

Recycling For Sustainability

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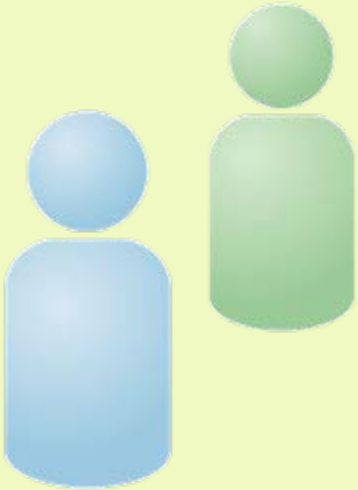
Simply Sustain LLC

- Help improve clients' profitability by guiding conservation of natural resources without leaving a legacy of waste.
- Create collaborative workgroups to solve plastics' environmental problems
 - Sustainable PP Roundtable with companies from cradle to cradle
 - Recycling “Beyond Bottles” coalition, now under Association of Post Consumer Plastics Recyclers supported by Simply Sustain
 - Disposable Cups waste reduction
- Expertise and knowledge of environmental and social issues of Plastics
 - Assess Life Cycle Impacts, Carbon footprint of Plastics, Guide green product development and marketing e.g. Packaging, Automotive, Recycling
 - Multi-client research report “Sustainable Polypropylene”

Today's topics

- **Who is Driving Sustainability & Recycling of Plastics?**
 - Retailers, Regulators, Brand Owners
- **Connection Between Sustainability and Recycling**
 - Life Cycle Impact for sustainability metrics
 - Example of Carbon Reduction From Recycling
 - Challenges of Recycle Content vs. Recycling
- **A Framework to help Increase Recycling and Recycle content**

Retailers Are The New Regulators



- **Wal-Mart**
 - Stricter standards than the EPA on Phthalates, lead, PVC, BPA, Cr, Br-FR
 - Cash from Trash
 - Distribution and supply chain scrutiny leading to packaging redesign - milk jug
 - Packaging scorecard
- **Tesco**
 - Carbon labeling
- **Marks & Spencer**

Wal-Mart's Sustainable Packaging Score Card

- Rates suppliers on their progress toward developing sustainable packaging
- A measurement tool that allows suppliers to evaluate themselves relative to others, based on specific metrics.
 - **15% GHG / CO2 per ton of Production**
 - **15% OSHA Injury Statistic**
 - **15% Product / Package Ratio**
 - **15% Cube Utilization**
 - **10% Distance to Transport**
 - **10% Recycled Content**
 - **10% Recovery Value**
 - **5% Renewable Energy**
 - **5% Innovation**

Marks and Spencer

- Committed £250 million to Plan A. There is no Plan B.
- 2012 aims - become carbon neutral, send no waste to landfill.
- Reduce use of packaging and make it easy to recycle, by:
 - Cutting their use of non-glass packaging by 25%
 - Trialing 'closed loop' recycling
 - Using materials that are easy to recycle or compost. E.g. focus on using four plastics: Polylactic Acid (PLA), PET, PP, PE. **(Note De-selection of PS and PVC)**

Labeling by Retailers Poses a Threat to Certain Plastics



California's Rigid Plastic Packaging Container (RPPC) Law is impacting brand owners

- Manufacturers of RPPCs that are sold or offered for sale in California must meet one of the following requirements:
 - The container is at least 10 percent source reduced, as defined
 - The container is comprised of at least 25 percent recycled content
 - The container is refillable or reusable at least five times, as defined
 - The container has a 25% recycling rate for either particular type or product specific containers
- Additionally, manufacturers may average one of the three requirements from #1-3, as defined. Producing a container that is recyclable does not fulfill these requirements.

