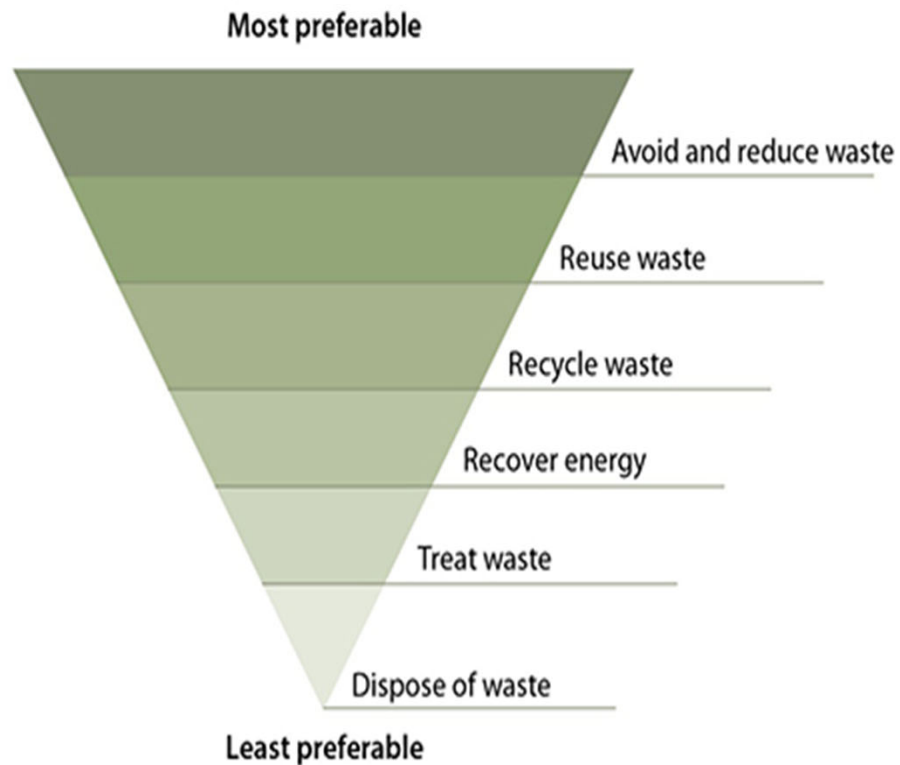




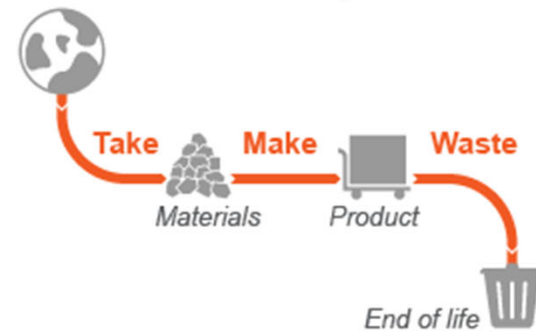
## **Collaborative Approach for a Resilient Maricopa County: Sustainability Benchmark Recommendations**

