

The evolving role of industrial wastes and by-products in contemporary production processes: A case study of Pennsylvania

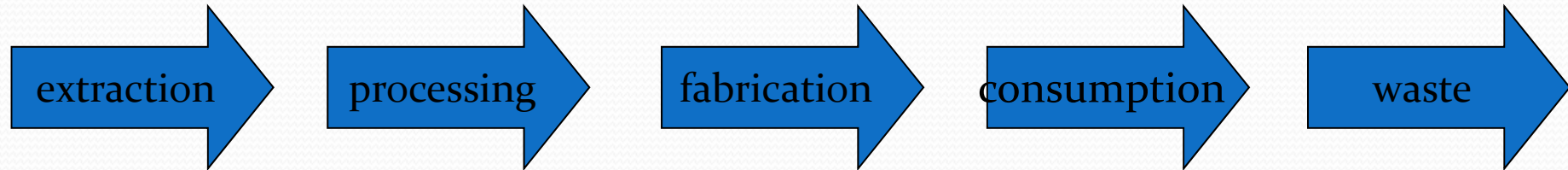
Donald Lyons



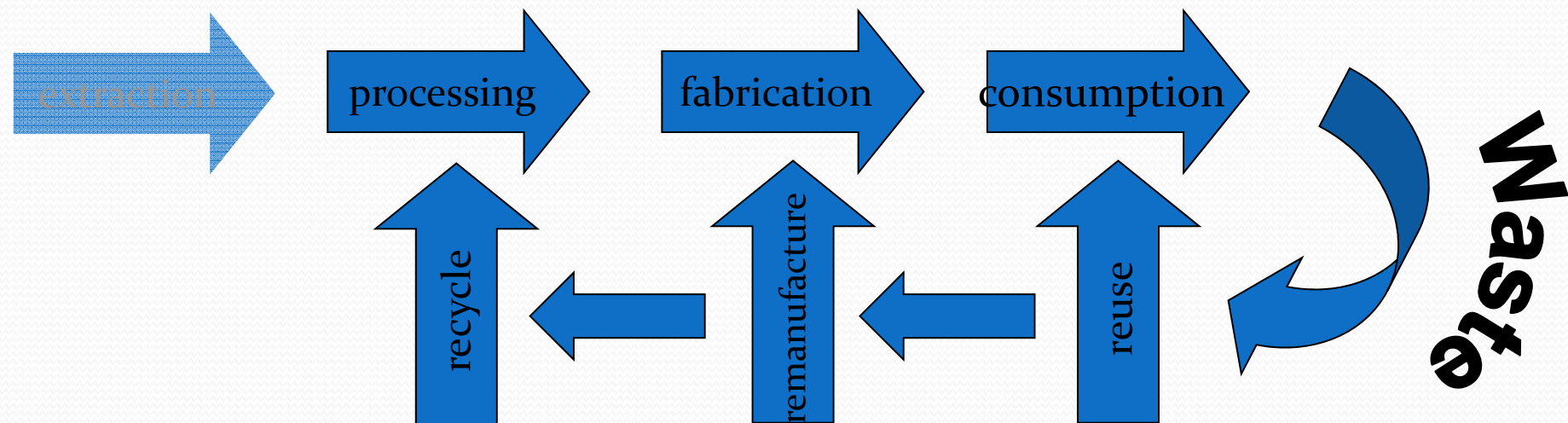
Ecological Modernization/Industrial Ecology

