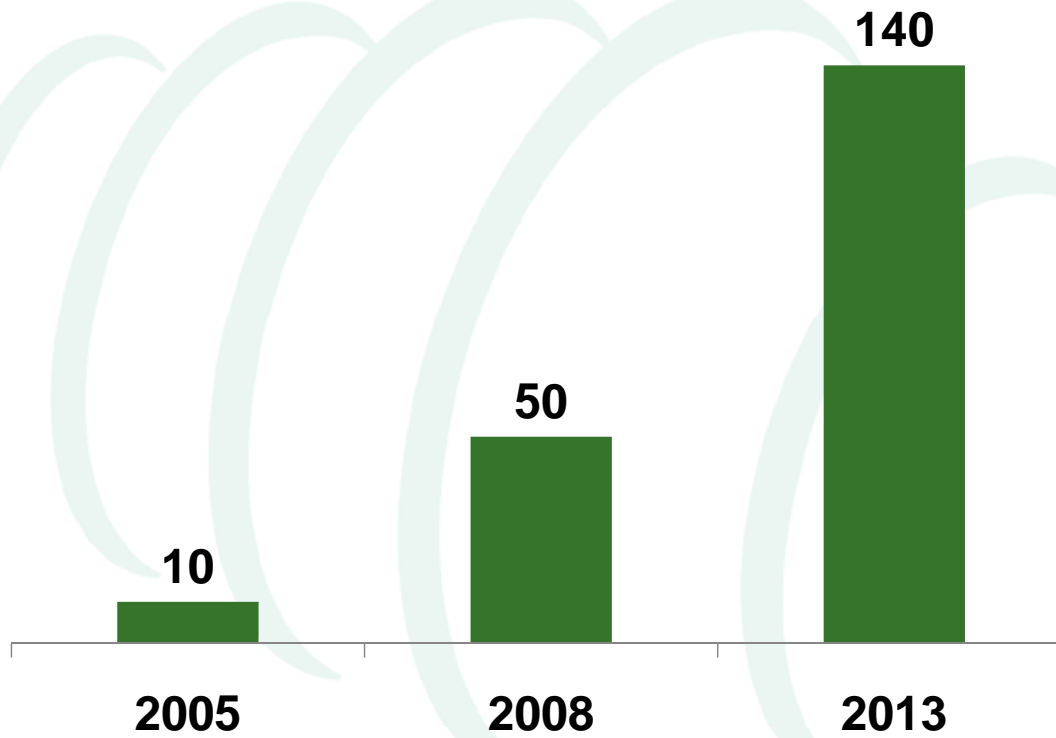

Sustainable Concrete Production: The Next Step Towards Industry Sustainability

Lionel Lemay, PE, SE, LEED AP
Sr. VP, Sustainable Development



U.S. Green Building Market Size (\$ Billions)



Source: McGraw-Hill Green Outlook 2009

Sustainability Will Save Money

- Top performers
 - ❑ 9 percent decrease in energy costs
 - ❑ 10 percent decrease in overall facility costs
 - ❑ 11 percent decrease in waste disposal, transportation logistics and packaging
- Poor performers
 - ❑ 19 percent increase in energy costs
 - ❑ 15 percent increase in facility costs

Source: Aberdeen Group: Sustainability Matters

Better Access to Capital

- Socially responsible investors are pushing companies to integrate climate risk and sustainability into their business strategy
- Sustainability-focused companies may emerge from the current crisis stronger than ever

Source: A.T. Kearny Report: Green Winners

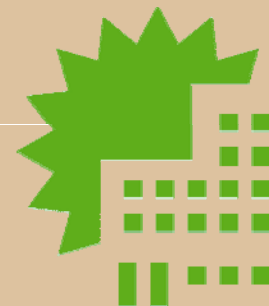
Sustainability Will Drive Revenues

- Catalyze innovation
- Attract the best and brightest talent
- Inspire new products
- Increase market share by differentiating products
- “Growing group of "alarmed" and "concerned" consumers willing to reward companies addressing climate change by buying their products and also willing to punish companies by not buying their products”

Source: Yale Project on Climate Change



NATIONAL READY MIXED CONCRETE ASSOCIATION
SUSTAINABILITY INITIATIVES



Vision



The vision of the ready mixed concrete industry is to transform the built environment by improving the way concrete is manufactured and used in order to achieve an optimum balance among environmental, social and economic conditions.

