A Prescriptive Analysis of the Indiana Coal Transportation Infrastructure

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Project Team

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- INDOT/JTRP Advisory Board
Project Rationale

- Use Indiana coal for economic development

Issues
- Technology – Coal composition
- Infrastructure
  - Indiana has the coal
  - Indiana is at the center of the national rail infrastructure
  - Does Indiana have the rail infrastructure?
Project Rationale

- “Depending on the proximity of the customer to the mine and the transportation available for delivering coal to that customer, transportation cost can range from 4 to 41% of the delivered cost. As a consequence, the availability and cost of transportation constitute important factors in the marketability of coal”
- “A crucial challenge was to connect the DM&E to Chicago and Minneapolis, major hubs where its coal shipments could connect with railroads serving the power plants”
- “Otter Tail created a virtual railroad on paper-complete with hypothetical routes, equipment, and customers to show that even a brand-new rail line would be able to serve Otter Tail’s coal needs at a lower cost than BNSF”
- “Once equipped with scrubbers, utilities can buy coal from just about anywhere and still meet the new regulations. Utilities that once burned Indiana coal are expected to return to their roots to take advantage of lower transportation costs, because Indiana is closer than Wyoming”
Project Task Status

- Characterize the demand and supply states of Indiana coal usage (95%)
- Characterize the transport methods of Indiana coal supply and demand (95%)
- Develop a simulated environment of Indiana coal supply and demand (40%)
- Develop a set of transportation infrastructure improvements to address bottlenecks in current Indiana coal Transportation Network (65%)
- Develop a Return on Investment Methodology and simple Portfolio Optimization Model (5%)
Infrastructure

忸  Supply Chain Concept

Mine

Time/Cost

Power Plant
Recent Interest

- Indiana Logistics Summit
- Duke Energy
- City of Vincennes
- NiSource/NIPSCO
- Vectren
Project Task 1

- Characterize the demand and supply states of Indiana coal usage
  - **Demand Side**
    - Where is coal consumed in Indiana?
  - **Supply Side**
    - Where is Indiana coal produced?
Project Task 2

- Characterize the transport methods of Indiana coal supply and demand
  - Demand Side
    - How does coal get to high-demand sites in Indiana?
  - Supply Side
    - How does coal produced in Indiana get moved?
The 10 by 10

- Characterization of the Indiana rail infrastructure
  - Detailed timetable construction
    - Station to Station
      - Mileage
      - Class(1-6)
10 by 10 Routes
### 10 by 10 Timetable

#### Indiana Coal Railroad Timetable: Route 2

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<th>Station Name</th>
<th>Mile Post</th>
<th>Owner</th>
<th>Track Number</th>
<th>Track Class</th>
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*Between Straight Line Jct and Wansford Yard CSXT Timetable governs.*

| Wansford Yard    | 338.0     | CSXT   | 1            | 1           | 10    | Y        | CSXT       |

*Read upward for northbound.*

Source: Comprehensive Railroad Atlas of North America, compiled by Chad Pfitzer
Project Task 3

- Develop a simulated environment of Indiana coal supply and demand
  - Use Task 1 & 2 data
  - Construct a simulated rail environment to investigate
    - Capacity Issues
    - Cost Issues
Use of the Model

- Quantify the Indiana Rail Infrastructure
  - 1 – Francisco Mine(5) to Wabash Valley(10)
  - 2 – Vincennes Railroad Relocation
  - 3 – Southern Indiana mine to Port of Indiana
  - 4 – Southern Indiana mine to Ohio River
  - 5 – Indiana Coal Corridor
Example Scenario
Francisco Mine to Wabash River

🌟 Model Inputs
- Task 2 timetable
- Random Factors
  - Speed
  - Equipment Breakdowns
  - Weather
- Track Capacity/Interference
- Station Connection Logic
- Equipment
  - Train length
  - Car Capacity
Project Task 4

- Develop a set of transportation infrastructure improvements to address bottlenecks in current Indiana coal Transportation Network
  - Indiana Coal Corridor
    - Port of Indiana access north
    - Ohio River access south
    - Road Interface
Indiana Coal Corridor

A Prescriptive Analysis of the Indiana Coal Transportation Infrastructure – Brady/Pfitzer
Project Task 5

🌟 Develop a Return on Investment Methodology and simple Portfolio Optimization Model
Next Steps

- Complete Scenario Development/Analysis
- Write Final Report
- Project Phase 2 Definition