

Research Area 7: Life Cycle Inventories and Methodologies

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Material Use and Waste Increasing

Domestic Extraction

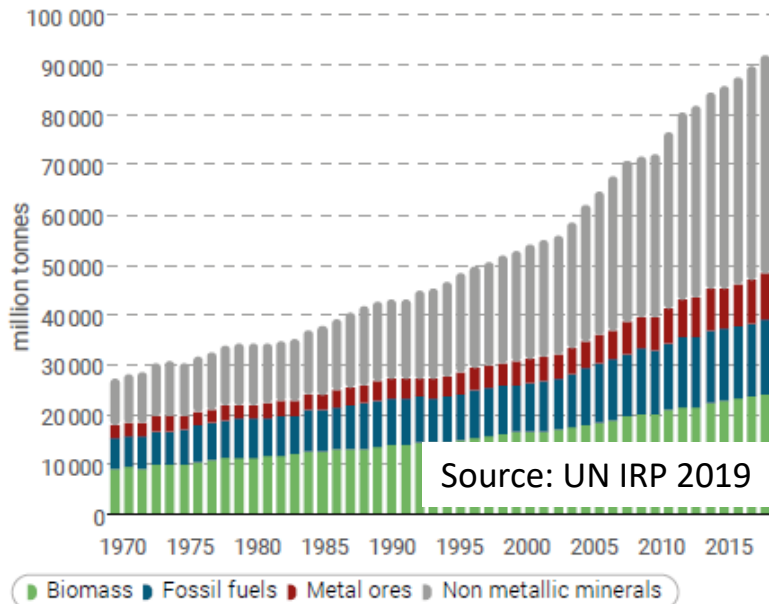
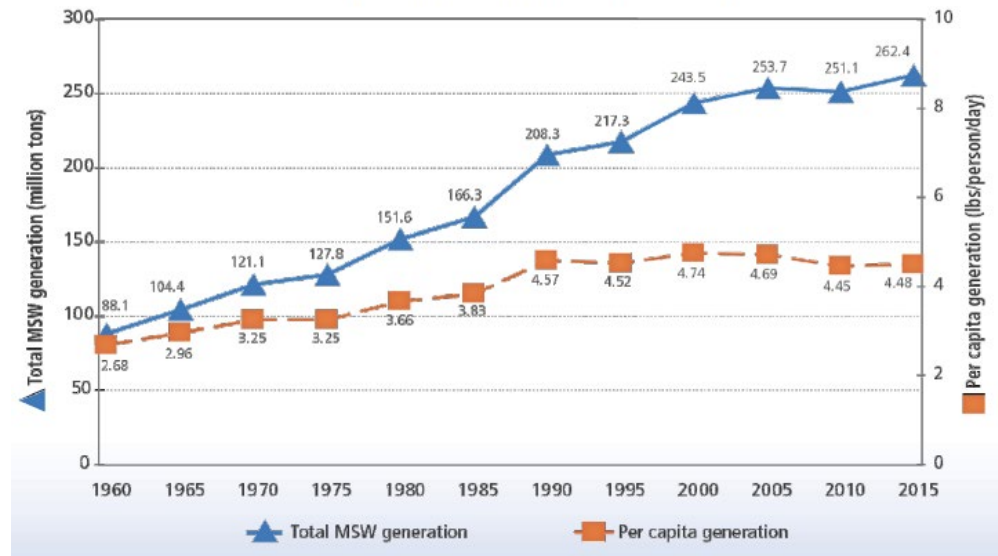
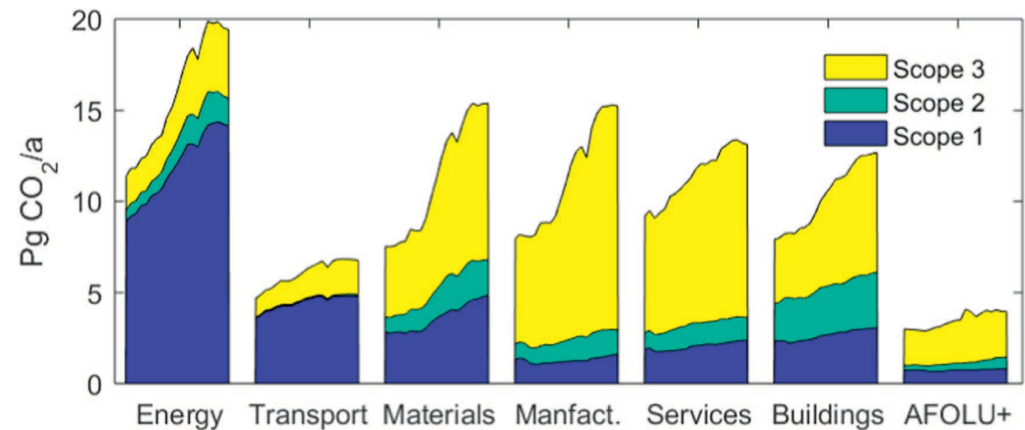
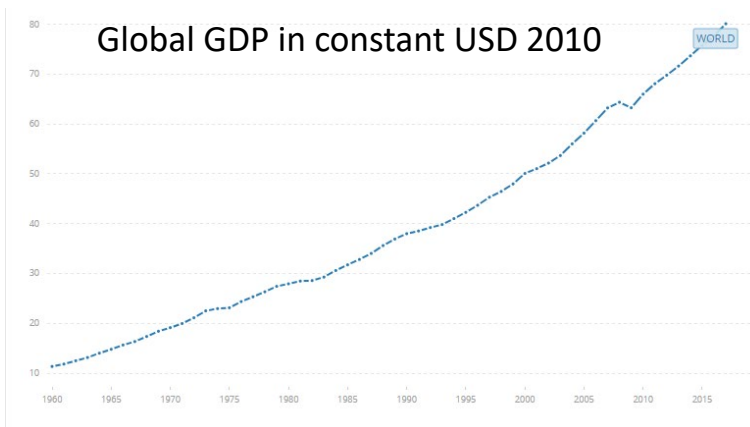