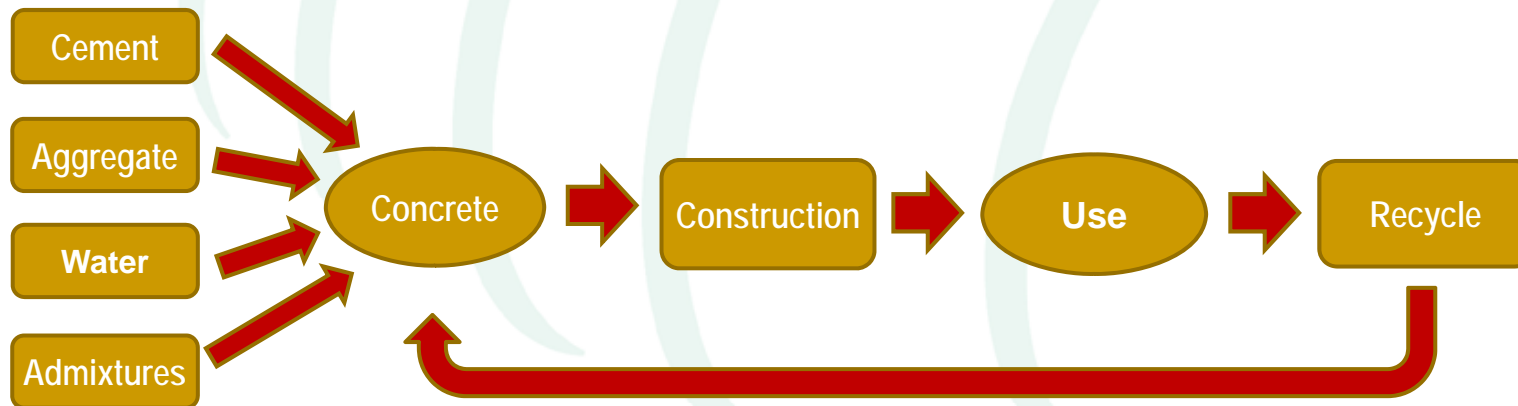


U.S. Sustainability Targets for Concrete

- Embodied energy:
 - 20% reduction by 2020
 - 30% reduction by 2030
- Carbon footprint:
 - 20% reduction by 2020
 - 30% reduction by 2030
- Potable water:
 - 10% reduction by 2020
 - 20% reduction by 2030
- Waste:
 - 30% reduction by 2020
 - 50% reduction by 2030
- Recycled content:
 - 200% increase by 2020
 - 400% increase by 2030

How Do You Measure Sustainability?

- Best Approach: Life Cycle Assessment
- Assess the environmental aspects and potential impacts associated with a product, process, or service.



Pros and Cons of LCA

- **Pros**
 - Pinpoints places where process improvements can yield environmental benefits
 - Good communication tool for customers and employees: market advantage

- **Cons**
 - Extremely complex and expensive
 - Lack/unreliable Life Cycle Inventory data
 - Prioritization of impacts is subjective

Should we Conduct LCA for Every Product/Project?

- Probably Not Realistic
- Alternative:
 - Rating Systems
 - Surrogates for LCA
 - Identify Impacts
 - Prioritize Impacts
 - Identify Trade Offs



Examples

- LEED
- BREEAM
- Green Globes
- Incorporate partial LCA in some cases



LEED Certification

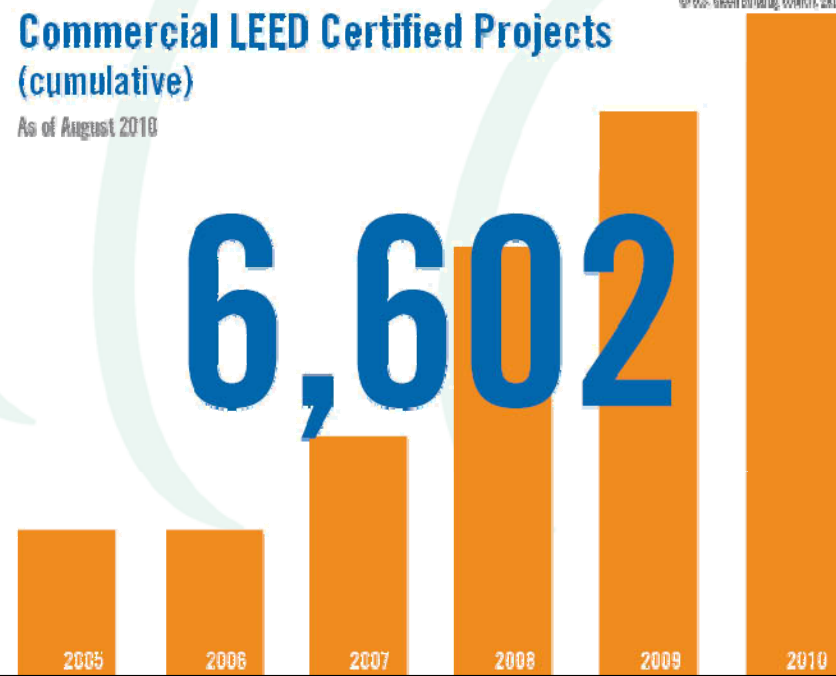
- Platinum
- Gold
- Silver
- Certified



Commercial LEED Certified Projects (cumulative)

As of August 2010

© U.S. Green Building Council, 2010



Rating System for Concrete Production?

