



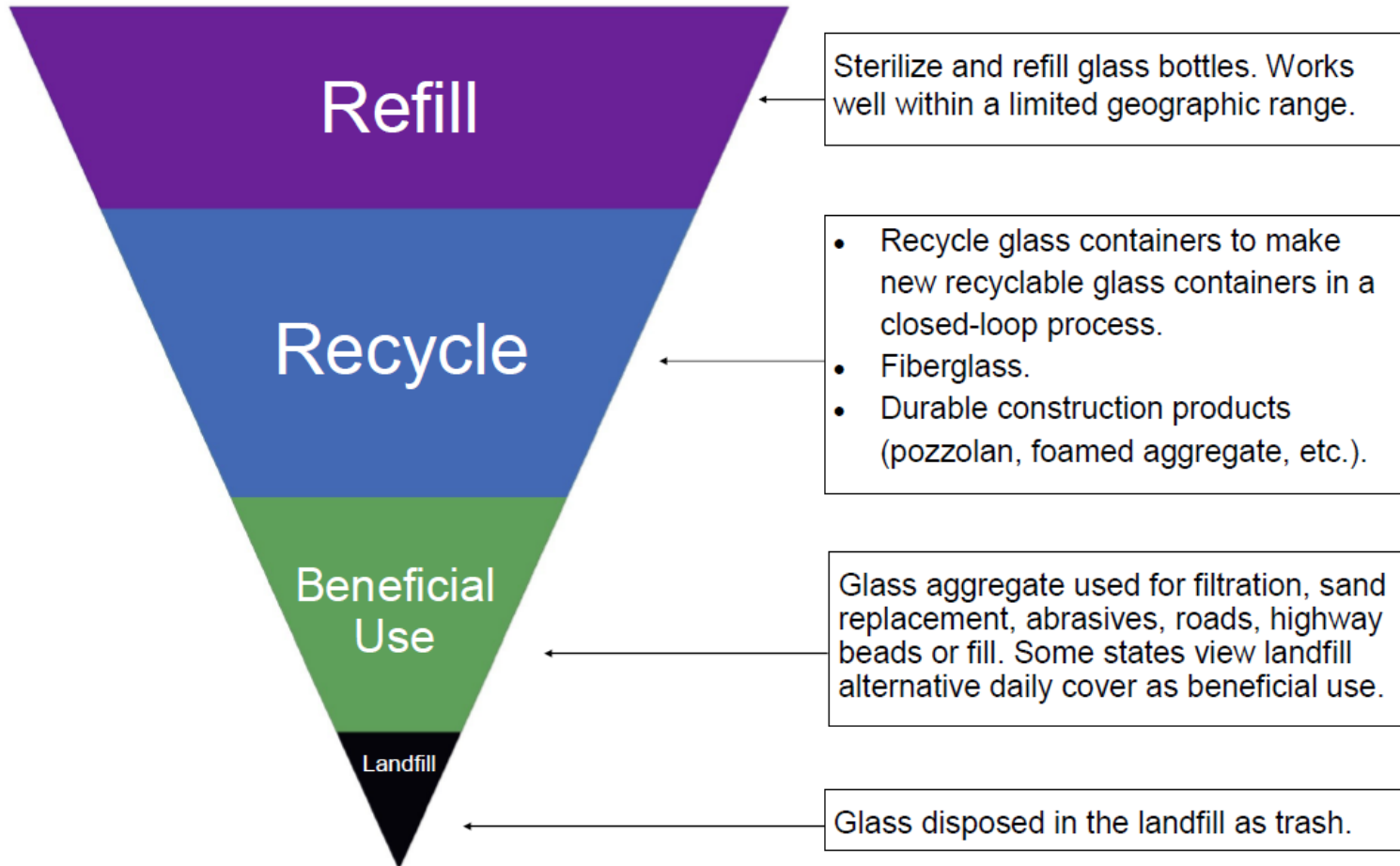
# Moving Glass Up the Hierarchy

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MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

*Protecting Maine's Air, Land and Water*

# The NERC Glass Recovery Hierarchy



Download Glass Committee Documents at <https://nerc.org/projects/current-projects>



# Environmental Benefits Comparison

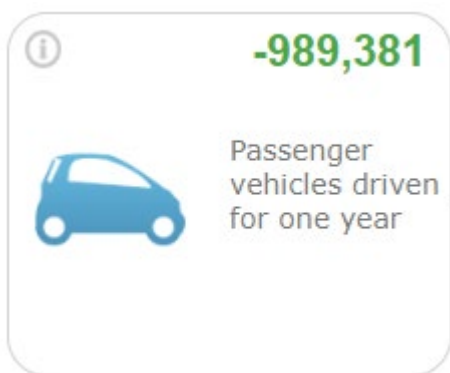
Environmental Benefit	Reuse	Recycle			Beneficial use
	Refill bottles	Make glass containers	Make fiberglass	Make construction materials	Crush for use as aggregate
Greenhouse Gas Savings	√	√	√	√	
Energy Savings	√	√	√	√	
Recyclability	√	√			
Water Savings	√				
Material Savings	√	√	√	√	*
Landfill Diversion	√	√	√	√	√

\*Particularly in regions where natural aggregate is not abundant, glass may substitute to conserve scarce local resources.



# Prioritizing Refill & Recycling

In 2017, the U.S. generated approximately 11,380,000 tons of glass and recycled 3,030,000 tons of glass. Below are EPA's Waste Reduction Model (WARM) tool estimates for the **GHG emissions that would have been eliminated** if the U.S. had managed to reuse or recycle the 8,350,000 tons of glass that was disposed.



Refilling vs. Landfill



Recycling vs. Landfill

*Passenger vehicles: 2-axle 4-tire vehicles (cars, vans, pickup trucks, and SUVs)*



# Glass-to-Glass Recycling

- **Container glass** is made from sand, soda ash, and limestone
- Glass bottles can be endlessly recycled in a closed-loop process
- Recycled glass cullet can be substituted for up to 95% of raw materials used to make new glass containers
- Every 10% of cullet used in new containers cuts carbon emissions by ~ 5% and reduces energy use by ~ 3%



# Alternative Glass Recycling

- Using cullet to make fiberglass reduces the energy needed to make new fiberglass by ~ 25%
- A growing body of research shows using glass in construction materials like pozzolan and foamed glass aggregate conserves energy and reduces greenhouse gas emissions
- One 2016 study on concrete production found that replacing 20% of the cement with ground glass:
  - Reduced carbon dioxide emissions by about 18%
  - Reduced emissions of nitrogen and sulfur oxides and particulates



# Glass Aggregate

- When other recycling markets are not available, glass can serve as an aggregate for infrastructure projects:
  - Backfill; drainage; subbase for roads, parking lots, trails, and sidewalks; stabilization; embankment; landfill cover
- Innovative examples from SIMS municipal recycling include:
  - Capping a closed landfill to support a new solar installation
  - Construction of raised garden beds
  - Engineered wetland meadow for stormwater treatment
  - Subbase to support sidewalk tree plantings





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