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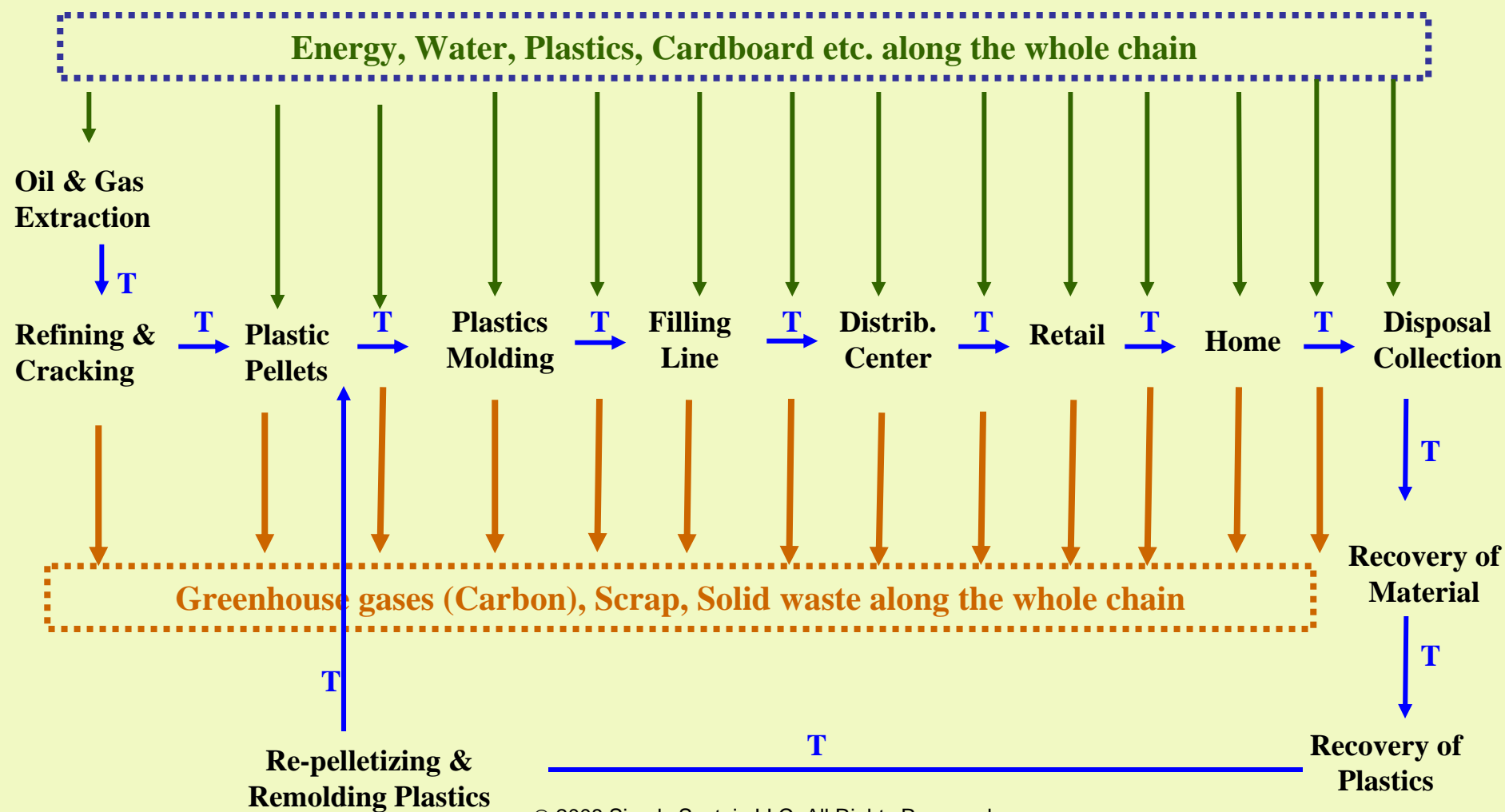
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Life Cycle Impact (LCI)

One of the metrics of sustainability

- A process to evaluate the environmental burdens associated with a product over its entire life cycle by identifying and quantifying energy and materials used and wastes released into the environment;
 - to assess the impact of those energy and material uses and releases to the environment.
 - and to identify and evaluate opportunities to affect environmental improvements. (SETAC, 1991)

Cradle to Cradle Environmental Impacts of Plastics



Example of Quantifying Sustainability

- **A major packaging company “felt” their new technology had sustainability benefits...**
- **Did not know how to quantify nor how to market these benefits to gain competitive advantage.**
- **Simply Sustain’s work**
 - Identified both qualitative and quantitative benefits
 - Identified data available and new data required for quantification
 - Applied LCI methodology and calculated energy and carbon reductions over the entire life cycle
- **Compared their new technology against:**
 - Their own standard technology and
 - That of a competitor who was using standard technology with 100% recycled plastic.