A key Concept: closing the loop across firms

Current Industrial System



Closed Loop (eco) Industrial System



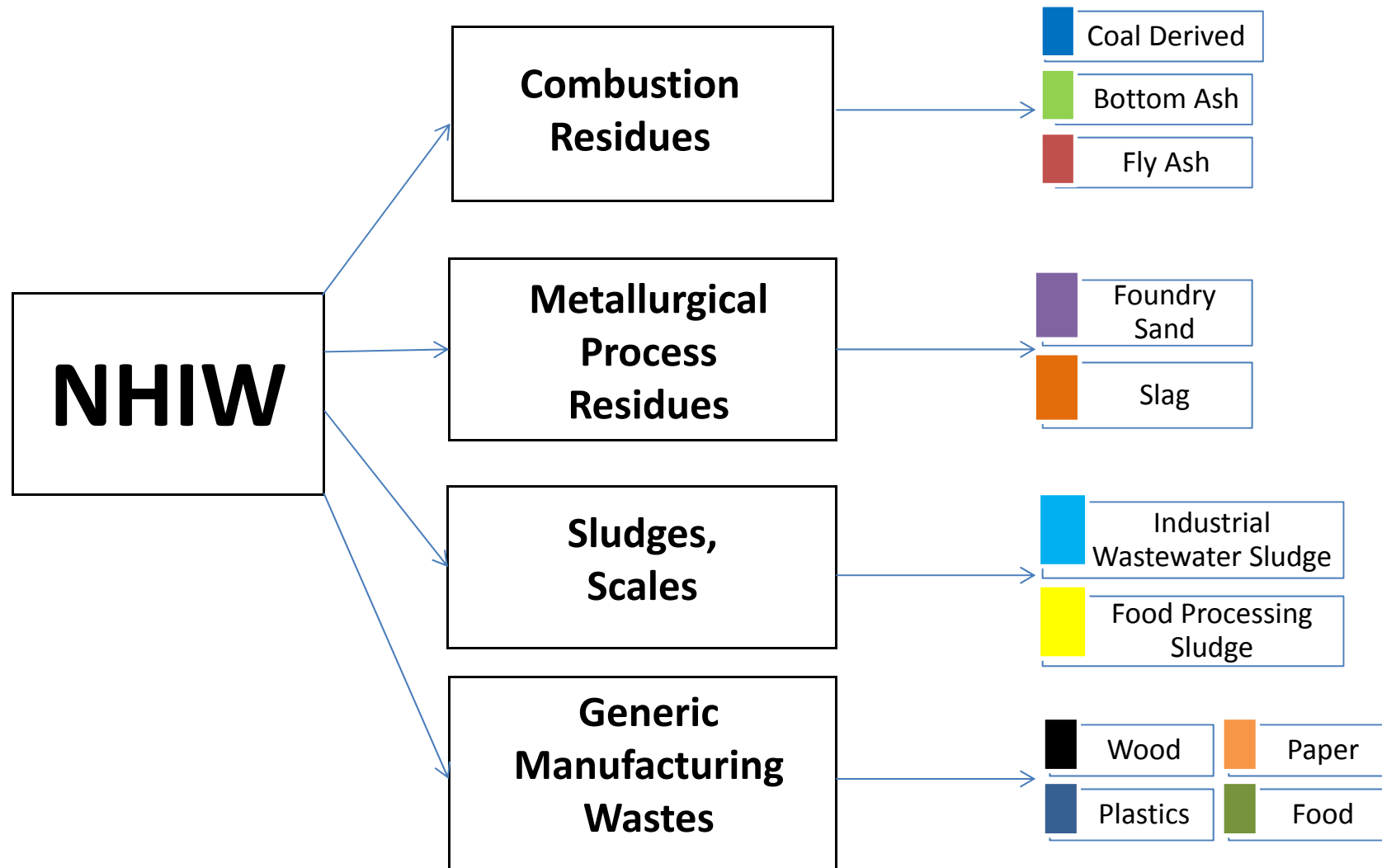
Industrial ecology: the evidence

- Considerable amount of case study evidence:
 - e.g., Kalundborg, Burnside Park, Guigang, NISP, Styria recycling network.
 - Implication that these are early adopters
 - harbinger's of a process – already underway
- Little systematic evidence
 - **Need more systematic evidence across wide sectors and regions of the economy**