Figure 1. MSW Generation Rates, 1960 to 2015



Source: EPA 2018 Facts and Figures 2015

Global GDP in constant USD 2010



Source: Hertwich & Wood. 2018. Environ. Res. Lett.

Concentrations in RA7

Readily-Accessible USEEIO Model

*Enhance Measurement Methods Used for
Waste Tracking*

USEEIO

USEEIO: A new and transparent United States environmentally-extended input-output model

Yi Yang ^{a,*,1}, Wesley W. Ingwersen ^{b,*1}, Troy R. Hawkins ^c, Michael Srocka ^d,
David E. Meyer ^b

- An environmentally-extended input-output model of the US
- Level of resolution: 385 goods and services
- 1875 unique releases or resource types
- 20 environmental, resource and socio-economic impact indicators
- Built on >9 million public data points



USEEIO in Use

Use

SMM Tool Suite

Environmental-economic
evaluation framework

Sustainable purchasing

Supply chain analysis

Sector-specific analysis

LCA studies

User

EPA OLEM

EPA Other

States & counties

NGOs

Federal Research/
Policy

Corporations/consult
ants

Universities



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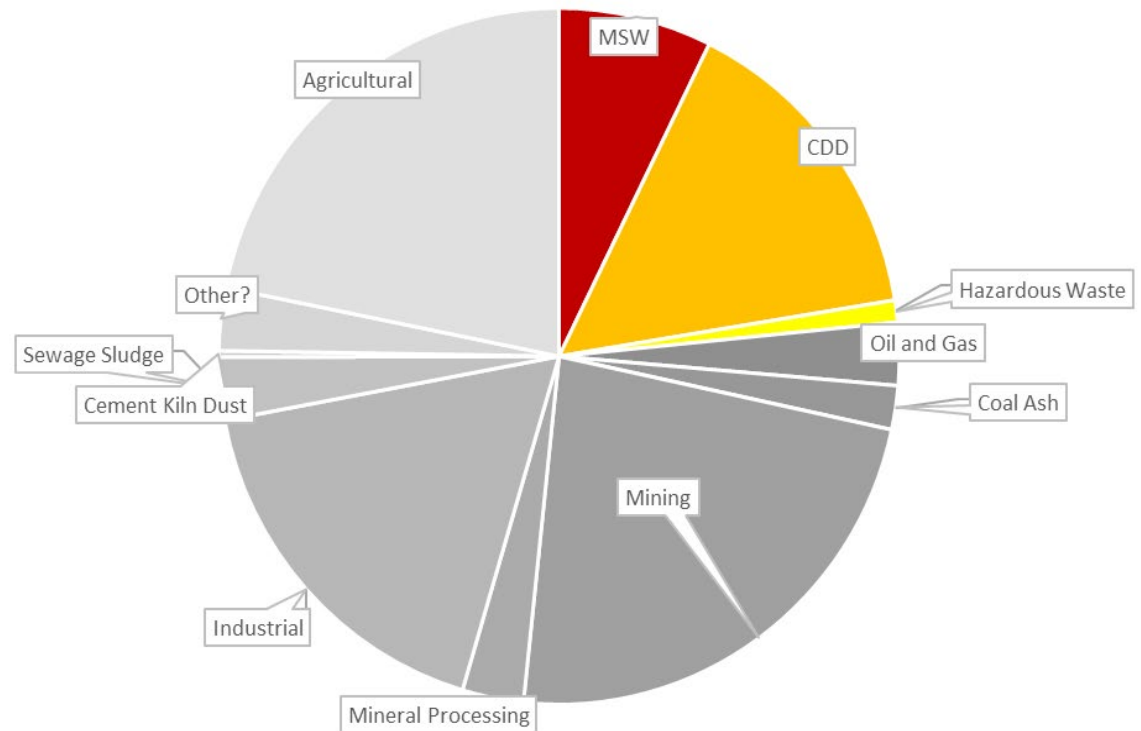
The heatmap below shows goods & services (down the left side) ranked by overall environmental, human health and socioeconomic impacts (across the top) based on the selected analysis settings. Click a good or service name to learn more about it, click an indicator name to sort by that indicator, and check out the comparison analyses below the heatmap. Click a "What's this?" link for more information.

