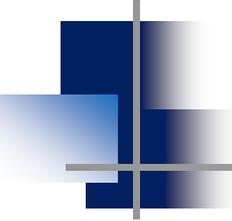


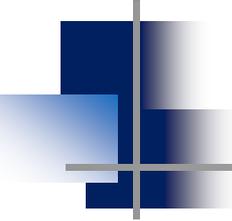
Sustainability Committee Meeting (via Zoom)

Mathieu Bouchard
NLA Staff
NLA Board Meeting
November 5, 2021



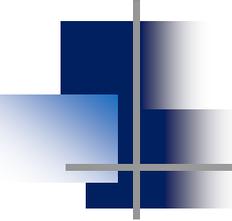
Senate Infrastructure Bill

- Passed August 10, 2021
- 69 votes in favor
- \$1 Trillion spending bill



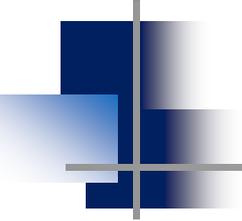
Senate Infrastructure—cont'd

- \$110 billion for roads/bridges etc.
- \$25 billion for airports
- \$66 billion for railways (incl. Amtrak)
- \$65 billion for internet access
- \$8 billion for Western water infrastructure
- \$21 billion for abandoned mine/well clean up



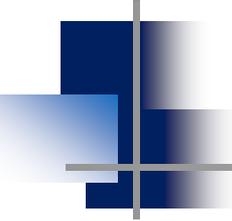
Infrastructure—cont'd

- House plans to take up the bill any day
- No longer tied to reconciliation bill
- Most trade associations (including NLA) are supporting the infrastructure bill



House Reconciliation Bill

- Opposition to certain provisions
 - NLA signed a letter opposing elimination of the percentage depletion tax deduction
 - Oil and gas opposes a proposed \$1,800/ton tax on methane emissions
 - Senator Sinema (D-AZ) opposes reversing the Trump tax cuts
 - Senator Manchin (D-WV) has expressed concern about the cost of the bill



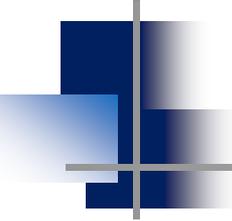
House Reconciliation Bill-- Cont'd

- Bill cut from \$3.5 Trillion to \$1.75 T
- Significant GHG provisions likely will be part of this bill--\$555 billion in spending on climate provisions...but they are incentives and not regulatory
- Clean Energy Standard and “Clean Electricity Payment Program” removed from the bill following opposition from Senator Manchin

House Reconciliation Bill-- Cont'd



- The bill also covers other significant areas besides GHGs, but have been pared back:
 - Tax increases
 - Social services
 - Education
 - Health Care



House Reconciliation Bill- cont'd

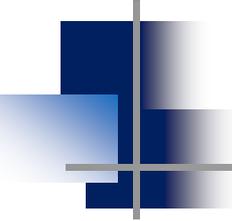
- Summary of Spending
 - \$555 billion on Climate Change
 - \$400 billion Child Care/Universal Preschool
 - \$200 billion expanded child and earned income tax credits
 - \$130 billion Medicare/Obamacare expansion
 - \$35 billion Medicare hearing benefit

House Reconciliation Bill- cont'd



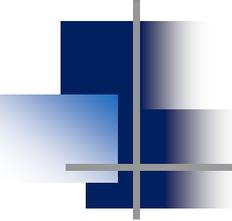
- \$150 billion in-home care access
- \$150 billion affordable housing
- \$40 billion worker training and higher education
- \$90 billion Miscellaneous spending

\$1.75 Trillion total



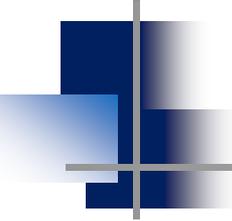
House Reconciliation Bill- Cont'd

- Summary of GHG Spending:
 - \$320 billion tax credits for renewable energy
 - \$7.5 billion for EV Chargers
 - \$12,500 tax credit for certain EVs
 - \$110 billion for clean energy manufacturing
 - \$105 billion for resilience (forest, wetlands, agriculture & cleaning legacy pollution)