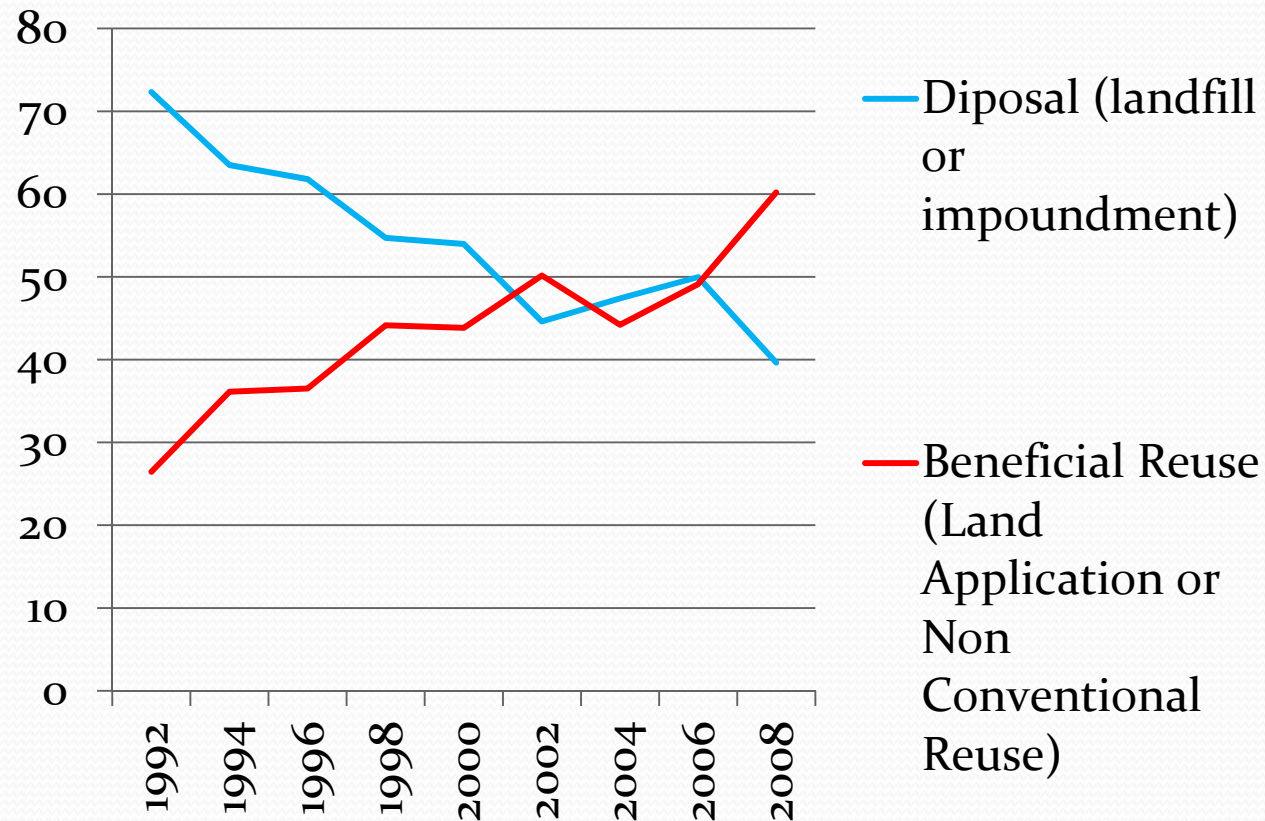
Non Hazardous Industrial Waste (NHIW)

- Very little known about very large quantities of non hazardous industrial wastes
- Pennsylvania Department of Environmental Protection (PA DEP),
 - Unique, but not unproblematic data
- Use this database to try and interrogate some of the assumptions behind IE and EM
 - Particularly notion of closed loops

