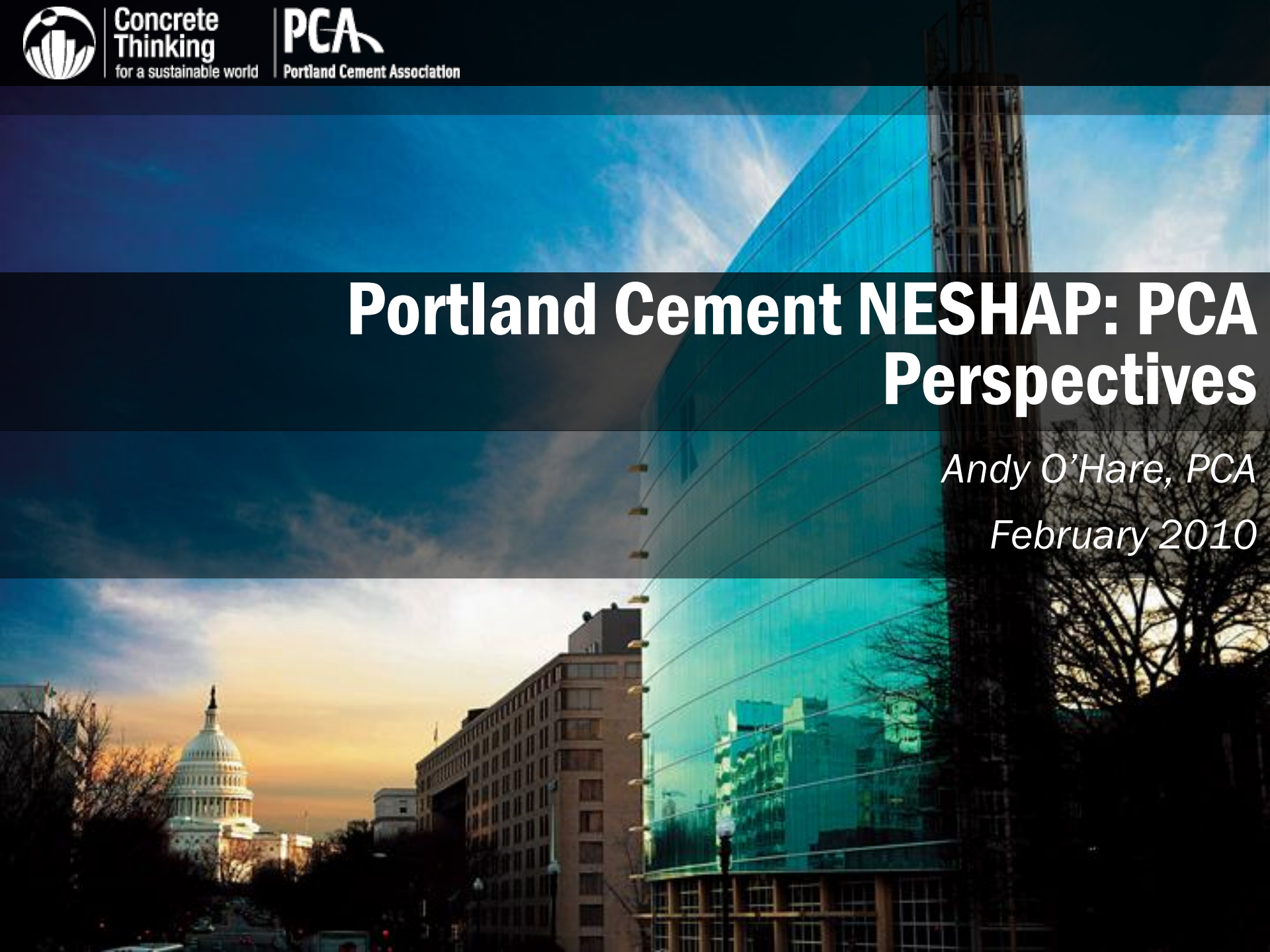


Portland Cement NESHAP: PCA Perspectives

Andy O'Hare, PCA

February 2010

Agenda

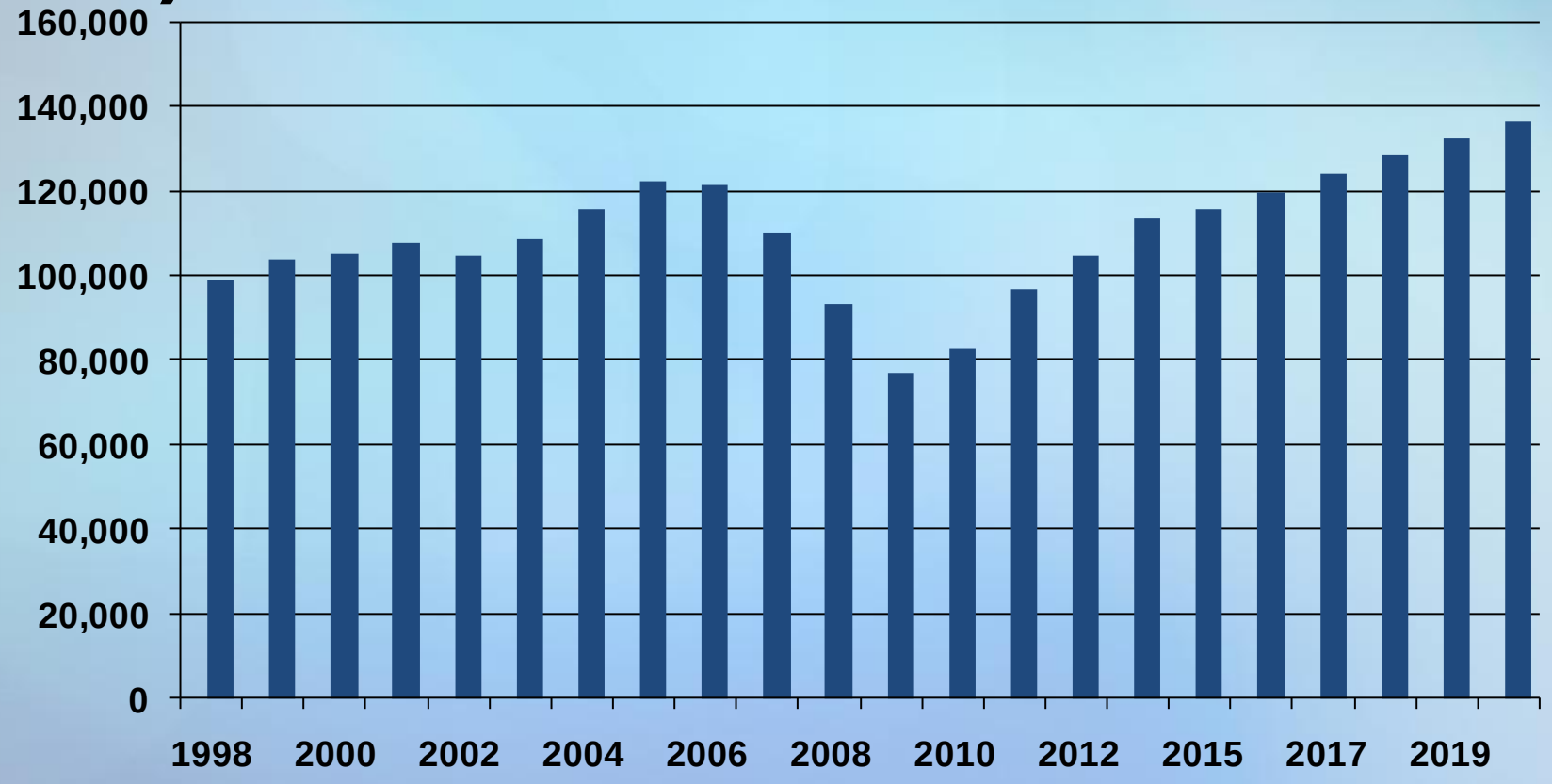
- Overview of U.S. Cement Industry
- Overview of Cement Manufacturing Process
- Summary of Concerns
- Pollutant Specific Concerns and Recommendations
- Overview of Potential Economic Impacts