House Reconciliation Bill— Cont'd

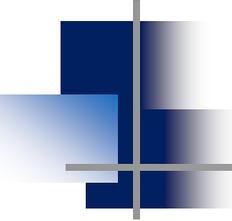
- Reconciliation can advance by a simple majority vote in House and Senate
- Certain restrictions apply (budget-related, 10-year limit, etc.)
- U.S. Chamber of Commerce and NAM oppose the reconciliation bill



Questions and Discussion

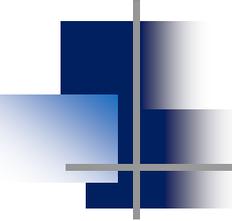
NLA GHG Protocol Findings 2019 & 2020 (Draft)

NLA Sustainability Committee Meeting
November 5, 2021



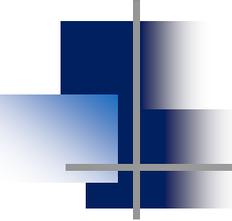
NLA GHG Protocol Responses

	2011	2019	2020
No. of Companies	16	12	12
No. of Plants	48	45	43



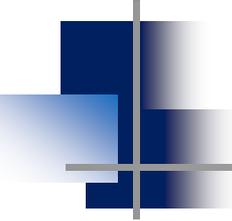
NLA Member Kilns in Operation

	2019	2020
Straight Rotary	49	48
Rotary Preheater	61	57
Vertical/Twin-shaft Vertical	10	10



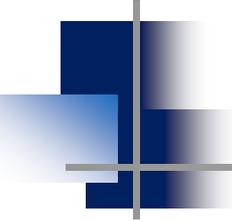
Data Collected

- Calcination Emissions (by kiln)
 - Product type
 - %CaO and %MgO
 - Production, calculated emissions
- Byproducts and Waste Emissions
 - Waste type
 - %CaO and %MgO
 - Amount Sold/Not Sold, calculated CO₂ emissions



Data Collected

- Kiln Fuel Emission
 - Fuel types and amounts (by kiln)
 - Fuel heat values
 - Calculated CO₂, CH₄, N₂O emissions
 - CO₂ CEMS (EPA Tier 4) – 2 companies, 5 plants
- Other Combustion Sources (OCS)
 - As per EPA “Report CO₂, N₂O, and CH₄ emissions from each stationary fuel combustion unit other than lime kilns.”
 - Fuel type, amount, and calculated CO₂ emissions

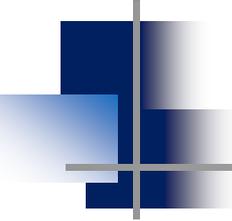


Data Not Collected

- Purchased electricity (~4-6% total emissions)
- Portable and emergency equipment (<1%)
- Quarry/Mine fuel (<1%)
- Emissions sequestered (0.3%)

Lime Produced and Byproducts Recycled

Million (MM) Metric Tons			
	2011	2019	2020
Quicklime	17	15.6	13.9 (-9% from 2019)
Byproducts Recycled	1.0	1.4	1.0



Production Breakdown

Lime Product	% Total Production		
	2011	2019	2020
Hi-Cal	78	79	79
Dolo	21*	19	18
Other (Mag lime, dead-burned, brick grain)		2	3

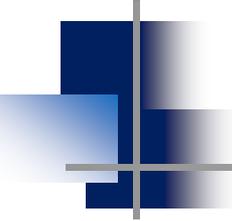
* Dolo plus "Other"

Byproduct Recycling

<u>WASTE TYPE</u>	Recycling Rate (%)	
	2019	2020
BLENDED/UNSPECIFIED LKD	58.5%	49.4%
DOLO LKD	72.8%	66.4%
DOLO OFF-SPEC LIME	0%	0.0%
DOLO SCRUBBER SLUDGE	0%	0.0%
HICAL LKD	70.3%	73.1%
HICAL OFF-SPEC LIME	34.8%	27.9%
HICAL SCRUBBER SLUDGE	0.0%	0.0%
MAG LIME LKD	0.0%	0.0%
MAG LIME OFF-SPEC LIME	0.0%	0.0%
MAG LIME SCRUBBER SLUDGE	0.0%	0.0%
OTHER CALCINED WASTE	7.5%	10.1%