Major Categories of Solid Non Hazardous Industrial Waste

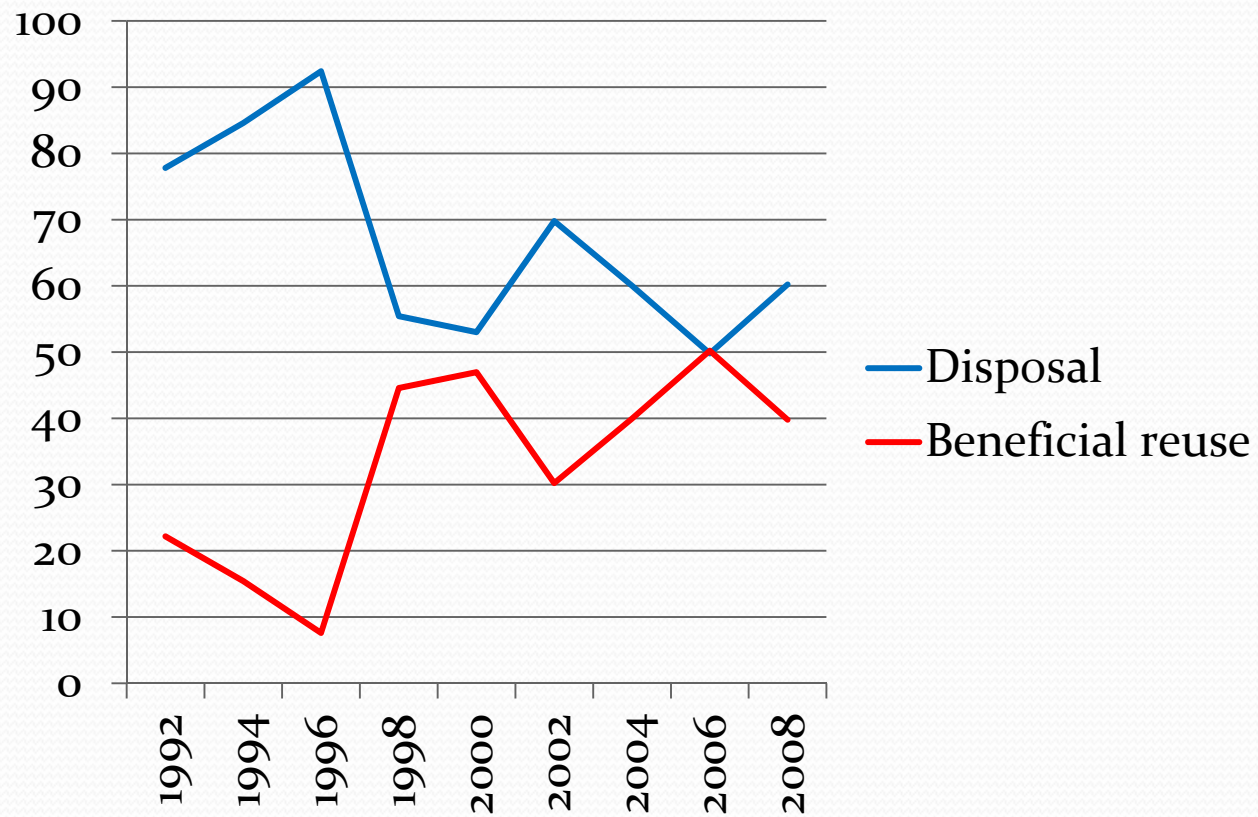


Dominant Treatment strategies for **Combustion Residues** (mostly electricity generation)