Overview of U.S. Industry 2008

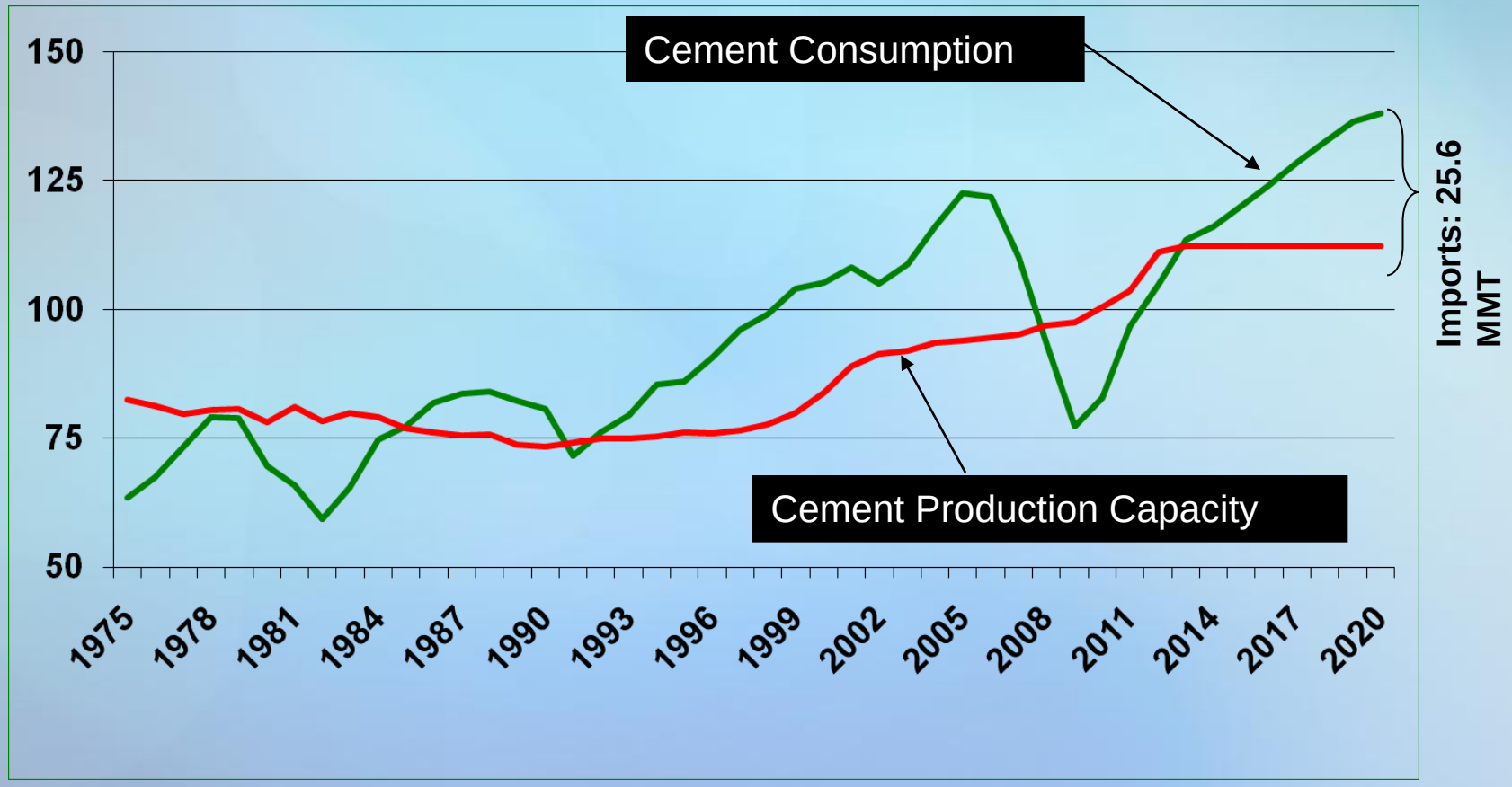
- 116 clinker producing plants
- 167 cement kilns
- Average clinker production: 584,000 tons per kiln
- Annual clinker capacity: 97.5 million metric tons
- Cement imports: 11.5 million metric tons
- 17,280 cement industry employees
- 7.2 million construction industry employees