Identified Benefits of Client's New Technology

- **Reduced package weight**

 - Conserves amount of plastic

 - Conserves fuel and energy

 - Lowers carbon dioxide emissions so global warming

- **New molding technology**

 - Allows use of recycled plastic without color problems

- **Redesigned packaging for better recyclability**

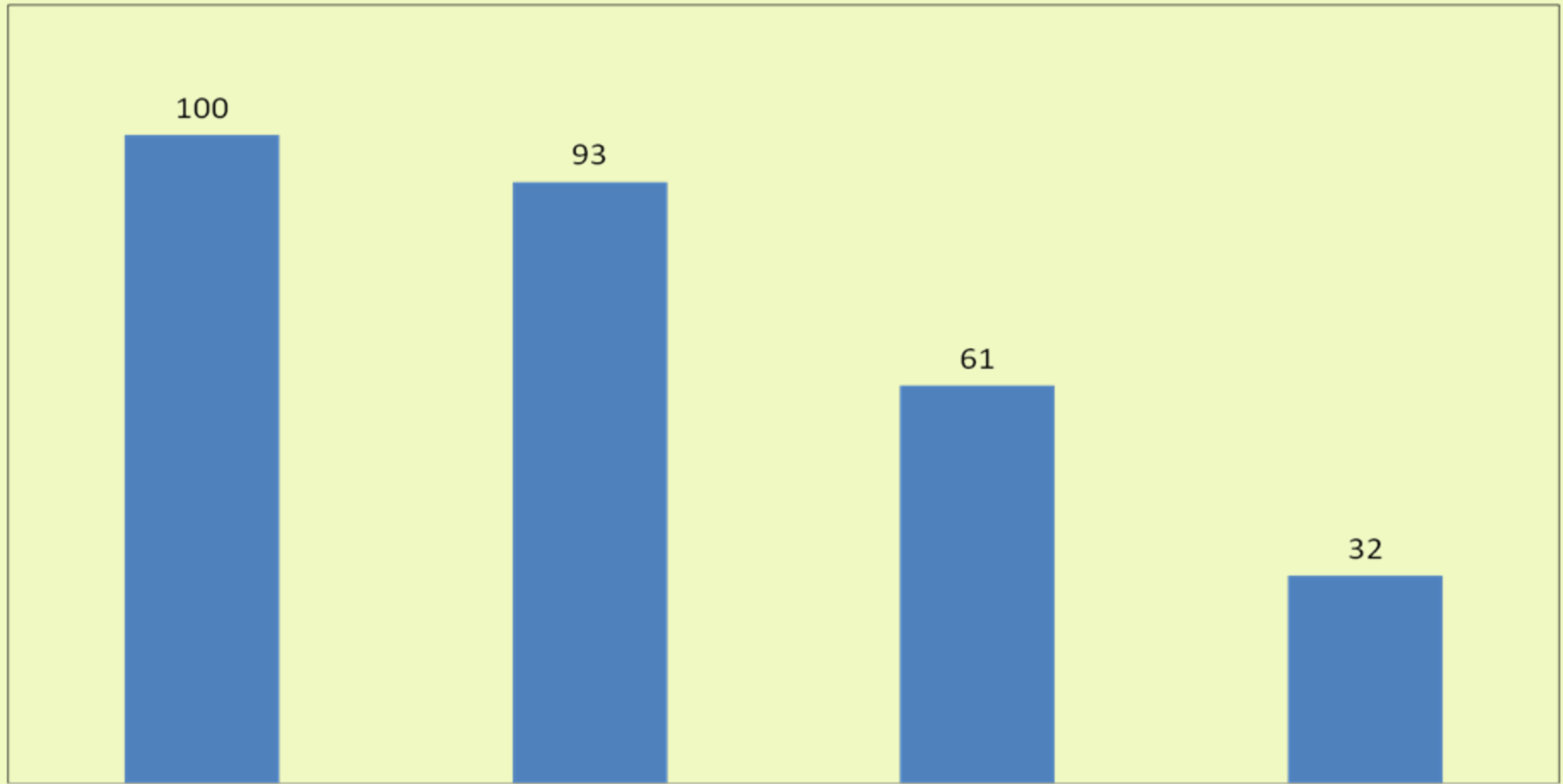
 - Reduces cost of dis-assembly at end of life