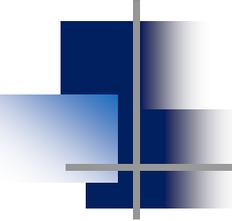
Byproduct/Waste Statistics

	2011	2019	2020
Overall Recycling Rate (LKD sold/total BPW produced)	42%	51.0%	46.9%
All Byproducts and Waste Generation Rate (All BPW/total lime produced)		16.2%	14.7%
LKD Only Generation Rate (LKD produced/total lime produced)		10.7%	9.8%



Oxide Content of Lime

	Percent CaO		Percent MgO		Percent Total	
	2019	2020	2019	2020	2019	2020
Hi-Cal	94.3	94.2	1.7	1.6	96.0	95.8
Dolo	56.9	57.1	39.3	39.5	96.2	96.6



Oxide Content of LKD

	Percent CaO		Percent MgO		Percent Total	
	2019	2020	2019	2020	2019	2020
Hi-Cal	47.0	42.0	1.70	1.76	48.7	43.8
Dolo	24.9	23.7	18.2	16.2	43.1	40.0

Lime Industry Kiln Fuel Use (%)

	2011	2019	2020
Coal	76	64	59
Coke	21	18	20
Natural Gas	2.6	16	19
Alternative Fuel	0.1	1.0	1.2
Fuel Oil	0.3	<1	<1

(Expressed as a percentage of total MMBTUs)

November 5, 2021

US Upstream GHG Tax with WTO- Compliant Border Tax Adjustments

Brian Flannery & Jan Mares
Resources for the Future

www.rff.org flannery@rff.org mares@rff.org

Resources for the Future

- Nonprofit, nonpartisan, highly ranked, independent institution performing economic research on energy, environment, natural resources
- Pioneered use of economics to develop more effective environmental policies
- Accepts project specific funding only from governments and foundations
- Collaborate with US, Japanese and European colleagues (RFF-CMCC European Institute on Economics and Environment)
- Staff of 75 in DC, includes 50 researchers, plus 30 non-resident and university fellows across the United States
- Well-connected with Congress, Federal Agencies, DC Think Tanks and Academia
- Similar to an economics department doing policy research, but not teaching
- RFF never lobbies or takes institutional positions on issues
- All work is public: posted at www.rff.org or published
- Board has leaders from ENGOs, academia, industry and law

RFF Carbon Pricing Models

- RFF has developed six economic models that simulate the impact of carbon pricing on US:
 - economy
 - revenues
 - employment
 - household income
 - electricity
 - other industrial sectors
- RFF has a Web based tool that allows anyone to estimate future CO2 emissions and revenues at:
<https://www.rff.org/publications/data-tools/carbon-pricing-calculator/>

RFF Interactions with Capitol Hill/Others

- Rooney/Deutch
- Whitehouse/Schatz
- Van Hollen/Beyer
- Other Reps. and Senators
- Climate Leadership Council
- Citizens Climate Lobby
- Niskanen Center
- Others ...

Background: GHG/Carbon Border Tax Adjustment

- Recognize that GHG/carbon tax legislation will require border adjustments (to address labor, business and community concerns)
- Provision of free allowances and other provisions in Waxman-Markey (2009) cap-and-trade bill were not WTO-acceptable
- Identified leading WTO experts, established collaboration (2017) with Georgetown University experts (and students)
- Developed a Framework for WTO acceptable BTAs (2018), updated 2020
- Shared proposal with 13 US trade associations, academics, NGOs, former government trade lawyers, for comment and advice, not endorsements
- Any BA proposal presents a significant, ongoing administrative challenge: many products, many nations trade GHG-intensive products
- Based on our backgrounds and experience (industry, engineering, govt, WTO and climate), confident the Framework would be administratively feasible