U.S. Cement Plants

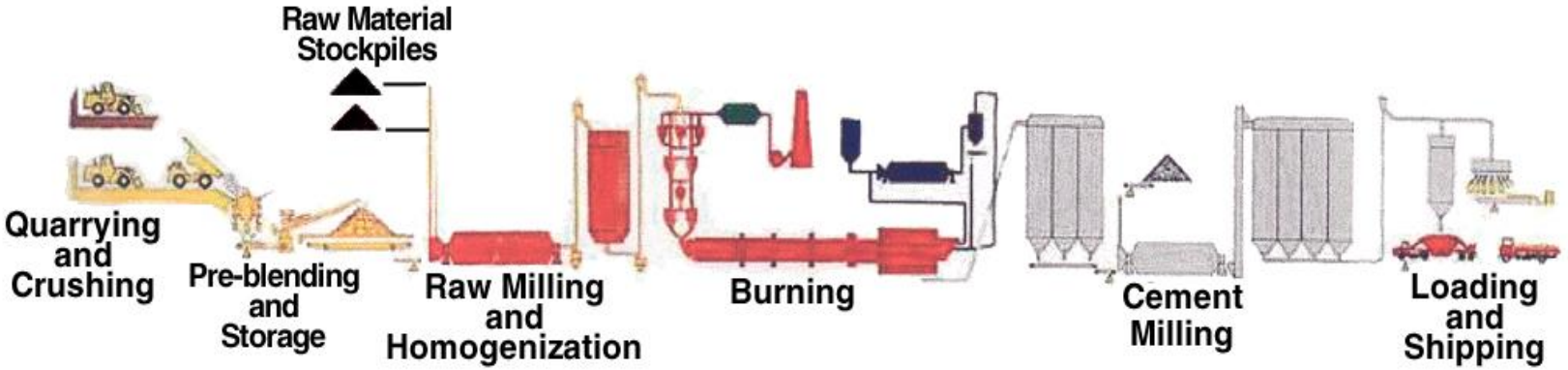
U.S. Cement Consumption ('000 metric tons)



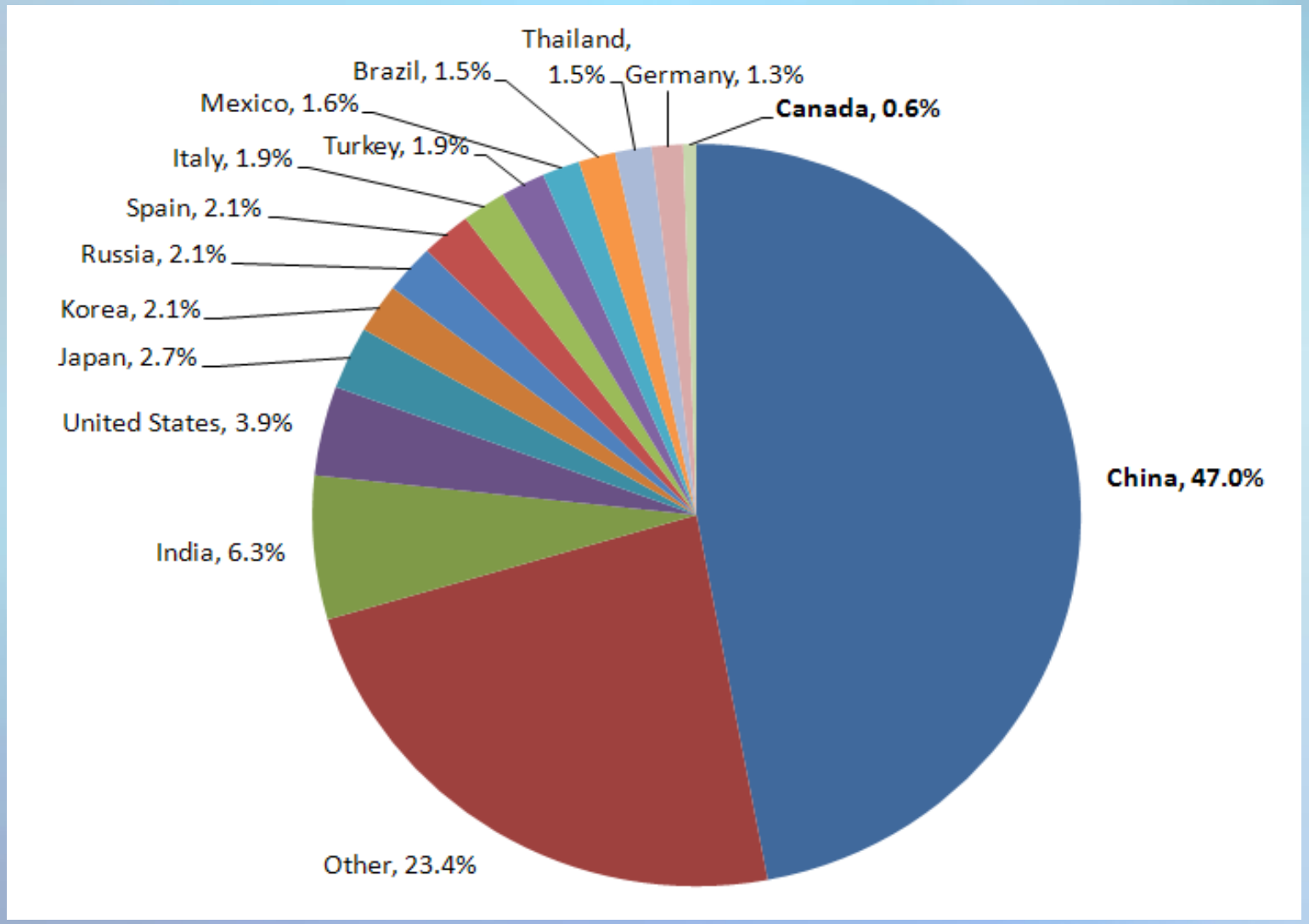
Net U.S. Supply Balance (MMT)