 - Reduces complexity at end of life

 - Preserves the value of plastic in next life

Comparison of Non-Renewable Energy

Relative NREU



Standard 100% virgin

Lightweight 100% virgin

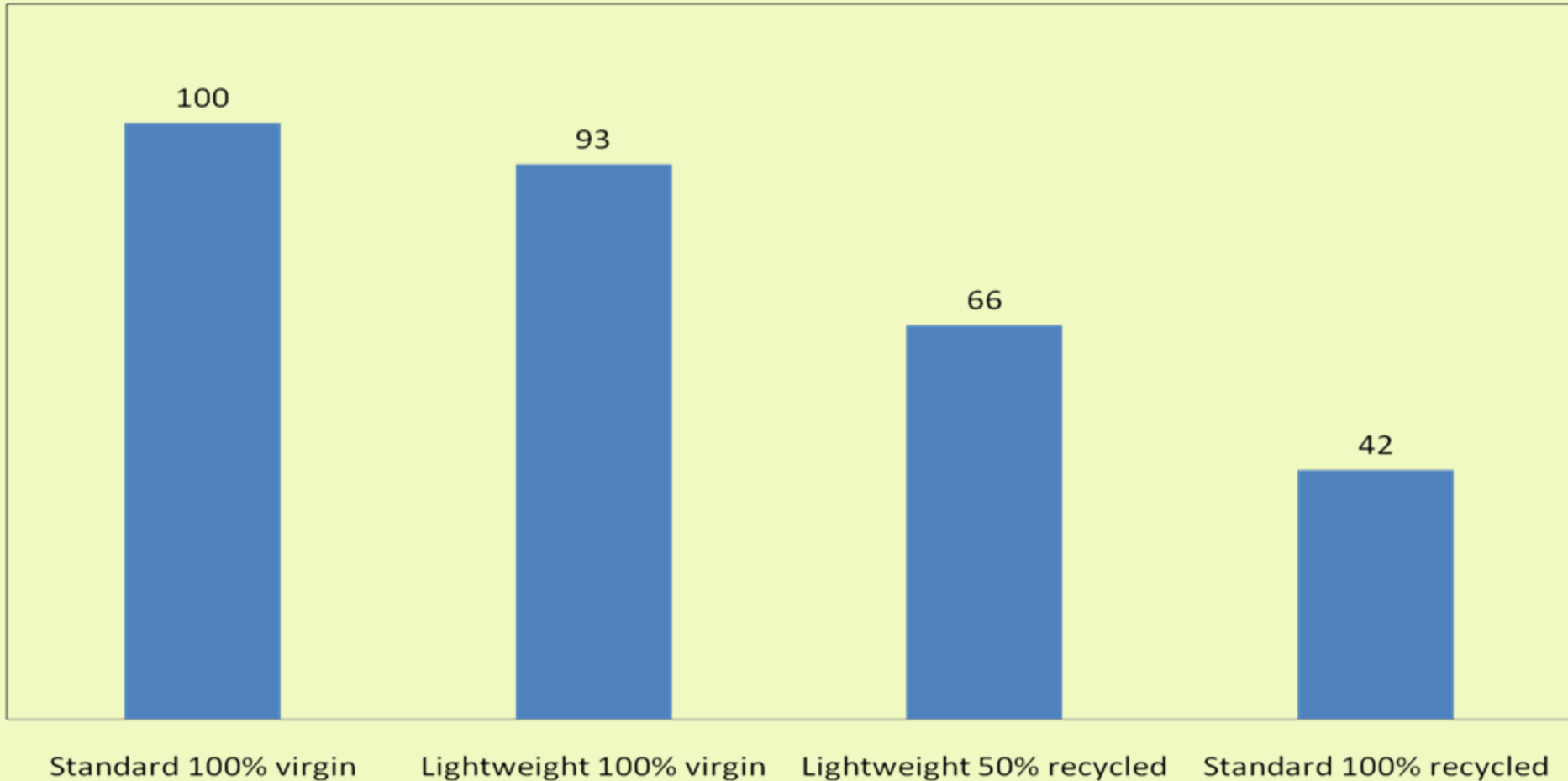
Lightweight 50% recycled

Standard 100% recycled

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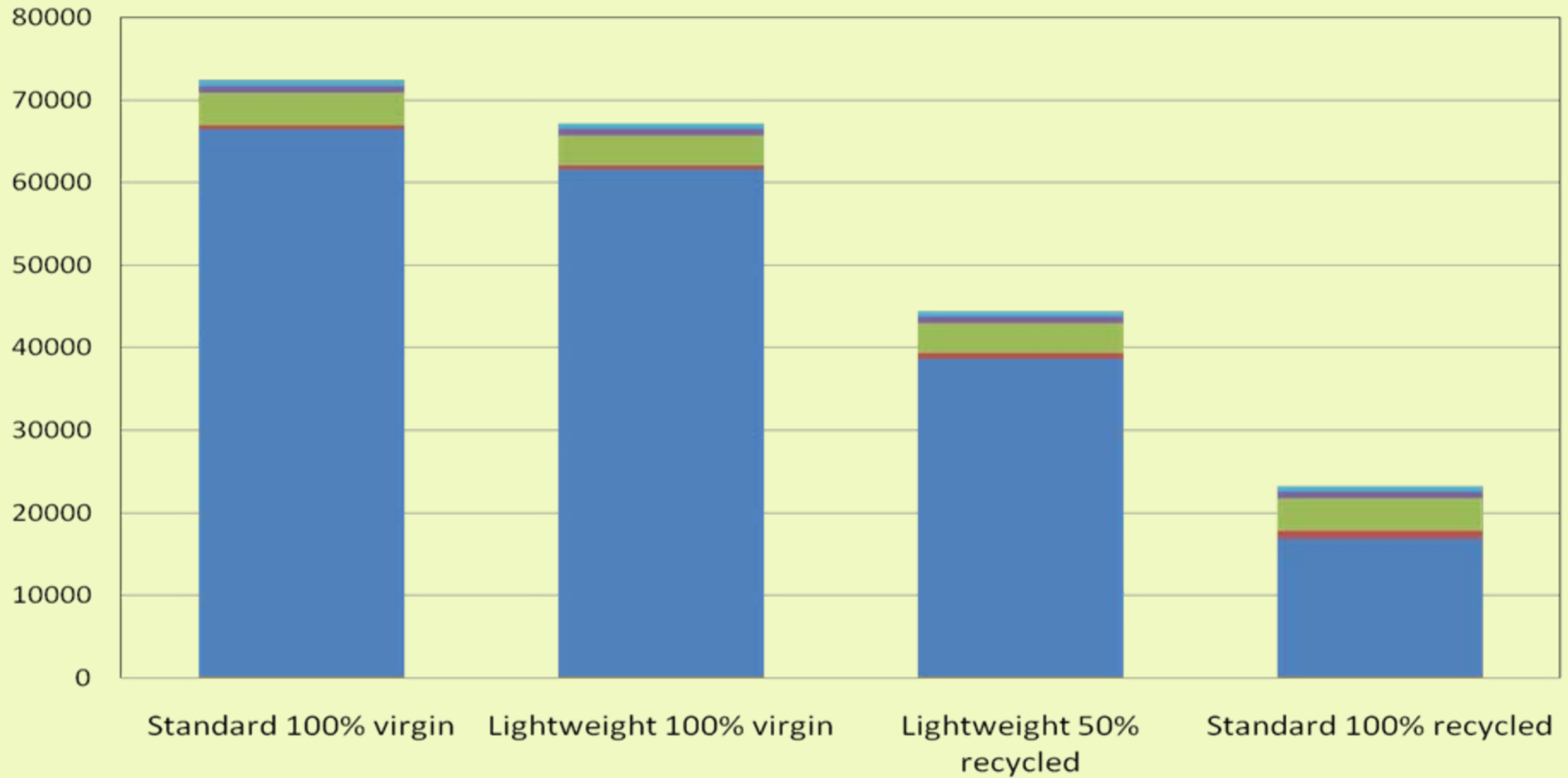
Comparison of Carbon Dioxide Equivalents