- Continuously improve product

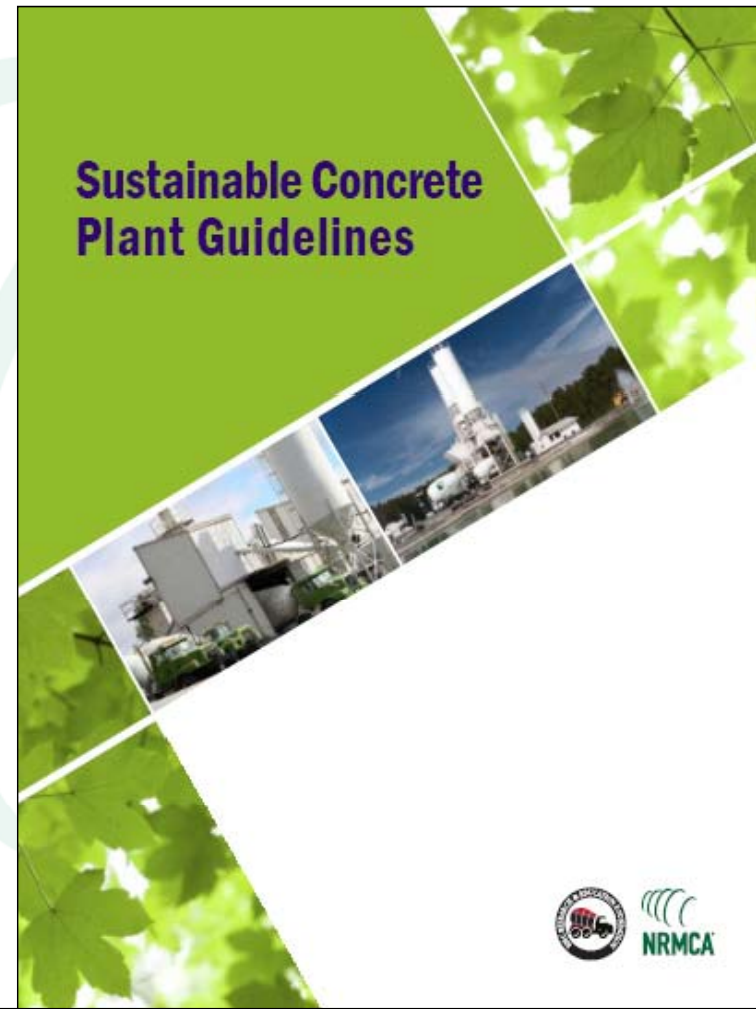


- Continuously improve process



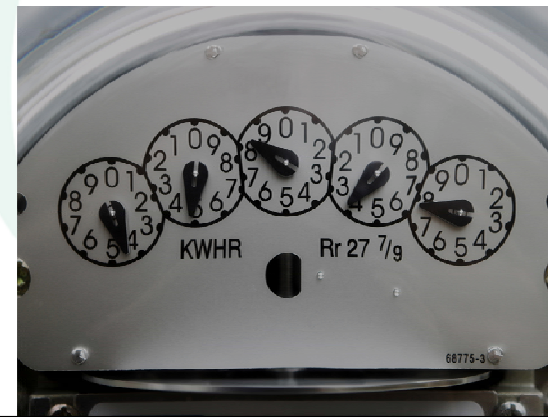
Sustainable Concrete Plant Guidelines

- Voluntary program
- Certifies concrete plant sustainability



Prerequisites

- Comply with environmental regulations
- Environmental Management System
- Energy audit
- Site plan Indicating measures to mitigate, control, or contain environmental hazards



Material Acquisition

- Recycle aggregate
- Optimize portland cement use
- Minimize materials transportation impacts
- Adopt sustainable purchasing plan



Production

- Control dust emissions
- Reduce fresh water use
- Manage stormwater
- Proper storage of chemicals and petroleum
- Reduce carbon footprint
- Reduce operating energy
- Reduce noise
- Adopt biodiversity
- Maintain worker safety



Construction

- Improve fuel efficiency
- Reduce fleet emissions
- Train driver
- Produce green building products



Product Use

- Conduct green building education for staff
- Conduct Green building education for specifiers
- Participate in sustainability advocacy



Material Reuse & Recycling

- Reduce excess concrete production
- Divert returned concrete from disposal
- Implement other recycling initiatives at the plant



Additional Credits

- Exemplary performance for a credit
- R & D for sustainable concrete products
- Community involvement
- Recognition for sustainable practices
- Maintain quality standards



Why Bother?

- Defines what make concrete sustainable
- Portrays positive image to community
- Identifies energy and cost savings
- Identifies increases productivity
- Differentiates your company



“Don’t let your competitors
control what sustainability
means in your industry”

Harvard Business Review, November 2010