Carbon/GHG Tax & Border Tax Adjustments (BTAs)

Background

- Economists and many others recommend an economy-wide GHG tax as the most efficient way to mitigate GHG emissions
- BTAs aim to limit competitiveness losses and GHG leakage
- Many challenges to design of politically acceptable GHG tax— if resolved, then likely that BTAs would have bipartisan support
- BTAs required to address otherwise strong opposition from affected: labor, business, entire communities and regions

Challenges for BTAs:

- Legal (WTO compatibility)
- Technical (require GHG data for products, not facilities)
- Administrative (many, many products and nations)

Major Elements: WTO-Compatible Border Tax Adjustments

US upstream, economy-wide GHG/carbon tax

GHG tax applies to:

- Carbon content of produced fossil resources: coal, oil, gas
- GHG process emissions (if any) in all covered sectors

Border tax adjustments (BTAs): export rebates and import charges

Greenhouse Gas Index (GGI: tonnes CO₂e per tonne of product)
determines covered products, sectors

BTA (US\$ per tonne of product) = (US GHG Tax rate) X (GGI)

- Product threshold:
 - ≥ 0.50 tonnes CO₂e per tonne of product
 - ≥ 0.25 Tonnes CO₂e per MWh electricity
- Covered sectors are those with covered products
- Note: products with GGI < thresholds are not subject to BTAs

Thresholds cover major commodity products of traditional EITE sectors
plus production of coal, oil, gas, refining electricity, LNG...

Design of BTAs for WTO-Compliance

WTO allows BTAs for an appropriately designed domestic tax that can be assigned to products. GGI modeled on VATs: WTO compatible

Design incorporates key criteria:

- Export rebate and import charge rate: $BTA = GGI \times (\text{Tax Rate})$
- GGI evaluation based on objective international standards
- Export rebate “does not exceed” domestic tax paid on product
- Import charge “does not exceed” domestic tax on like products
- Import charge applied without discrimination based on national origin

Most favored nation principle

If BTAs were allowed for policies **not based on a tax**, objectively determining an “**effective price**” would be challenging. Difficult (impossible?) to determine:

- The amount to charge imports...for US or EU policy
- Credit for domestic policy in nations that export to the US

MFN implies: no credit granted for GHG policy in nations that export to others

GGI: Determining GHG Emissions Associated with Products

In analogy with VATs, for a specific manufacturer, GGI accumulates taxed sources of GHG emissions, both from the facility and products it purchases (supply chain):

- Decades of experience determining and reporting GHG emissions from facilities, e.g., a steel mill or operation to produce coal
- Framework for products requires two significant extensions:
 - **Allocation:** of GHG emissions of facilities to their products
 - **Supply Chain:** include emissions (GGI) associated with GHG-intensive products from suppliers, especially feedstocks, electricity and fuels
- Developed approaches for allocation based on straightforward systems, e.g., by carbon content or weight of core products
- By design GGI tracks taxed sources of emissions from operations and the supply chain

Given the GHG Tax paid by covered facilities, determination of GGI for products is “just accounting” for allocation and supply chain

GGI As a Standard for BAs Based on Product GHG Emissions

- Border Tax Adjustments (BTAs) under proposed Framework
 - GHG Tax sets the price on emissions (US \$ per tonne CO₂)
 - GGI sets emissions of products (tonnes CO₂e per tonne of product)
- Recently proposed BAs not based on a tax ([note imports only](#))
 - EU CBAM–emissions price set by permit price in EU-ETS
 - US Coons Peters–”effective price” to be determined for a portfolio of federal, state, local and regional policies: CAFE, RGGI, ...
- Challenges for BAs not based on a tax
 - Legal: WTO-compatibility using regulatory policy to set GHG price
 - Lack of objective procedure to determine an “effective price”:
 - + Set import charge for domestic regulations
 - + Provide credit for cost of regulations in nation exporting to US / EU (aside MFN may preclude providing such credit)
 - Applying GHG price to covered products not facilities