Point of Consumption, US, Full System, 2007, Consumption

Tutorial | What's this? 

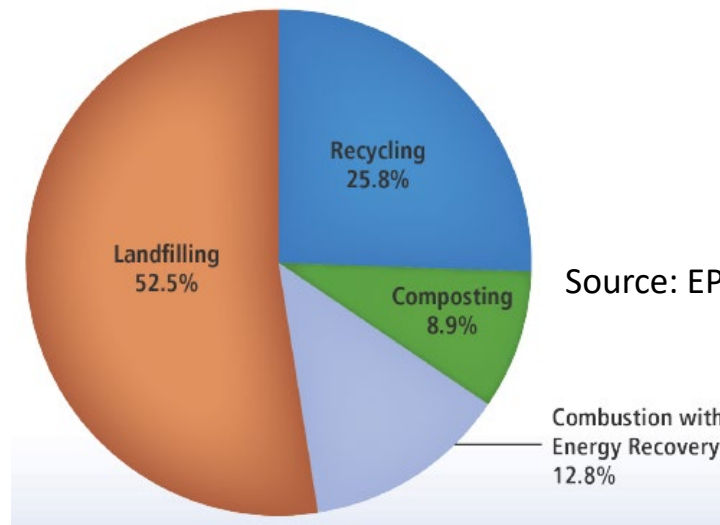
	Impact Potential								Resource Use				Waste Generated			Economic & Social	
Search...	ACID	ETOX	EUTR	GCC	HRSP	HTOX	OZON	SMOG	ENRG	LAND	MINE	WATR	FOOD	HAZW	MSW	JOB\$	VADD
Electricity	Dark Red	Light Red	Light Red	Dark Red	Dark Red	Light Red	Light Red	Dark Red	Light Blue	Light Blue	Light Blue	Dark Blue	Light Purple	Light Purple	Light Purple	Light Green	Light Green
State and local genera...	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Blue	Light Blue	Light Blue	Light Blue	Light Purple	Dark Purple	Light Purple	Dark Green	Dark Green
Gasoline, fuels, and b...	Light Red	Light Red	Light Red	Light Red	Light Red	Dark Red	Light Red	Dark Red	Dark Blue	Light Blue	Light Blue	Light Blue	Light Purple	Dark Purple	Light Purple	Light Green	Light Green
Packaged meat (except ...	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Blue	Dark Blue	Light Blue	Light Blue	Light Purple	Light Purple	Light Purple	Light Green	Light Green
Limited-service restau...	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Blue	Light Blue	Light Blue	Light Blue	Dark Purple	Light Purple	Dark Purple	Dark Green	Dark Green
Single-family resident...	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Blue	Light Blue	Dark Blue	Light Blue	Light Purple	Light Purple	Light Purple	Light Green	Light Green
Truck transport	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Dark Red	Light Blue	Light Blue	Light Blue	Light Blue	Light Purple	Light Purple	Light Purple	Light Green	Light Green

Waste Estimation



Disclaimer: this is a hypothetical figure that is not to scale – greyed category data are unknown or not current

Figure 3. Management of MSW in the United States, 2015



Source: EPA 2018 Facts and Figures 2015

Progress in FY14-18

- Base national model with broad set of indicators and supporting environmental data tables
- Created code base, API, dataset publication stream, and data quality scoring
- Worked with a state (GA) to develop, vet, and discuss uses of a state-version of USEEIO
- Foster relationships and collaborations (e.g. DOD)
- Created CDDPath¹ method for estimating disposition of CDD at end-of-life

¹ Townsend, T.G., Ingwersen, W.W., Niblick, B., Jain, P., Wally, J., 2019. CDDPath: A Method for Quantifying the Loss and Recovery of Construction and Demolition Debris in the United States. *Waste Management*

Looking toward FY18-22

Readily-Accessible USEEIO Model

- Make a family of 'USEEIO' models
 - Includes models for all states
- Expand toward physical input-output
- Globalize model
- Enable scenario analysis

Looking toward FY18-22

Enhance Measurement Methods Used for Waste Tracking

- Review methods used across waste types
- Improve methods with consistency, data quality, transparency
- Add new waste types, sectoral resolution
- Integrate waste tracking and handling data seamlessly with USEEIO models
- Model processing and recirculation

Disclaimer

The U.S. Environmental Protection Agency through its Office of Research and Development collaborated in the research described here. It has not been subject to Agency review and does not necessarily reflect the views of the Agency. No official endorsement should be inferred