



Problem Summary & Decision Context

Processes for sustainable materials management are not yet optimized in the United States. More integrated approaches, focusing on the concept of reducing material consumption supplemented with reuse, recycle, and conversion, considering risk, are needed to shift from waste management (end-of-life-thinking) towards sustainable material use.

Utility to Agency

1. Approaches for managing materials across the life cycle, from generation to beneficial use and reuse to reducing of long-term disposal risks including climate change impact; including tools to address options and risk; conversion to OpenLCA format.
2. Regulatory and/or technical support involving approaches for materials management and inventory systems (CCR, CDD, e-waste)

Accomplishments

1. Viability of food waste to energy
2. Landfill Bioreactor Performance Report
3. Environmental, Social, and Economic Implications of Beneficial Reuse Report
4. Waste Sites to Community Asset Report
5. CCR rule support
6. Source characterization using LEAF methods for multiple materials management applications and environmental scenarios



Focus Area 1: Tools, Methods, and Models for Sustainable Materials Management

Decision support tools enable users to identify materials of concern and mitigate associated impacts using life cycle assessment, risk information, and sustainable design principles.

- 1) Adaption of the existing Waste Reduction Model (WARM) into OpenLCA to include other environmental impacts
- 2) Generation of life cycle inventory of common materials for inclusion in EPA's portal to the Federal Data Commons (USDA)
- 3) Risk-Informed Materials Management (RIMM) Tool System; including the multi-scale HE2RMES model system; D4EM and other tools to support site/regional/national-scale exposures and RA

Focus Area 2: Processes for Evaluating Beneficial Reuse of Organics and Other Materials

Develop dynamic methods, strategies, and science-based tools to assist communities in framing sustainability goals to enhance material use and reuse, including renewable energy from organic waste

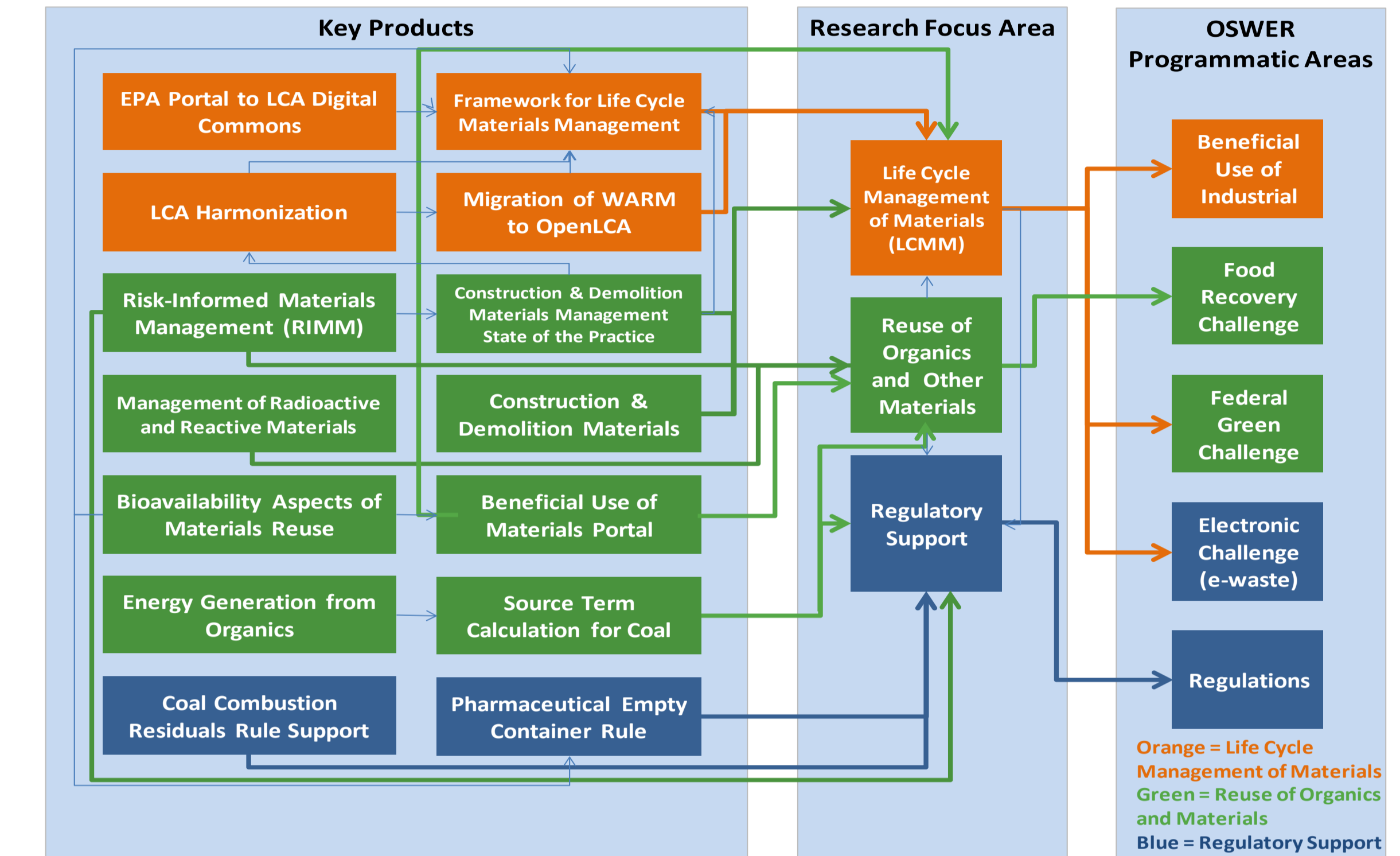
- 1) Co-Digestion Economics Evaluation Tool (Co-EAT)
- 2) Utilization of spent materials for secondary uses (valorization)

Focus Area 3: Inventory, Integration, and Materials Management Practice Assessment for Regulatory Support

Provide data and other technical input to support sustainable regulatory and policy approaches to Program Offices for:

- 1) Inventory and Tracking of electronic waste (E-waste)
- 2) Generation and Recycling of Construction and Demolition Debris (CDD)
- 3) Coal Combustion Residue Management (CCR)

Meeting Program Office and Regional Needs



Future Direction

- Framework for Sustainable Materials Management Decision Analytics
- Development of shareable datasets and tools to better address end-of-life management in LCA (Federal Data Commons)
- Enhanced Energy Recovery from Organic Waste and Wastewater Biosolids
- Beneficial Use of Materials Information Portal
- Post-Closure Care for Subtitle D and C Facilities
- Application of Geophysical Techniques for Landfill Performance Monitoring
- E-waste tracking

