ENGINEERING SOLUTIONS FOR SUSTAINABILITY:
MATERIALS AND RESOURCES 3

Toward a Circular Economy

February 18–19, 2017 | Denver, Colorado

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Session #8: Environment / Waste

U.S. EPA's Efforts to Advance Sustainable Materials Management

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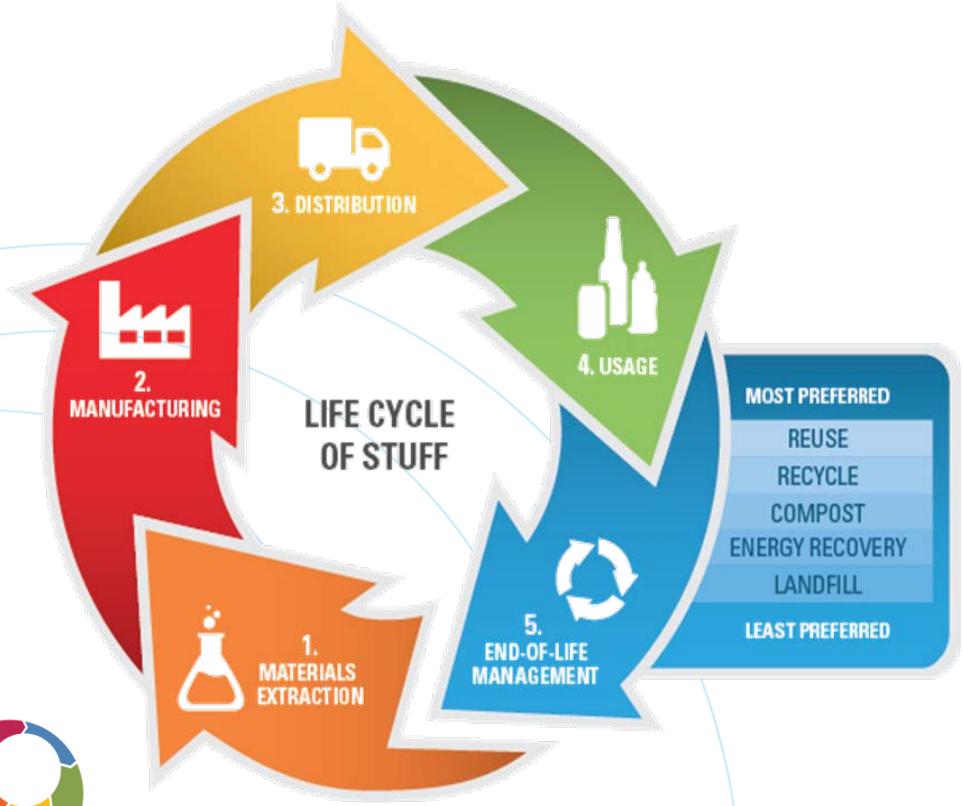
Presentation Overview

- Overview of Sustainable Materials Management (SMM)
- U.S. EPA Transition to SMM
- Advancing SMM through Policy Instruments
- SMM and the G7 Alliance on Resource Efficiency
- U.S. EPA's SMM Strategic Plan
- SMM and the Beneficial Use of Industrial Secondary Materials

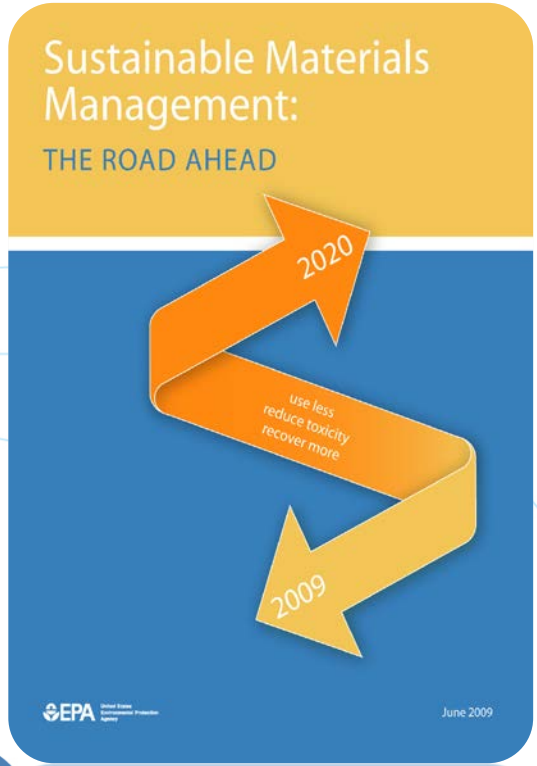
Sustainable Materials Management (SMM)



"An approach to serving human needs by using/reusing resources productively and sustainably throughout their life cycles, generally minimizing the amount of materials involved and all associated environmental impacts."