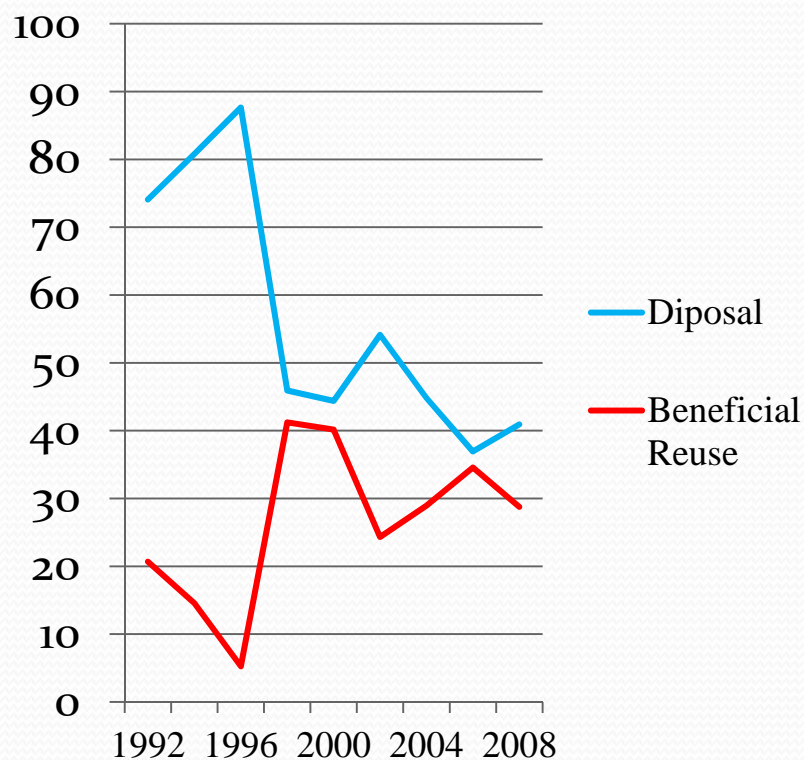
Mostly treated reused locally, aggregate, concrete and de-icing