SOS 498:  
Urban Sustainability Best Practices Application  
Fall 2018

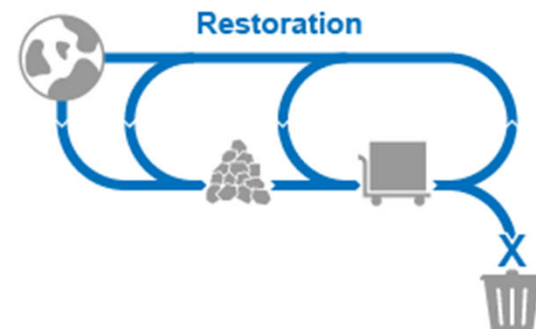
# Waste Management



## The linear economy



## The circular economy



# Waste: Air, Land, and Water

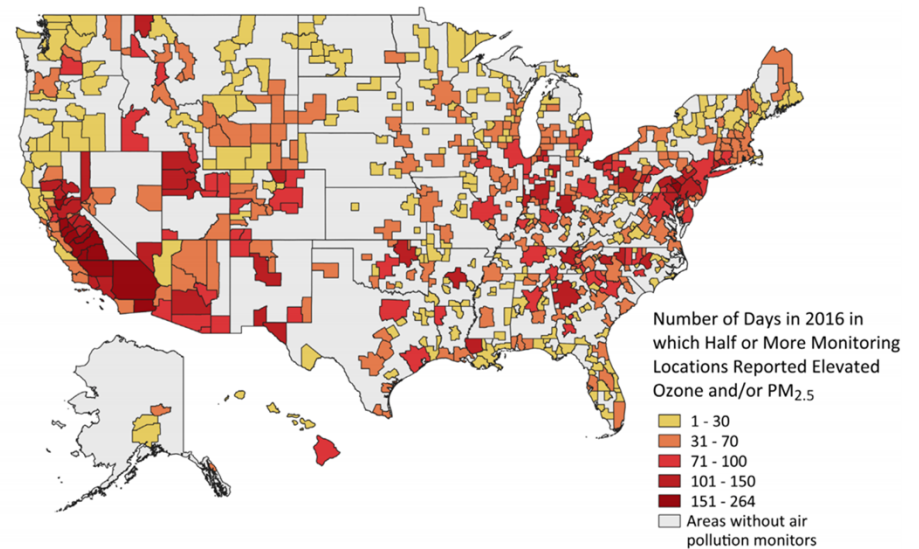
By 2040, Maricopa County will have less than 30 days of Reported Elevated Ozone and/or PM<sub>2.5</sub>

By 2025, Collaborate with local industrial and large scale farming operations to measure, reduce and minimize the release of noxious odors in the community.

By 2030, Work with state and regional partners to electrify truck stops to reduce idling and unnecessary emissions.

By 2035, Install green roofs on those not compatible for solar and install green plants along highway columns.

Figure ES-1. Both Urban and Rural Areas Experienced Frequent Smog and/or Particulate Pollution in 2016<sup>7</sup>



# Waste: Air, Water, and Land

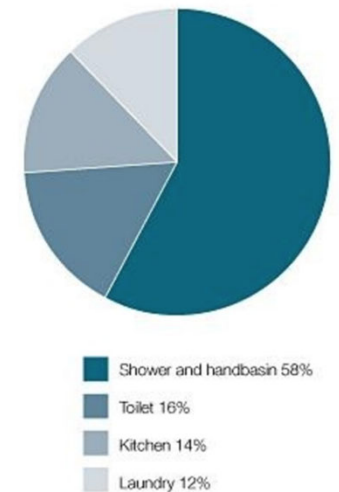
By 2040, 100% greywater systems in new construction, municipal buildings and retrofit permits.

By 2025, Implement a rebate program for residential installation county wide and improve current water measurements tools for efficiency and development.

By 2030, Conduct impact study of water loss on sewage system. New Construction is required to implement third system to support greywater.

By 2035, require greywater system use in industrial and commercial complexes.

BLACKWATER	LITRES/PERSON/DAY
Toilet	20
GREYWATER	LITRES/PERSON/DAY
Shower	63
Hand Basin	6
Washing Machine	13
Laundry tap	2
OTHER WASTEWATER	LITRES/PERSON/DAY
Kitchen tap	12
Dishwasher	5
<b>Total Greywater</b>	<b>84</b>
<b>Total Wastewater</b>	<b>120</b>



# Waste: Air, Water, and Land



- **Circular economy:** Increase circular economy activity contribution to gross state product to 2%, by 2040
- **Diversion rate:** 60% diversion rate from landfill and incineration
  - Recycling rate: 100% recycling rate with a contamination rate under 10%
- **Waste energy:** 30% increase in applied use of waste energy

# Waste: Air, Water, and Land

Based on data from 2014, circular economy activities could contribute a maximum of **\$1.9 billion** to GSP in the county.

- Translates to **.9% GSP**

**Increase circular economy activity contribution to gross state product in the county to 2%, by 2040**

2025- circular economy contributes to 1.3% of gross state product

2030- circular economy contributes to 1.5% of gross state product

2035- circular economy contributes to 1.8% of gross state product



## THE CIRCULAR ECONOMY

Primarily intended as a practical solution to the planet's diminishing resources, a circular economy redesigns the way that we make things, replacing the high levels of waste associated with the current 'take-make-dispose' linear approach of our society.