Cement Manufacturing Overview



Global Cement Production 2007



The Cement Sector is Trade Exposed

- Lowest cost building materials are generally sought for construction, including lower cost imported cement
- It is relatively inexpensive to ship cement across oceans
- U.S. manufacturers compete with imports from China, Colombia, Korea and other developing countries that do not face comparable air emission or potential climate change regulation
- Cement producers in these countries therefore have a cost advantage over U.S. manufacturers

Timeline for Portland Cement NESHAP

- March 1998: Initial Proposal
- June 1999: Final Rule - particulate matter, dioxin/furan stds and total hydrocarbon (THC) std (greenfield plants only)
- August 1999: Challenged by Earthjustice, PCA and NLA
- December 2000: D.C. Circuit Decision; Remand back to EPA
- April 2002: Final Rule implementing PCA/EPA settlement of litigation
- December 2005: Proposed Revisions
- December 2006: Revisions Finalized – mercury and total hydrocarbon stds for new and modified facilities; work practices for existing facilities; 112(d)(4) petition granted for HCl
- December 2006: December 2006 rule reconsidered
- 2007: Extensive 114 data request; testing of scrubbers
- May 2009: EPA proposes substantial changes

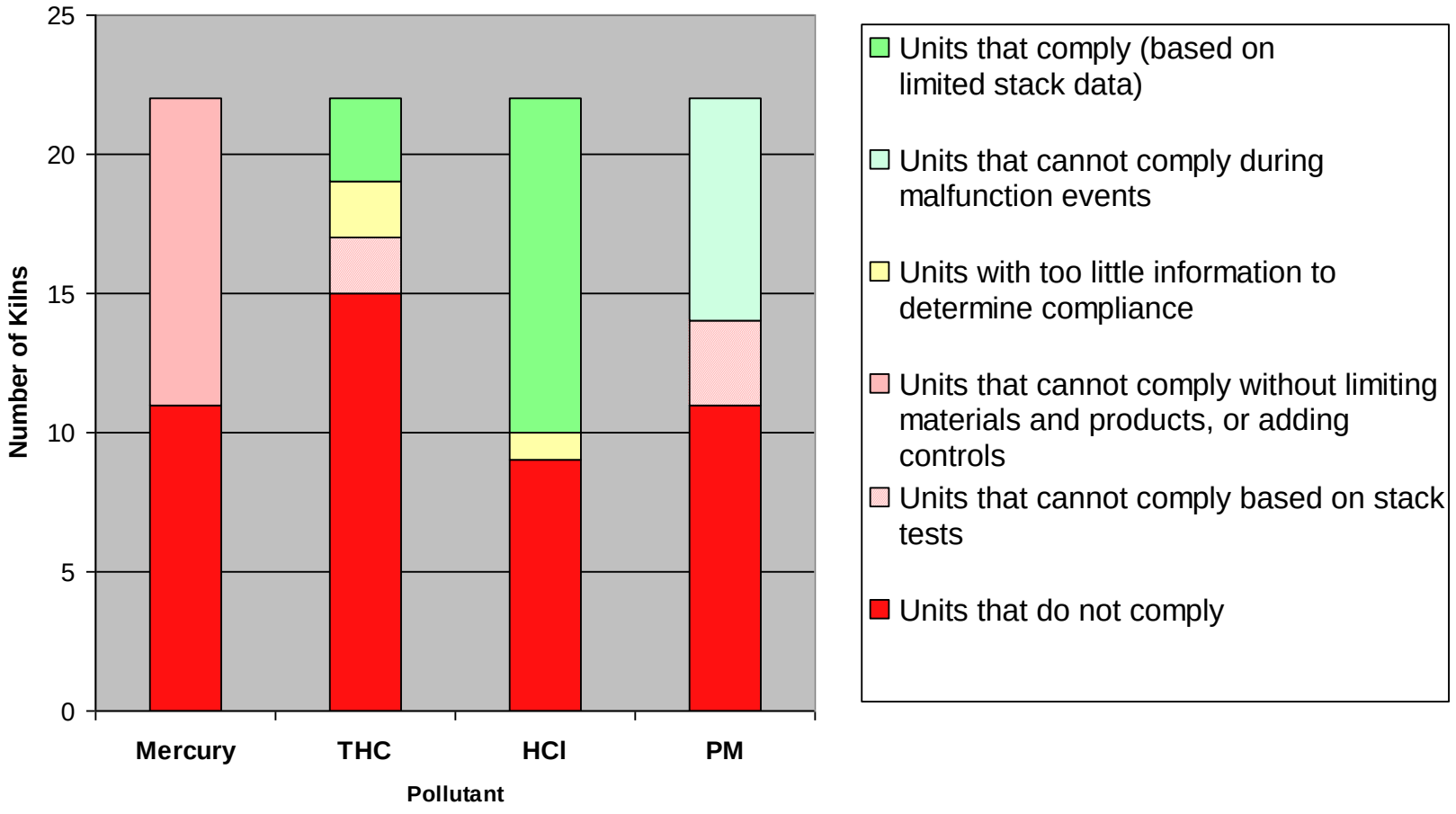
Key Concerns with EPA Rule

- Rule will have significant economic impacts
- Mercury and total hydrocarbon (THC) emissions linked primarily to site specific limestone quarries
- Use of pollutant-by-pollutant “lowest emitting” methodology with limited data and consideration of variability is inconsistent with Clean Air Act
