converted to IGCC over time (i.e., some power demand as BAU2, but lower coal demand due to higher efficiency of IGCC plants)

3. **BAU2 + LowH2**
   - Same as BAU2S plus a low H2 demand scenario where hydrogen fuel cell vehicles make up 50% of the total vehicle market by 2030, and coal is used to produce all of the hydrogen

4. **BAU2 + HighH2**
   - Same as BAU2S plus a high H2 demand scenario where hydrogen fuel cell vehicles make up 100% of the total vehicle market by 2030, and coal is used to produce all of the hydrogen

**Key Findings:**

- Increase in rail coal demand = Increase in rail transportation of coal
- A hydrogen economy based on coal could increase demand for co-combustion and transportation in 2030 by 20-60 compared to a business-as-usual coal scenario
- More efficient IGCC plants can substantially reduce coal consumption and transportation demands
- All coal plants are cooled to provide IGCC units maximum efficiencies if cold demand can be achieved
- Railroads could use this capital to make strategic investments in the ROC network
- We identified 12 key factors that could be removed from the ROC network: site selection, rail switching, and terminal operations
- We analyze the top six railswitches where the average coal switch is expected to be 50-70% in 2030
- Railroadd capital investments ~ 50-75% of all railroadd capital investments in the ROC network
- Coal's share of electric generation [%]
- 31% in 2004, 28% in 2020, 26% in 2030, and 23% in 2050

**Analysis Methodology:**

1. Estimate national coal demand for each scenario
2. Estimate coal and rail traffic flows for each scenario using EIA’s[
3. Use Surface Transportation Board’s (STB) data to compare traffic levels to historical demand
4. Process traffic flow data using modeling software to measure traffic
5. Use EIA’s[4] data to estimate traffic levels for each scenario
6. Identify the most heavily traveled coal-railway corridors
7. Estimate current traffic capacity of important coal routes
8. Estimate future coal traffic on different corridors
9. Calculate increased costs of capital enhancements
10. Identify rail routes that might be forced to increase rail rates in the future as a result of increased traffic

**References:**