If challenges to setting the price could be overcome GGI could provide the basis to assign emissions to products

Observations, Challenges, Outstanding Issues

- For nations that adopt it, the Framework shifts the effort to mitigate emissions from nations that produce internationally traded products to those that consume them
- Framework would encourage other nations to adopt similar approaches (to avoid “double taxation” of exports to the US)
- Obtaining reliable data, especially from some developing nations
- Framework was designed to incorporate continuous improvement, e.g., through appeals processes and annual updates
- Issues associated with
 - Timing and availability of data
 - Country of origin
 - Biofuels
 - Supply chains
 - Administrative law

Thank You

References available through the RFF web site:

Blogs (with links to Full Reports)

October 2020

Flannery: Implementing a Framework for Border Tax Adjustments in US Greenhouse Gas Tax Legislation and Regulations

Hillman: To Address Climate Change While Protecting Workers, the United States Needs a Border-Adjusted Carbon Tax

October 2021

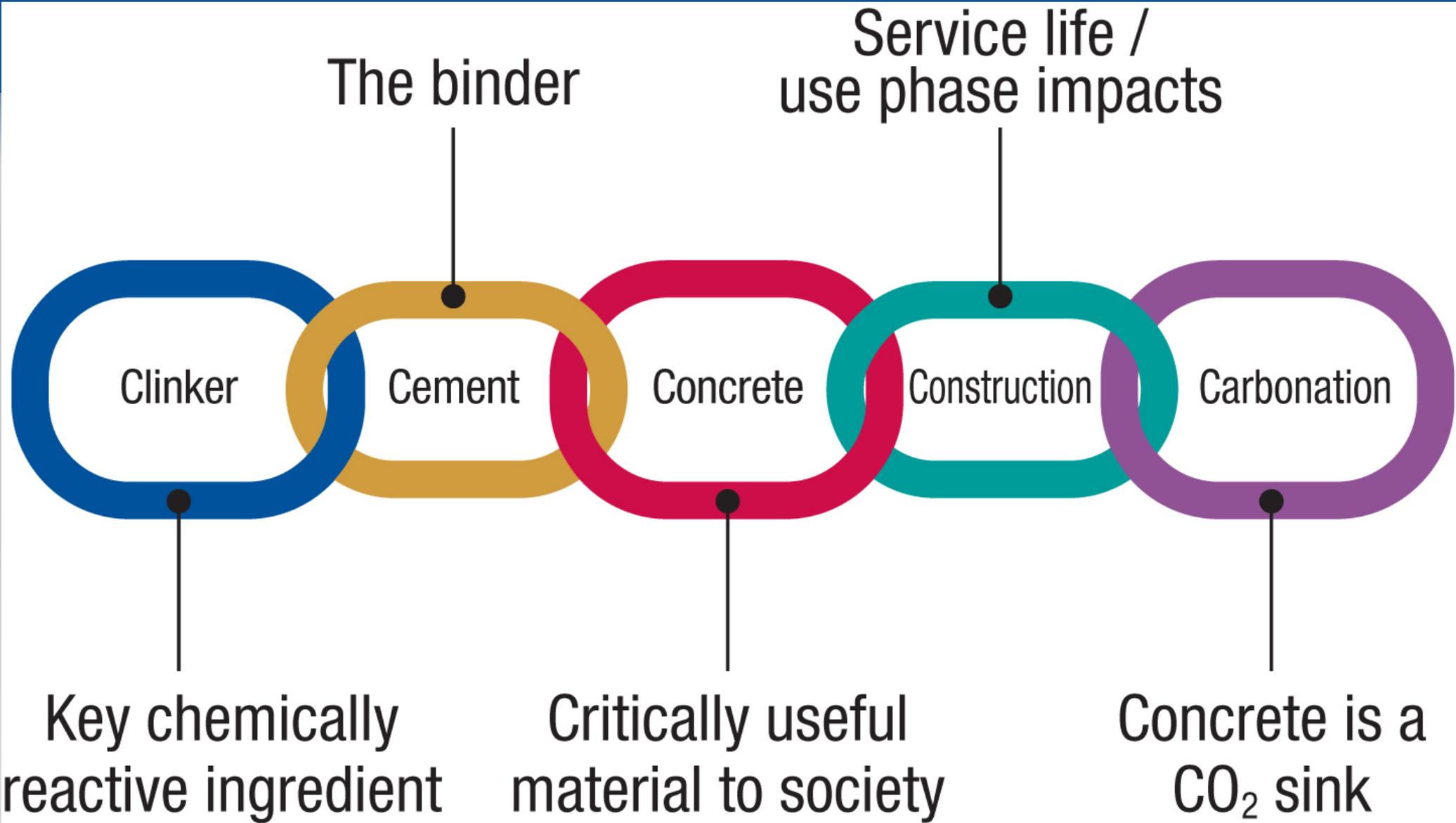
Flannery: Accounting for Emissions in Global Trade with a Greenhouse Gas Index,