- Standards should reflect full range of emission characteristics of “floor” facilities
- Subcategorization and variability methodologies can provide reasonable floors
- Emission limits not appropriate for periods of startup, shutdown and malfunction.

Pollutant-by-Pollutant Concern

- Different set of “lowest emitting”(rather than “best performing”) units used to set “floors” for mercury, THC, hydrochloric acid (HCl) and particulate matter (PM)
- None of the “floor” facilities capable of complying with proposed standards without additional controls
- EPA approach creates “hypothetical” plant which does not exist
- Best performers should be actual plants capable of achieving emission standards “in practice” without add on controls

None of the Floor Units Comply with All of the Proposed Limits



Mercury

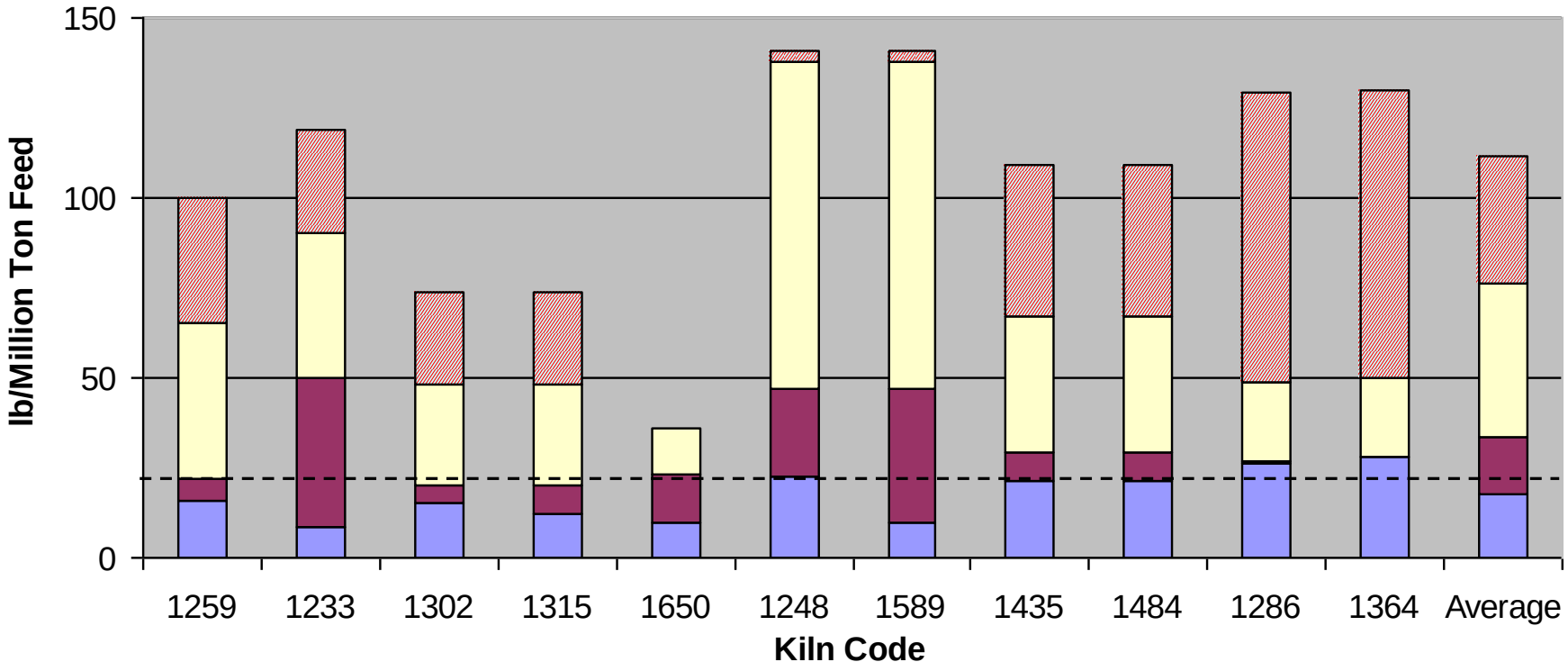
Pollutant/Technology Concern

- Mercury comes primarily from plant-specific limestone
- Some plants will not be able to achieve the standard even when equipped with technology
- Scrubbing efficiency is related to the valence of mercury; only oxidized mercury is captured
- Accordingly, scrubber performance will vary by an order of magnitude
- Mercury control by cement kiln dust (CKD) removal is very limited

Recommendations

- More expansive consideration of variability when determining a specific emission limit
- Consider establishing a percent removal as a beyond the floor requirement for selected kilns with elevated mercury limestone concentrations
- Subcategorize universe of facilities based on at least the concentration of mercury in limestone

