Results and Observations from the Mid-Atlantic By-Product Synergy Project

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Byproducts Beneficial Use Summit, Kansas City, MO
November 9, 2004

About the Center for Clean Air Policy

- Non-profit environmental think-tank, founded by bipartisan governors in 1985, to work with governments to develop practical strategies to protect air quality and climate

- Major issues currently include air quality, climate change, mercury emissions, transportation/smart growth, both domestically and internationally

- Involvement with by-product synergies consistent with CCAP's mission to find innovative solutions to environmental problems that balance environment and economics

  - » Synergies can reduce GHG emissions, air pollution, energy and water consumption, landfill demand, and raw-material consumption.

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Acknowledgements

- CCAP and small company funding from U.S. EPA
  - » Office of Solid Waste
  - » Office of Environmental Policy Innovation
  - » Office of Air and Radiation
  - » EPA Region 2

- CH2M HILL: Company recruitment and synergy development

- Initial Project Impetus
  - » Andrew Mangan, Executive Director, US BCSD
  - » Robert C. Shinn, President, S^2 Concepts
    Former NJDEP Commissioner

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Presentation Overview

- Big Picture
- Mid-Atlantic By-Product Synergy (BPS) Project
- BPS Process
- Project Activities: Events, Summary, Observations, Explanations
- Hypothetical Case Studies: Summary, General Conclusions
- Recommendations/Suggestions
- Closing Remarks

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Big BPS Picture

- BPS Vision: “The synergy among diverse industries, agriculture, and communities resulting in profitable conversion of by-products and wastes to resources promoting sustainability”
  - » Things that we want/need cost less to produce, with greater profit.
  - » Their production uses fewer resources and has less environmental impact.
  - » Economic relationships are more interdependent and numerous.
- Still in its infancy, BPS implementation requires more practice and experience to make it “effortless” and “natural”.

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Project Goals

- To identify synergies in NJ and Mid-Atlantic states
- To implement the most-feasible synergies
- To develop strategies for overcoming implementation barriers (e.g., regulatory, technical)
- To serve as a pilot project for nationwide replication
- To quantify the energy and environmental benefits of implemented synergies through case studies

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BPS Process

1) Identify industry, regulatory, research, and academic partners
2) Conduct recruiting research
3) Recruit 20 to 30 companies to participate in the project
4) Collect and analyze data
5) Identify most promising synergies
6) Quantify synergy benefits

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Project Activities: Setting the Stage

- Start-up in latter 2001
- Verification of BPS Process by NJDEP in late 2001
- Formal launch in February 2002
- Selection of overall project champion (high profile company executive)
- Partnerships with U.S. EPA, NJ, PA, NY, and DE; contact with MD
- Development of recruitment list with 150 companies identified
- Targeted recruitment of 100 priority companies

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Project Activities: Synergy Development

- Company meetings in May, August, October 2002 to develop synergy ideas and to identify most-promising synergies
- Site visits for data collection and analysis
- Project review meeting in December 2002
- Synergy development through 2003
- Selection of case studies by Synergy Review Panel

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Project Activities: Summary

- 14 companies recruited, with 8-10 expressing strong interest
- 80 synergy opportunities identified, 35 by-products, and 14 companies
- Identification of ~10 priority synergy opportunities (next slide)
- Significant development of 3 priority synergy opportunities
- No synergies implemented
- Intracompany synergies implemented/scoped (surprise result)
- CCAP examining 3 hypothetical case studies to estimate potential for reduced energy consumption and air emissions

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Priority Synergies

- 3 Developed Priority Synergies/Hypothetical Case Studies
  - » Spent catalyst for reuse in ferrovanadium production
  - » Spent solvent for reuse as packaging agent (and cleaning agent)
  - » Latex process water for reuse as binding agent for dusts (and aggregates)
- Other Priority Synergies
  - » Flyash for reuse in concrete production and road construction
  - » Vacant land for siting an energy facility
  - » Polyurethane foam for reuse in bioremediation and soil amending
  - » Vinyl composite tile for reuse in landfill drainage and road construction

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Observations: Process

- BPS Process increases trust and information sharing.
- Third-party assistance important for synergy development
- Participation largely motivated by economic benefits
  - » Some motivated by potential good PR from environmental benefits
- Financial, human resources greatest barriers for small companies
- No reduction in regulatory and liability risks for implementing synergies
- Visible political/regulatory support at state level important to synergy development and implementation
- Corporate leadership, synergy champion important to implementation

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Observations: Synergies

- Accurate communication of by-product details is important.
- Much testing/due diligence done because of by-product quality, liability
- Technical analysis critical to synergy development and implementation
- Technical barriers often very difficult, requiring “unexpected changes”
- RCRA uncertainty a barrier, but neither insurmountable nor “fatal”
- Beneficial Use Determination process apparently skews synergy ideas.
- External economic conditions do matter.

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Circumstances Affecting Synergies

- Too few companies participated to create sufficient synergy opportunities
- Too little “harmony” among available by-products and end uses
- External economic factors (next slide)
  - » 4 plant closings (3 companies): 2 by-products and 3 synergies eliminated
- Declining political and regulatory visibility/support at state level
  - » New state administration with different priorities
  - » Budget crisis reduced state spending and programs.