In short, a circular economy encourages us to reuse, repurpose, recycle, refurbish, and repair goods and resources to minimize waste and manage the earth's finite stocks and renewable flows.

## ECONOMIC IMPACT IN MARICOPA COUNTY

Circular economy activities impact the Maricopa County economy through employment and payroll, supplier purchases, state and local taxes, and a range of secondary effects that ripple through other local industries.

Applying a series of local and national recycling, repair, and reuse rates to 43 sectors and sub-sectors in Maricopa County, the *maximum gross economic impact of circular economy activities in 2014 is estimated at:*



### **\$1.9 BILLION GROSS STATE PRODUCT**

*The state equivalent of GDP, this is the final value of all goods and services produced in Maricopa County.*



### **35,454 JOBS**

*This is a count of full- and part-time paid employment.*



### **\$1.2 BILLION LABOR INCOME**

*These are salaries and benefits received by employees and the self-employed.*



### **\$158.5 MILLION TAX REVENUES**

*These are state and local tax revenues received by Maricopa County.*

The estimates above only account for recycling, repairs and maintenance, and reuse activities in Maricopa County in 2014. They exclude repurposing and refurbishing activities due to an absence of relevant data in Maricopa County.

Circular economy activities are therefore estimated to contribute a *maximum 0.9% Gross State Product* in Maricopa County in 2014.

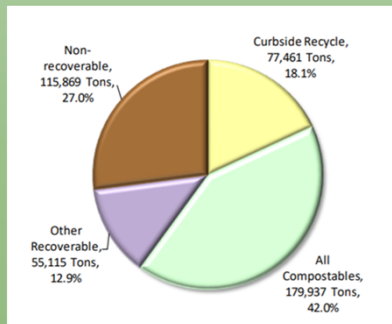
Circular economy activities are estimated to contribute a *maximum 2% of all salaried jobs* in Maricopa County in 2014, and a *maximum 1.4% of annual labor income*.

Circular economy activities are also estimated to contribute a *maximum 2.6% of state and local government tax revenues* collected in Maricopa County in 2014.

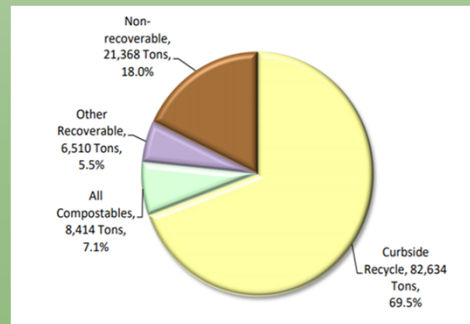
# Waste: Air, Water, and Land

Phoenix's goal is a diversion rate of **40% by 2020**.

- Approximately **60%** of the city's waste was recoverable through composting or recycling.
- Average recycling contamination rate is **30.5%**



PHX garbage findings



PHX recycling findings

**2040- 60% diversion rate from landfill and incineration,**  
**2040- 100% recycling rate with a contamination rate under 10%**

2025- Perform analysis on waste characterization for the county,  
2030- Established neighborhood compost and recycling hubs,  
2035- Extended Producer Responsibility Legislation enacted

# Waste: Air, Water, and Land

Two landfills in the county have an operational LFG collection system in place:

- Northwest Regional MSW landfill
- City of Glendale municipal landfill

**2040- 30% increase in applied use of waste energy**

2025- Incorporate LFG collection systems in candidate landfills and create baseline  
 2030- Achieve 10% increase  
 2035- Achieve 20% increase

Landfill Name	Waste in Place (tons)	LFG Collection System in Place?	LFG Collected (mmscfd)	Current Project Status	Project Start Date	Project Type Category	LFG Energy Project Type	MW Capacity	Current Year Emission Reductions (MMTCO2e/yr) - Direct	Current Year Emission Reductions (MMTCO2e/yr) - Avoided
City of Glendale Municipal Landfill	10,022,321	Yes	1.42	Operational	1/30/2010	Electricity	Reciprocating Engine	2.8	0.1265	0.01479
Northwest Regional MSW Landfill	18,201,705	Yes	1.973	Operational	8/1/2012	Electricity	Reciprocating Engine	3.2	0.14458	0.0169