Mercury Variability Summary for Best Performers



THC

Pollutant/Technology Concern

- Data set is too limited and of too short a duration
- Carbon not effective with light hydrocarbons; THC and mercury carbon systems designed differently
- Limitations on the effectiveness of activated carbon will lead to greater use of RTOs; greater greenhouse gas impacts
- RTOs have a 5-10 ppm performance limit, restricting emission control capabilities
- Many cement plant have limited or no access to natural gas needed for RTOs
- THC emissions may be influenced by various plant configurations

Recommendations

- Collect additional THC data over much longer period of time to capture natural variability
- Subcategorize universe of facilities

Note: THC data collection now ongoing

HCl

Pollutant/Technology Concern

- EPA has used area source data for a major source standard
- Standard based on stack tests; CEMs required for compliance
- EPA has overstated the collateral benefit of a wet scrubber for HCl and SO_2
- High efficiency removal of HCl has not been demonstrated in the presence of SO_2

Recommendations

- Endorse previously EPA accepted risk based exemption

PM

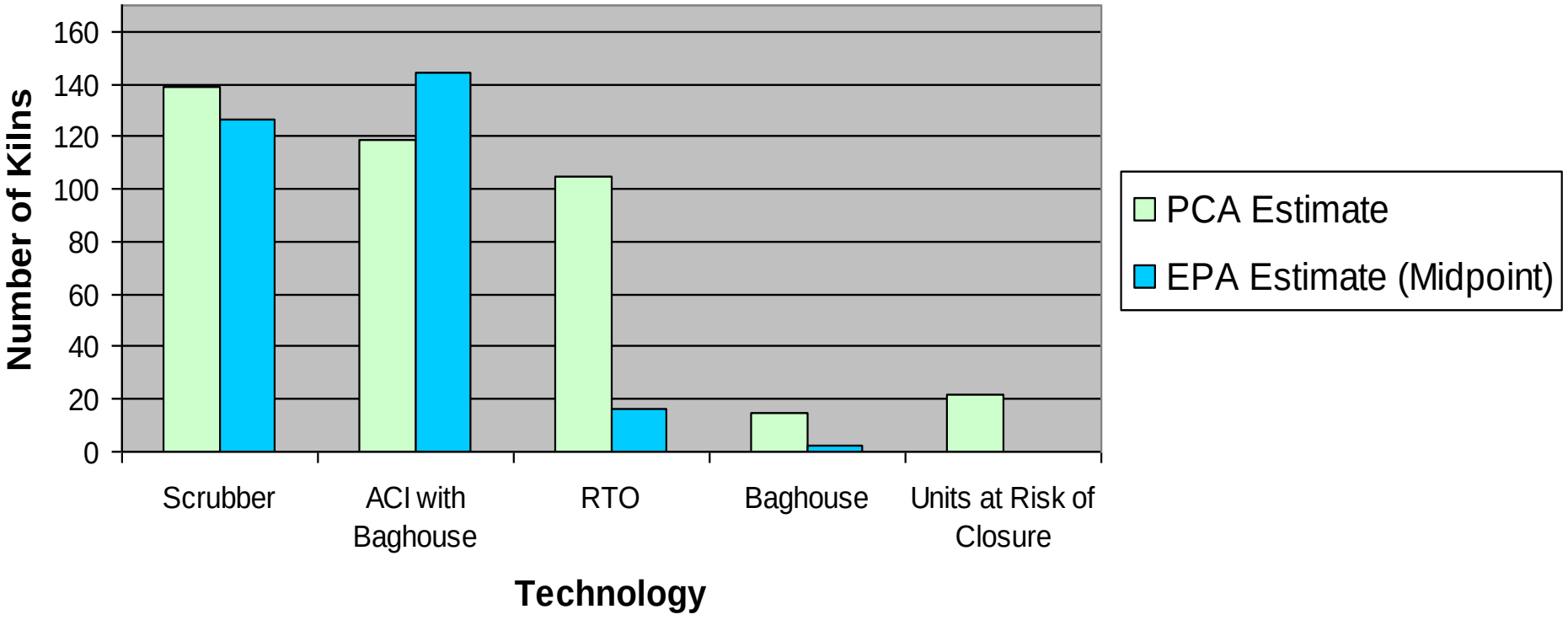
Pollutant/Technology Concerns

- PM data set includes kilns that were tested for NESHAP compliance; PCA concerned with “MACT on MACT” implications