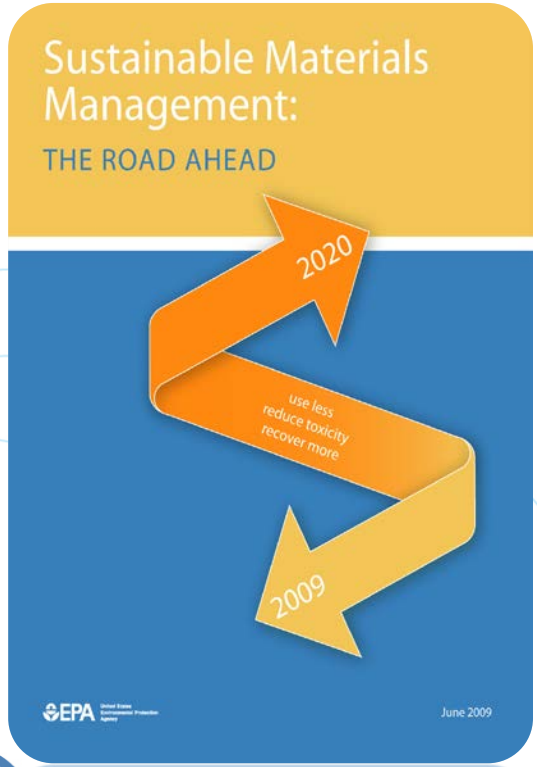
Sustainable Materials Management: The Road Ahead, EPA (2009)

U.S. EPA Transition to SMM



- 2002: "*Beyond RCRA: Waste and Materials Management in the Year 2020*":
  - Vision: shift focus from waste management to materials management.
- 2009: "*Sustainable Materials Management: The Road Ahead*" using life cycle assessment to evaluate material use across the US economy.
  - Systems approach needed to effectively and efficiently:
    - Use materials
    - Minimize negative environmental impacts
    - Minimize unintended consequences of actions

U.S. EPA Transition to SMM (cont.)



- *The Road Ahead's* recommendations and analysis serve as the foundation for current and future materials management efforts.

- Identified 38 materials, goods and services (7 groups) with potential significant environmental impacts.

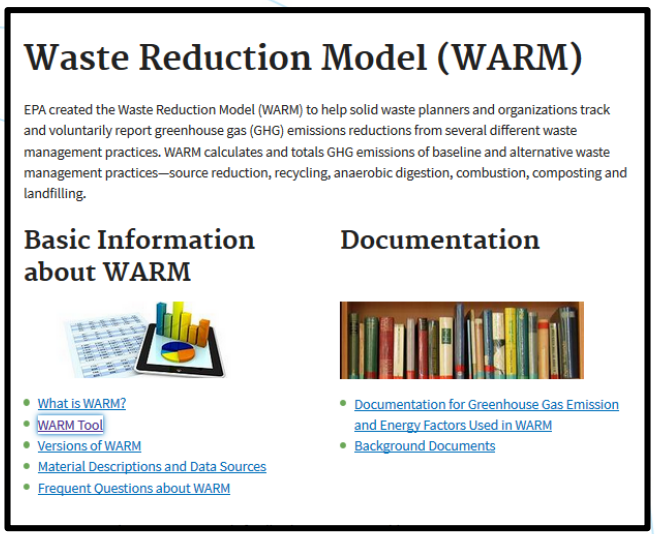
Advantages of Life Cycle Thinking

- Prioritizing and strategic planning.
  - Life cycle information helps target program resources to where they may be most effective.
- Challenging preconceived ideas about where and how agencies should target their efforts and policy approaches to mitigate environmental issues.
- Avoiding unintended consequences.
- Identifying key partners and stakeholders.

Advancing SMM through Policy Instruments

- Applied Research
  - SMM Prioritization Tool
- Business Models
  - "'Green Servicing' for a More Sustainable U.S. economy: Key Concepts, Tools and Analysis to inform Policy Engagement"
- Convening Stakeholders
  - Identifying common goals and developing solutions
  - Spurring collaboration through voluntary partnerships
- Regulations
  - Recognizing incentives for materials reuse

Advancing SMM through Policy Instruments (cont.)



- Information and Guidance:
  - Waste Reduction Model (WARM).
- Voluntary Standards (life cycle-based):
  - Electronic Product Environmental Assessment Tool (EPEAT).
- Procurement Practices:
  - Draft Guidelines for Product Environmental Performance Standards and Ecolabels for Voluntary Use in Federal Procurement.

