

## Window Recyclability: Circular Economy

### The request:

- Provide tax incentives for recycling glass as existing buildings are remodeled and/or demolished, beginning with requirements for government buildings.
- Support glass recycling infrastructure.

### The issue:

Approximately 10 million tons of flat glass was manufactured in 2018. 2.5 million tons (25%) was recycled as glass cullet 7.5 million tons (75%) was incinerated/landfilled.

Glass recycled materials can be used in a wide variety of industries from recycling back into the melt furnace to make new windows, glass containers (jars & bottles), road grade, fiberglass, reflective highway paint, landscaping products, countertops, and coastal restoration materials.

>50% of the 2050 building stock exists today with single and double pane windows, so RETROFIT will be key to meeting 2050 energy conservation goals for buildings. Windows that are removed from buildings at the time of replacement can be recycled.

Glass is infinitely recyclable which supports a circular economy and reduces waste and landfill. These benefits drive material choice decisions, for example glass containers instead of less recyclable materials such as single use plastics.

Recycling could soon become competitive due to carbon costs increase and landfilling becoming more expensive.

The glass recycling industry creates jobs and tax benefits.

### The strategy:

Recycling and reusing glass saves raw material usage. Incentivization drives research and development and innovation which will speed adoption.

Glass recycling helps reduce the cost and emission burdens on glass manufacturing.

Recycling glass reduces raw material mining, reduces furnace fuel needed to manufacture glass, and reduces the furnace emissions from glass plants.

Higher recycled material content is a key element for future decarbonization efforts for the glass industry.

Replacement windows can be a cost-effective retrofit solution, as shown in GSA: GPG-049 report, 2021.

### Cost-Effective Across Climate Zones<sup>6</sup>

Positive return on investment at average GSA utility rates, \$0.11/kWh and \$7.43/mmBtu

Location		Savings from Single-Pane to Double-Pane Insert					
CLIMATE ZONE	CITY	WHOLE BUILDING ENERGY SAVINGS kBtu/ft <sup>2</sup> /yr	ENERGY COST SAVINGS \$/ft <sup>2</sup> /yr	ANNUAL SAVINGS \$/yr	SAVINGS %	PAYBACK* YRS	SIR positive ROI if >1
1A	Miami, FL	8.1	\$0.27	\$14,480	11%	11.2	1.59
2A	Houston, TX	9.1	\$0.30	\$16,088	12%	10.1	1.76
2B	Phoenix, AZ	10.7	\$0.35	\$18,770	14%	8.7	2.05
3A	Atlanta, GA	10.3	\$0.35	\$18,770	14%	8.7	2.05
3B	Las Vegas, NV	10.8	\$0.36	\$19,306	15%	8.4	2.11
3C	San Francisco, CA	8.3	\$0.28	\$15,016	13%	10.8	1.64
4A	Baltimore, MD	12.6	\$0.43	\$23,060	16%	7.1	2.52
5A	Chicago, IL	13.5	\$0.46	\$24,669	17%	6.6	2.70
5B	Boulder, CO	13.9	\$0.47	\$25,205	18%	6.5	2.76
6A	Minneapolis, MN	15.6	\$0.54	\$28,959	17%	5.6	3.17
<b>AVERAGE SAVINGS</b>		<b>11.3</b>	<b>\$0.38</b>	<b>\$20,432</b>	<b>15%</b>	<b>8.4</b>	<b>2.2</b>

National Glass Association (NGA) combined with the Glass Association of North America (GANA) in 2018 to create the largest trade association serving our industry. We develop standards, create technical resources, and promote and advocate for glass in the built environment. Learn more at [glass.org/about-nga/advocacy](http://glass.org/about-nga/advocacy). For further information on glass industry sustainability efforts and CO<sub>2</sub> eq. please feel free to contact NGA Technical Staff at <mailto:technicalsvcs@glass.org>.

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### References:

- <https://recyclenation.com/2010/11/facts-glass-recycling/>
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- <https://patents.google.com/patent/WO2002016277A1>
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- <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management>
- GSA: GPG-049 report, 2021



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