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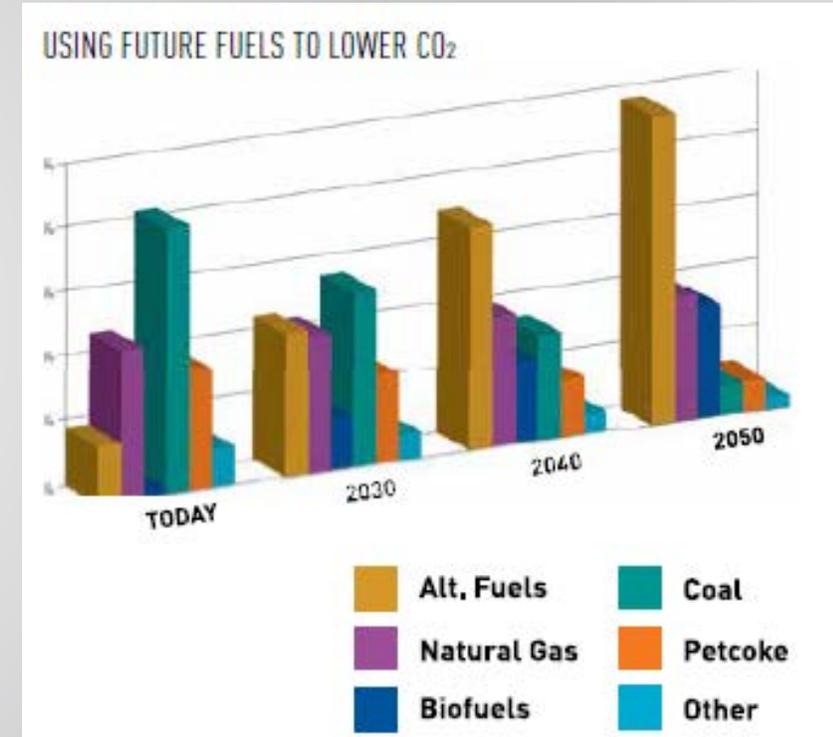
**National Lime Association
Sustainability Meeting
Louis Baer, Senior Director and Counsel, Government Affairs**

November 5, 2021



OPTIMIZING CLINKER

- Increased use of decarbonated/pre-calcined raw materials like slag
- Efficiency gains
- Fuel switching/fuel substitution/renewables
- Transformative fuels and technologies: H₂, plasma heating, oxyfuel/oxy-calcination, electric calcination...
- CCUS: solvents, sorbents, membranes, algae...