Relative Emissions of CO2



Comparison of Non-Renewable Energy During Various Stages Of The Life Cycle

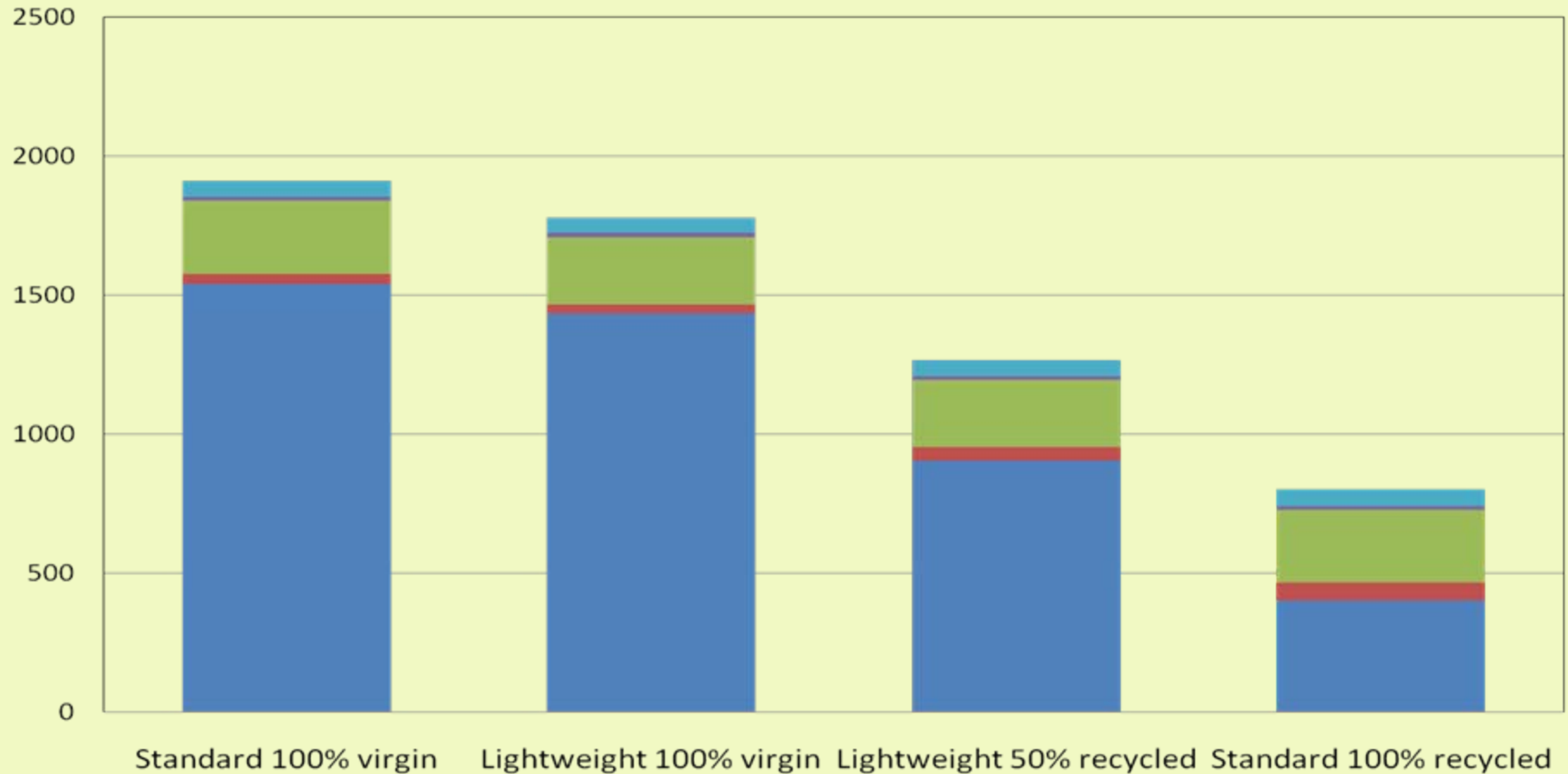
NREU, MJ/1000 Functional Units



■ Materials ■ Transport to Nampac ■ Fabrication ■ Packaging ■ Transport to customer

Comparison of CO2 Emissions During Various Stages Of The Life Cycle

CO2 Emissions, kg/1000 Functional Units



■ Materials ■ Transport to Nampac ■ Fabrication ■ Packaging ■ Transport to customer