Recommendations

- Remove from PM data set those kilns which were tested for NESHAP compliance

Technology Requirements of Proposed MACT Rule

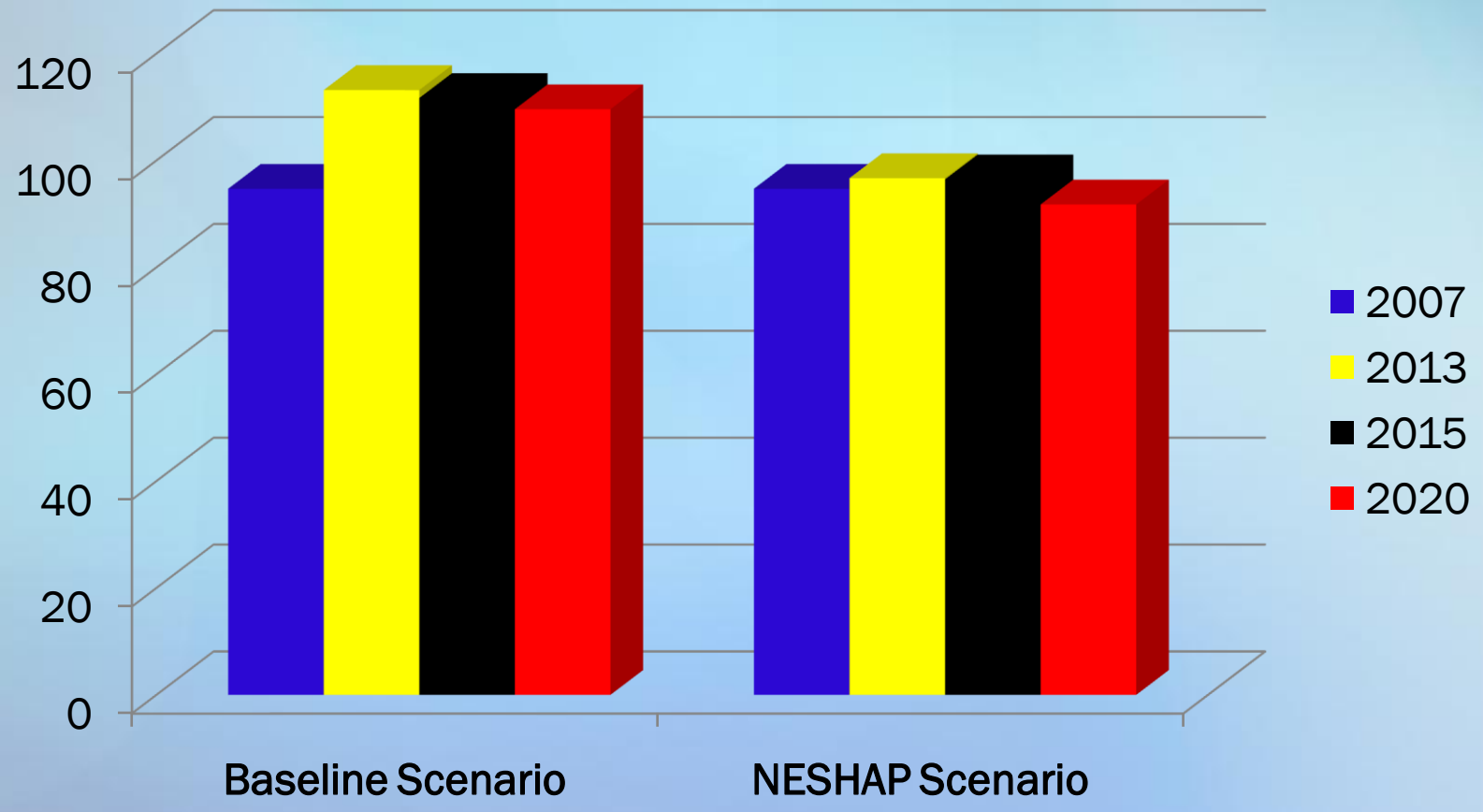


Potential Economic Impacts of NESHAP

- Compliance with the NESHAP as proposed could cost more than $4.7 billion; add $21 to the cost of cement in 2020 potentially exacerbating leakage of cement production
- Limited available capital and market circumstances may make it difficult to comply within the allotted three year timeframe
- As many as 30 plants could close, with an additional 12 at high risk of closure
- Upwards of 27 million tons of U.S. annual clinker production capacity could be lost
- Imports could represent more than 36% of consumption by 2020

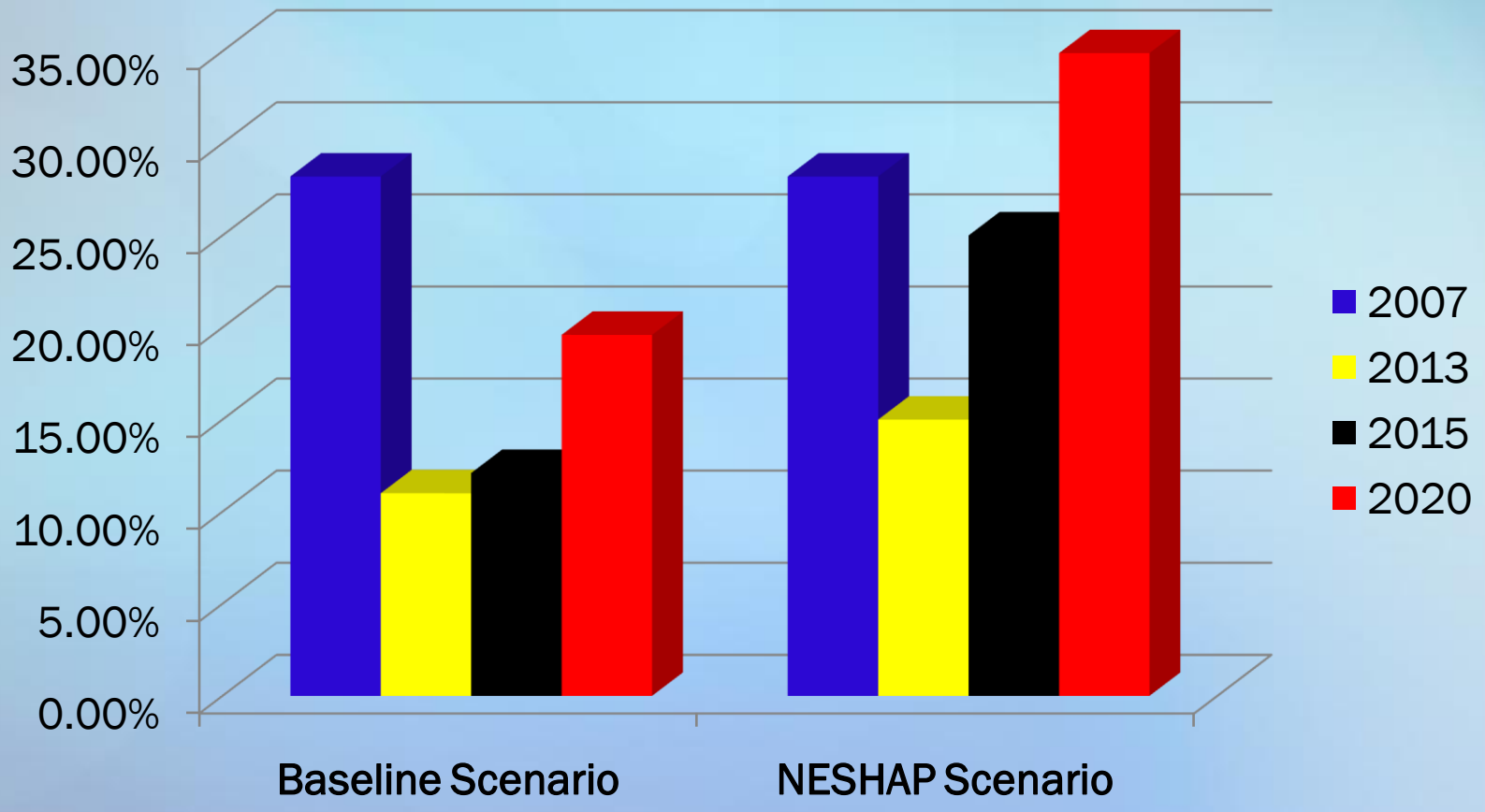
Estimated U.S. Cement Clinker Capacity by Scenario