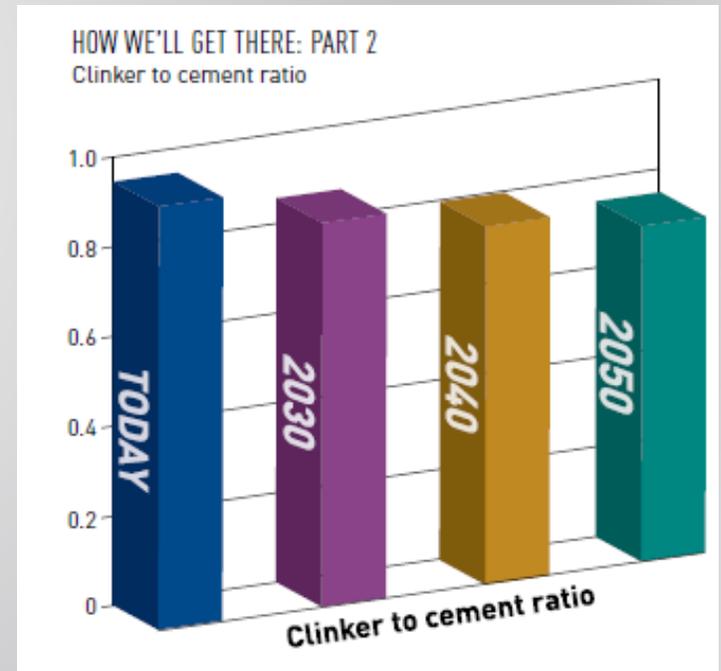


OPTIMIZING CEMENT

U.S. CEMENT INDUSTRY CONTRIBUTION TO GLOBAL GHG = 0.17% CO₂EQ

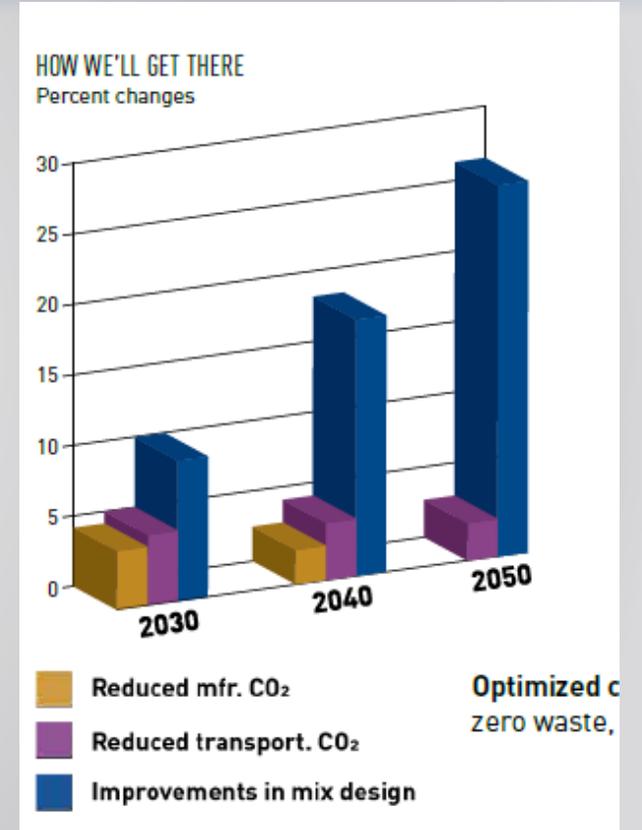
U.S. CEMENT INDUSTRY CONTRIBUTION TO U.S. GHG = 1.25% CO₂EQ

- Appropriate clinker to cement ratio
- Increased use of non-gypsum additions
- Flexibility in standards and specifications: P2P
- Universal acceptance/adoption of PLCs
- New cements
- Zero emissions manufacturing & transportation



OPTIMIZING CONCRETE

- Improvements in mix design
- Shift from prescriptive to performance-based specifications
- Increasing supplementary cementitious materials like slag, fly ash, silica fume, and other additives
- Reduced concrete plant energy consumption/reduced concrete delivery energy consumption
- Breakthrough technologies