Treatment methods for Sludges, scales

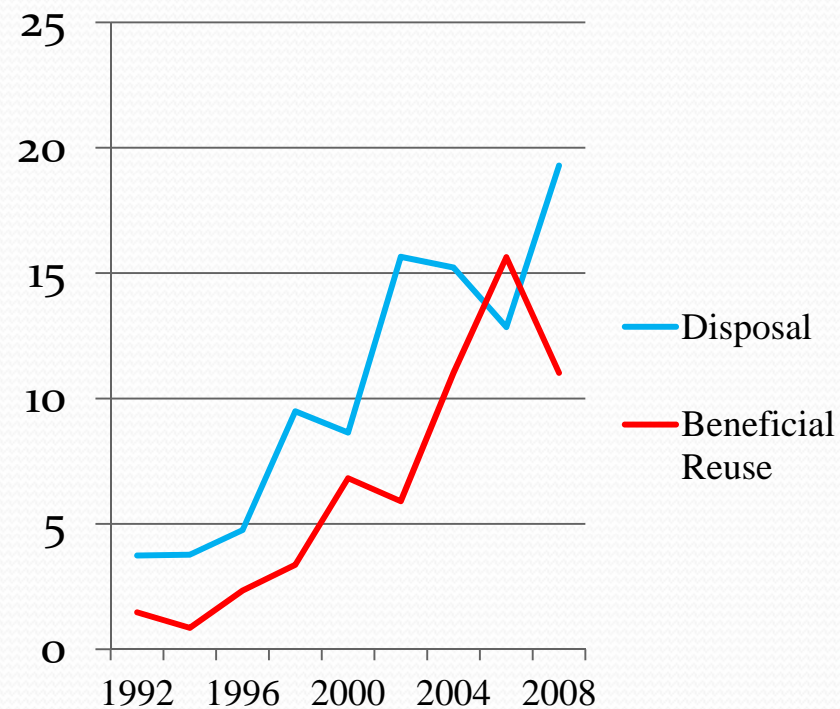


Geography of Treatment Strategies, sludges and scales

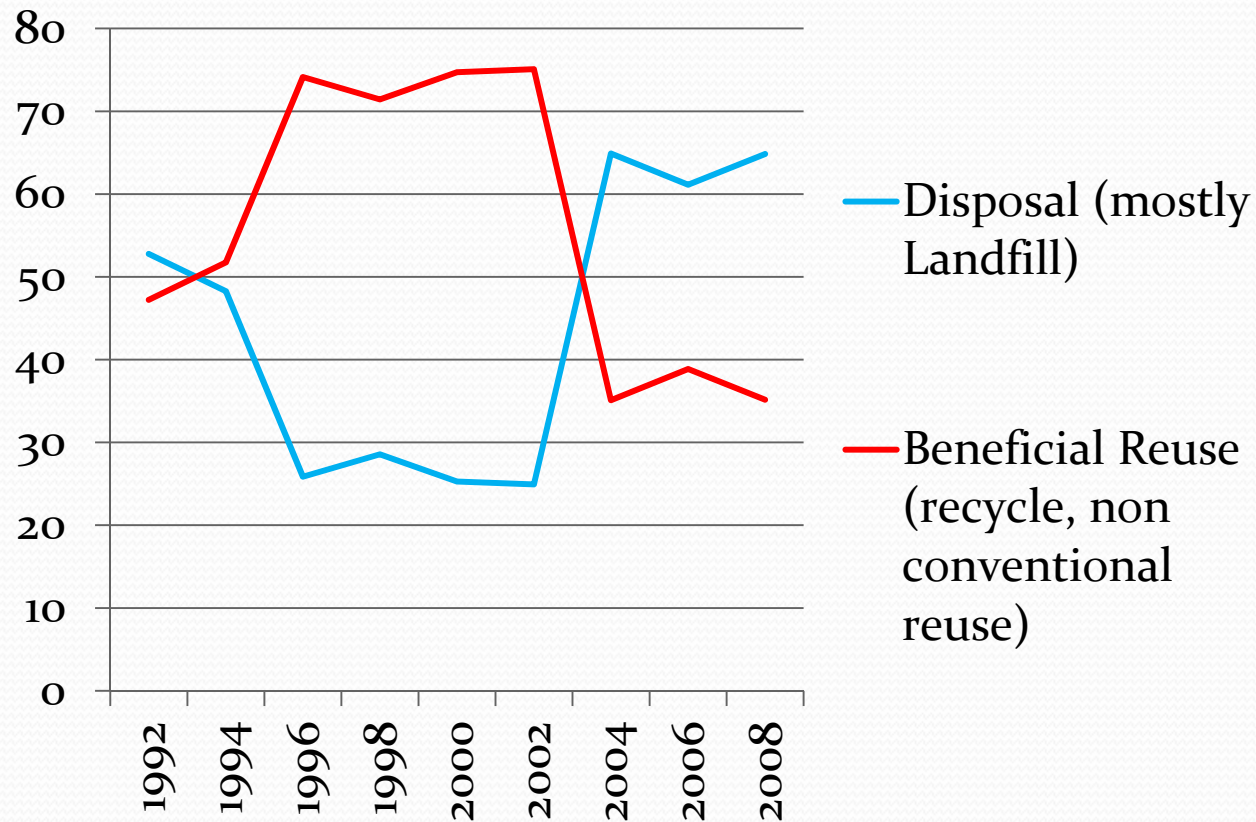
Within Metropolitan Region



Beyond the Metropolitan Region

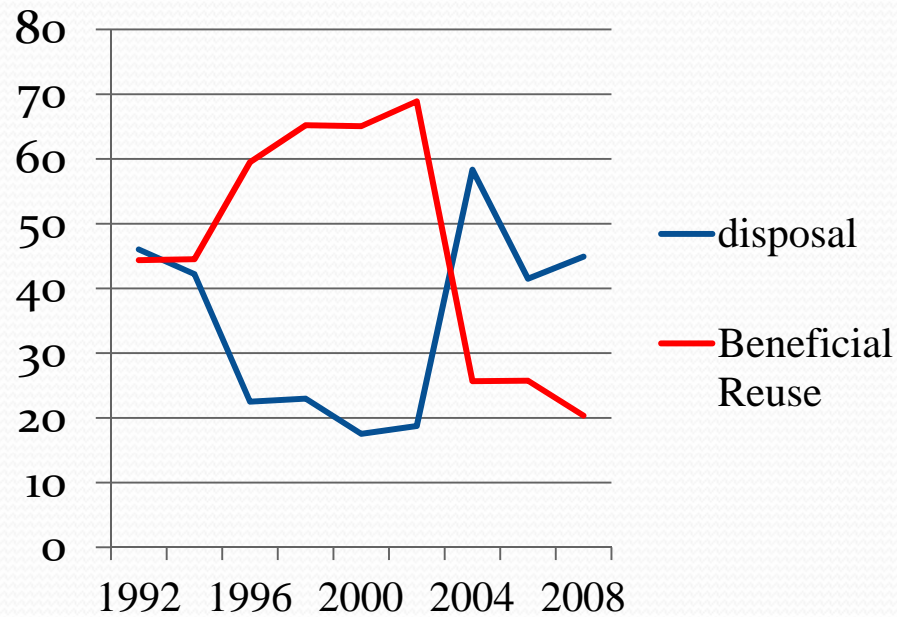


Dominant Treatment Strategies for Metallurgical Wastes

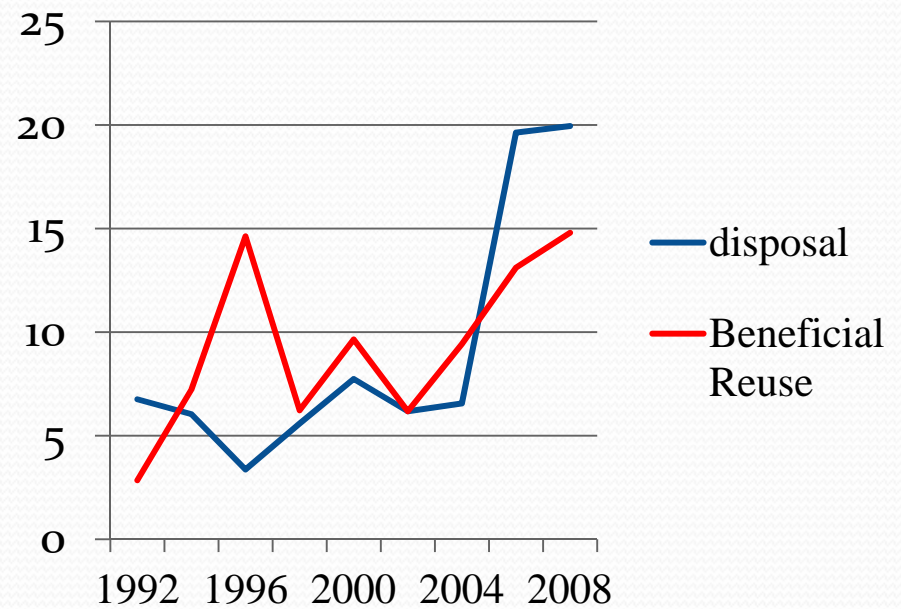


Treatment strategies for Metallurgical Wastes within Pennsylvania

Within Regions



Beyond Region



Conclusions

- Overall some very positive empirical trends
 - Particularly for the most dominant waste category (**combustion wastes**)
 - And even more importantly given the rapid increase in electricity production (mainly for export) to surrounding states.
 - Also, the continued increase in the proportion used within a given region, suggests increasing new uses for such wastes.
- Similarly, the increased reuse of sludges and scales is positive
 - Although the increase in disposal of sludges beyond the region in which it was generated is somewhat disconcerting.



Conclusions

- The situation with metallurgical wastes is more disconcerting.
 - If my hypothesis is correct,
 - Then the collapse of an industrial sector may have significant negative impacts on the flow of residuals (wastes, by-products) and how those residuals exit the system.



Conclusions

- Empirical trends are just the beginning of our understanding
- Understand the connections between:
 - the necessary technological changes
 - required institutional changes
 - requisite inter-firm relationships
 - willingness to reform production systems and modes of social regulation



Conclusions

- Key question remains
 - what are the major drivers and motivations behind the reuse of residual commodities?
- An alternative to rising costs of disposal?
- Or an integral part of new revolutionary industrial production strategies?
 - A new transition in the way industry deals with large volumes of non hazardous industrial wastes