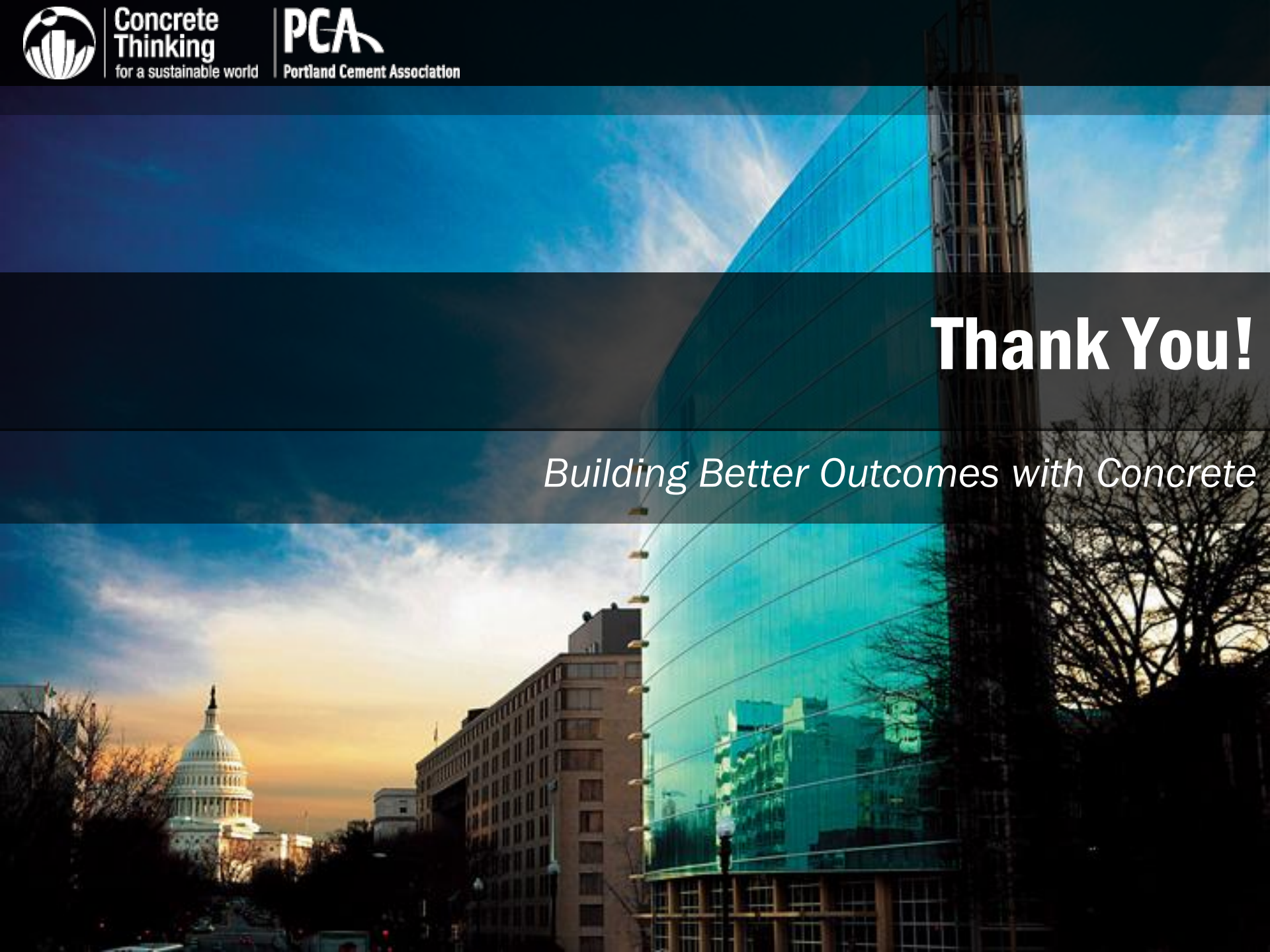
Million Metric Tons



Estimated U.S. Cement Import Shares by Scenario

Share of Total Market (%)

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