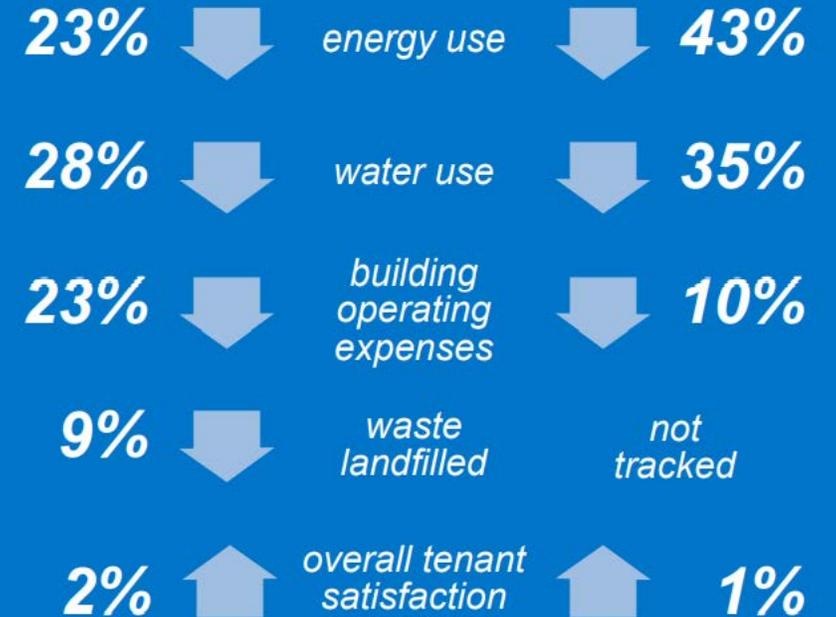
OPTIMIZING CONSTRUCTION

- Optimization in each phase of construction:
 - Design: 3D modeling, virtual reality design, etc.
 - Construction: zero waste, sequencing, scheduling, zero emission delivery and materials handling
 - Use: Focus on appropriate use of EPDs and LCCAs
 - End-of-life: Recognizing concrete as a carbon sink

key findings

Compared to legacy stock buildings, GSA's high-performance buildings show:

Compared to industry benchmarks, GSA's high-performance buildings show:



CARBONATION: CONCRETE AS A CARBON SINK

- Concrete permanently sequesters CO₂ through process called carbonation
- For all the concrete produced in the U.S. between 1990 and 2018, more than 300 million metric tonnes of CO₂ will be absorbed and sequestered by concrete over its service life
- Typically, over its lifetime, exposed concrete will absorb about 10% of the CO₂ emissions that were generated in its production

KEY POLICY LEVERS

-  Research, Development & Innovation
-  Regulations, Permitting & Guidance
-  Financial Incentives & Support
-  Performance-Based Material Standards
-  Market-Based Carbon Pricing
-  Market Acceptance
-  Community Acceptance
-  Cradle to Cradle Life Cycle-Based Procurement
-  Low-Carbon Infrastructure
-  Level Playing Field

PRINCIPLES FOR CARBON PRICING POLICY

1. Prevent carbon leakage to support domestic industries: Prevent carbon leakage through a Carbon Border Adjustment Mechanism (CBAM) to maintain a fair and level competitive playing field across building materials and global suppliers;
2. Prevent carbon leakage to support domestic industries: Prevent carbon leakage through a Carbon Border Adjustment Mechanism (CBAM) to maintain a fair and level competitive playing field across building materials and global suppliers;
3. Clear the regulatory path to a low-carbon economy: Promptly establish clear, consistent, and common-sense regulatory policies, preempt inconsistent state and local policies, and eliminate regulatory barriers to the adoption of sustainable low-carbon technologies, fuels, feedstocks, product designs, and infrastructure; and
4. Adopt a “whole life cycle” approach for the built environment: Account for the “cradle-to-cradle” life cycle impact of regulated products and activities, including embodied emissions as well as carbon sink and carbon avoidance opportunities during manufacture, use, maintenance, and end-of-life management.

CARBON PRICING POSITION

- Well-designed market-based carbon pricing mechanism can potentially enable the cement industry to reach goal of carbon neutrality by 2050
- A federal multi-sectoral cap-and-trade program offers the greatest promise
- These systems encourage an economy-wide, multi-sector life cycle perspective, encouraging industries to direct carbon reduction investments to projects with the lowest cost and highest reduction potential, with certainty in long-term decision-making and planning

QUESTIONS?

shaped
BY CONCRETE

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America's Cement Manufacturers™