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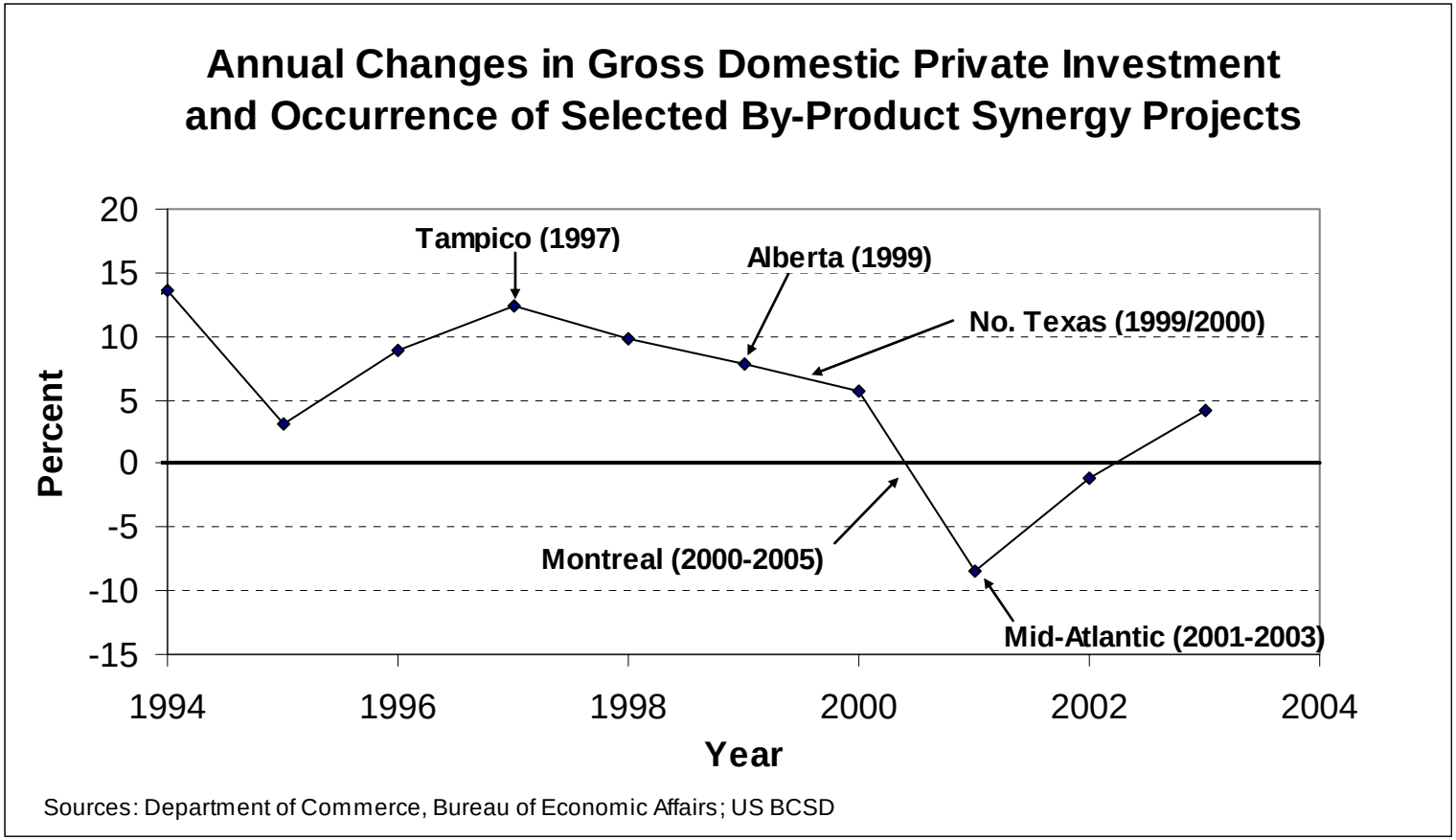
External Economic Factors



Sources: Department of Commerce, Bureau of Economic Affairs; US BCSD

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Overview of Hypothetical Case Studies

- 3 synergies, 3 different by-products
  - » Spent catalyst and gasifier slag containing vanadium
  - » Latex process water (“whitewater”)
  - » Spent solvent with IPA
- Hypothetical by-product transfer between Supplier and User
- Analyzed changes in energy consumption and air emissions
- Changes depend upon differences in material transport and material processing between BAU and synergy operations
- Where data unavailable, analyses used many assumptions.
- Analysis around Supplier and User: neither IE view nor LCA

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General Conclusions from Hypothetical Case Studies

- "Good" synergy ideas not always beneficial/feasible upon technical analysis: context important
- Implementation probability increased by "purer" by-products and less-stringent use criteria: less complexity, more flexibility
- Reduced cost, energy consumption, and air emissions probable but context dependent
- Long-term availability of by-product helpful to implementation
- Stable by-product "value" helpful to "particular" implementation

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Recommendations/Suggestions from Synergy Activities

Project

- Seek “sufficient” number of participating companies
- Seek “sufficient” number with “harmonious” by-products and end uses

General

- Encourage “service orientation” by state agencies towards synergy formation and implementation, not “guarding of the regulations”
- Change regulatory “philosophy”/orientation towards synergies
- Develop programs (e.g., “reg neg”) and products (e.g., insurance) to address regulatory and liability risks of synergy implementation

Research

- Conduct retrospective studies on past projects to determine synergy stability, especially w/r/t external economic and political factors
- Analyze and document environmental impacts of implemented synergies

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Closing Remarks

- Synergies are neither self-implementing nor easy to implement.
  - » Process factors: commitment, trust, patience, flexibility, third party
  - » Synergy factors: by-product quality, by-product end use, and particular contexts of Supplier and User
  - » External factors: economic, political, regulatory
- Synergies lead us towards developing a more-sustainable society, with lower costs and less environmental impact.
- Synergies are worth trying, even failing, to learn to do them better.

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