SMM and the G7 Alliance on Resource Efficiency

"We will work with business and other stakeholders to improve resource efficiency with the aim of also fostering innovation, competitiveness, economic growth and job creation. We encourage all countries to join us in these efforts."– G7 Leaders Declaration, May 2016

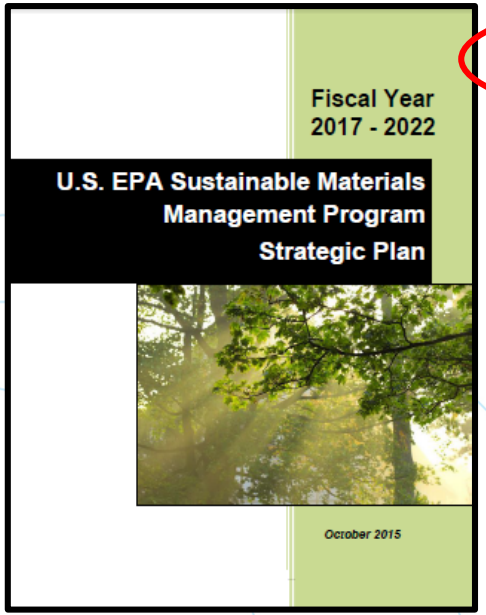
G7 Leaders' Summit June 2015 established the Alliance on Resource Efficiency to:

- Serve as a forum to share knowledge and create information networks on a **voluntary basis**.
- Collaborate to advance opportunities offered by
  - Resource efficiency
  - Promoting best practices
  - Fostering innovation

U.S.-Hosted G7 Workshop

- The U.S. hosted a workshop under the G7 Alliance on Resource Efficiency in March 2016.
  - Focused on the use of life cycle concepts in supply chain management.
  - Used several examples from the auto sector to generate discussion.
  - Conversations identified more universal challenges and best practices.
- 190 attendees
- Key observations:
  - Discussions centered on implementing life cycle concepts.
  - EPA Summary Report: “Advancing Resource Efficiency in the Supply chain- Observations and Opportunities for Action.”

U.S. EPA's SMM Strategic Plan

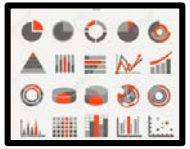


- Built Environment (buildings, roads, bridges, infrastructure)
- Sustainable Management of Food
- Sustainable Packaging
- Sustainable Electronics Management
- Life Cycle Thinking
- Measurement
- International Efforts










SMM and the Beneficial Use of Secondary Materials

- Over 500 million tons of non-hazardous industrial secondary materials generated each year in the U.S.
- Two key EPA documents:
  - *Methodology for Evaluating the Beneficial Use of Industrial Nonhazardous Secondary Materials.*
  - *Beneficial Use Compendium: A Collection of Resources and Tools to Support Beneficial Use Evaluations.*

BU Evaluation: Fly Ash Concrete and FGD Gypsum Wallboard

- Completed using *Methodology for Evaluating Beneficial Use of Industrial Nonhazardous Secondary Materials*
- Evaluates the two largest encapsulated BUs of CCR:
  - Fly ash used in concrete and
  - FGD gypsum used in wallboard.
- Conclusion: environmental releases are comparable to or lower than those from analogous non-CCR products, or are at or below relevant regulatory and health-based benchmarks.

BU Evaluation: Agricultural Use of FGD Gypsum

- FGD gypsum can be used as a soil amendment to enhance crop production.
- Multi-year collaboration w/USDA over many years to obtain field data on use of FGD gypsum.
- EPA is currently conducting a BU evaluation (similar to the Fly Ash concrete and FGD Gypsum in Wallboard document).
- Anticipated completion date is in 2017.

Next Steps for the U.S. EPA and SMM

- Continue to shape implementation of FY17 – FY2022 Strategic Plan.
- Build on momentum around SMM and advancing the use of life cycle thinking in design and decision-making.
- Continue to work with global public and private leaders to scale-up best practices in the supply chain and institutionalize SMM.

Thank you!

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Additional Resources

- Advancing SMM: Facts and Figures report that includes information on SMM
  - https://www.epa.gov/smm/advancing-sustainable-materials-management-facts-and-figures-report
- C&D measurement
  - https://www.epa.gov/smm/sustainable-management-industrial-non-hazardous-secondary-materials
  - https://www.epa.gov/smm/advancing-sustainable-materials-management-facts-and-figures
  - https:// www.epa.gov/smm/advancing-sustainable-materials-management-facts-and-figures-report
- Electronics management
  - Implementation Study on the Electronics Recycling Standards: R2 and e-stewards: https://www.epa.gov/smm-electronics/implementation-study-electronics-recycling-standards-r2-and-e-stewards

Additional Resources
(cont.)

- SMM Road Ahead
  - https://www.epa.gov/smm/sustainable-materials-management-road-ahead
- Waste Reduction Model (WARM)
  - https://www.epa.gov/warm
- Methodology for Evaluating Beneficial Uses of Industrial Non-Hazardous Secondary Materials and the Beneficial Use Compendium
  - https://www.epa.gov/smm/methodology-evaluating-beneficial-uses-industrial-non-hazardous-secondary-materials-and