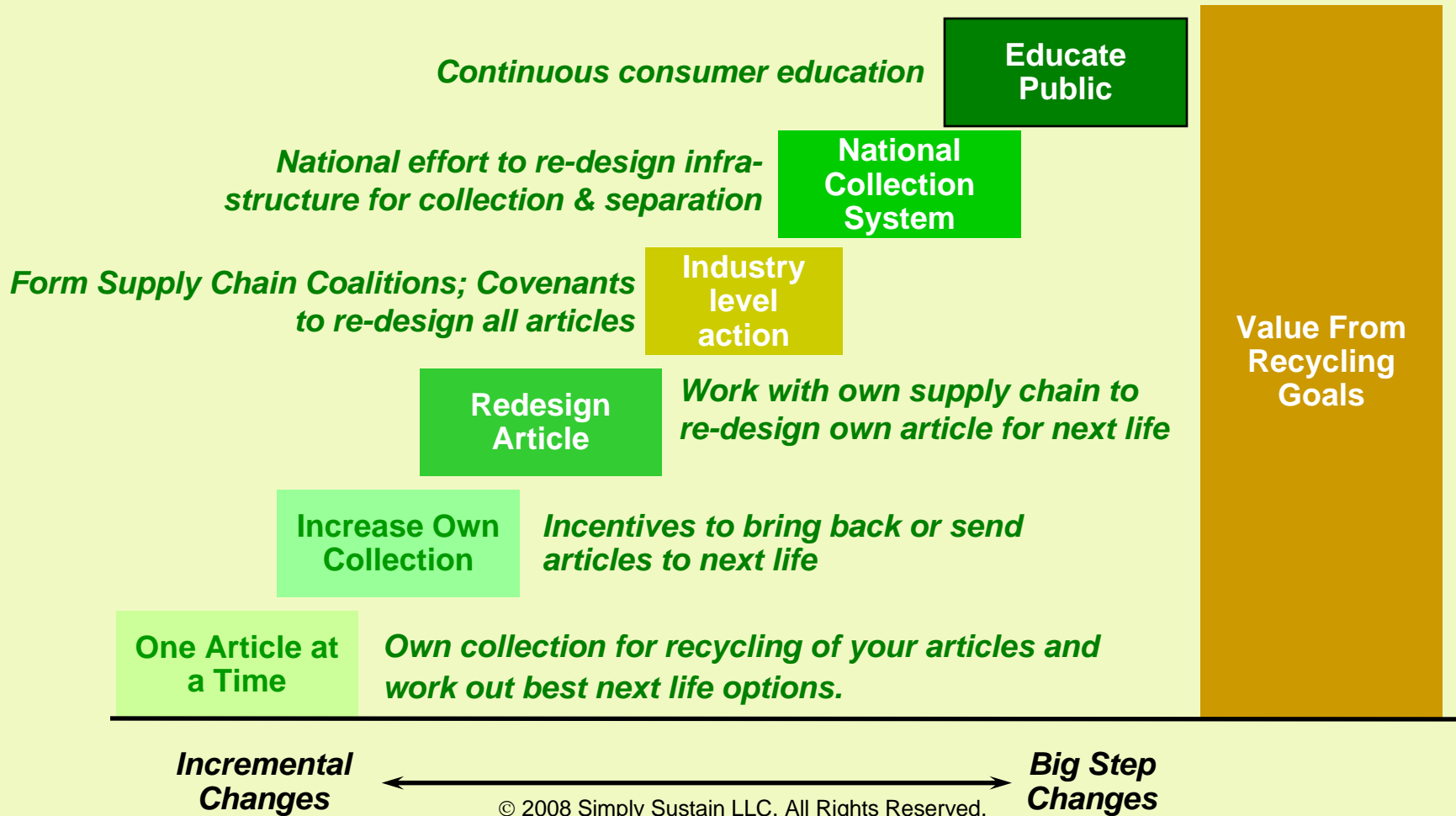
Recycling and Recycle Content

- **Incorporating recycled plastics even in small quantities can reduce energy and carbon footprint.**
- **There are many challenges for going to high levels of recycle content**
 - Complexity of grades and MFR in even a single article e.g. PP dairy tubs
 - Close loop recycling e.g. bottle to bottle is a lot more difficult than putting (mixed) recycled plastics into different articles.
 - Quality and consistency of supply is a big challenge; waste can not be generated and supplied to a specification on demand!!.
 - Surface finish and color issues

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Thank You...

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