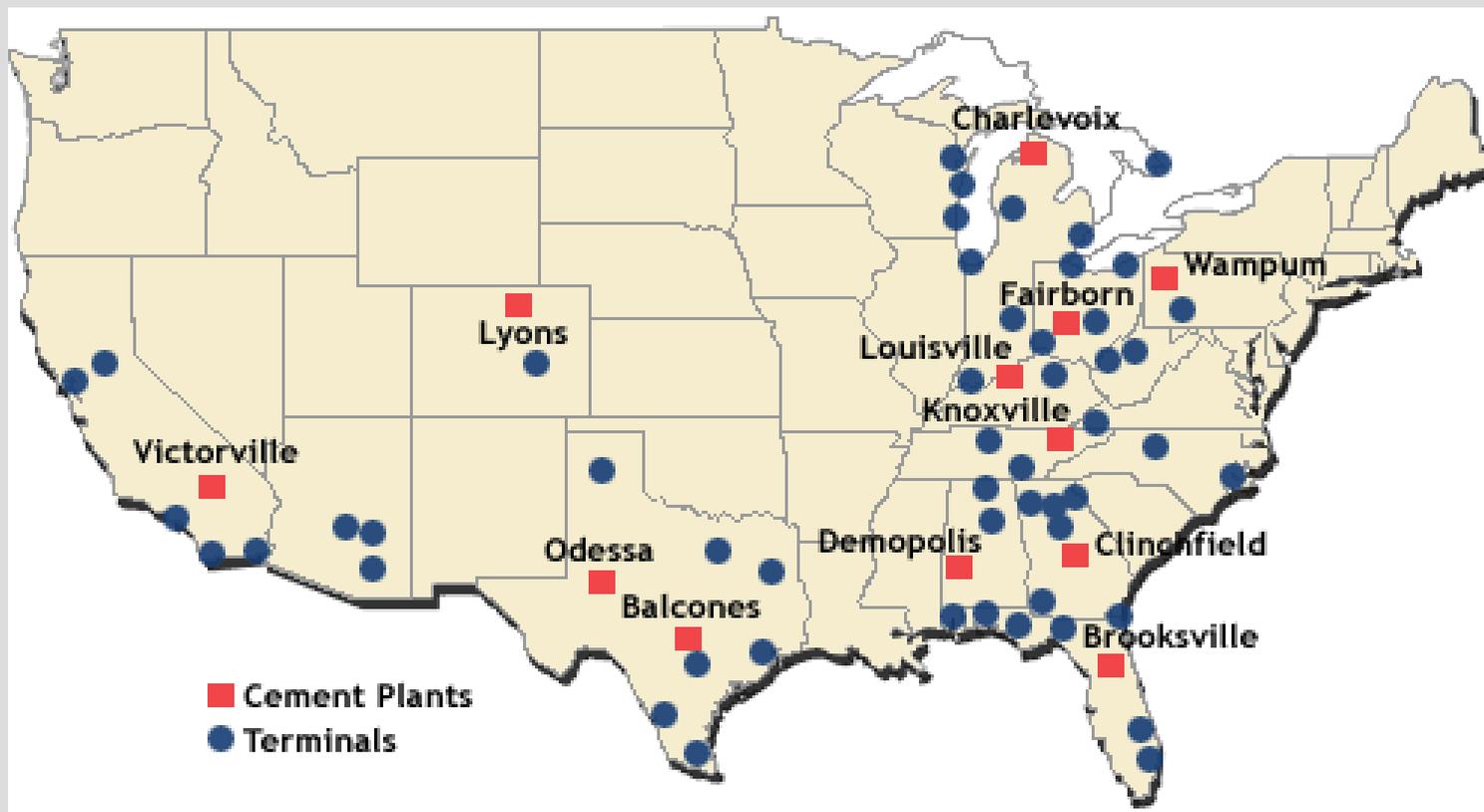


**Attributes and Benefits of  
Using High-LOI Fly Ash in Cement Manufacture**

**October 2003**



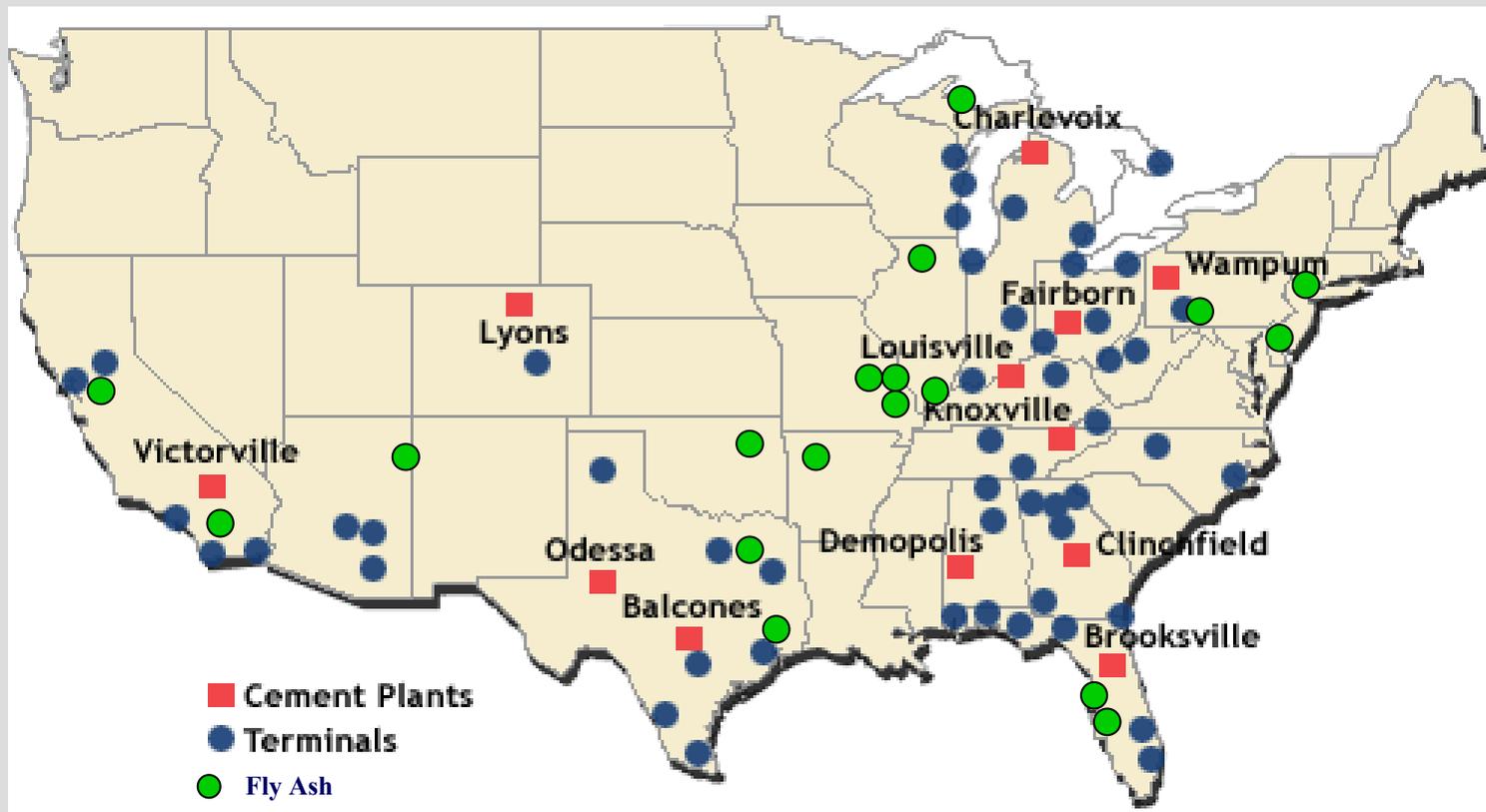
## Plant Locations & Terminals



- 13 Plants with 12.5m tpy installed clinker capacity
- 60 Terminals
- 90+ ready-mix plants



## Plant Locations & Terminals



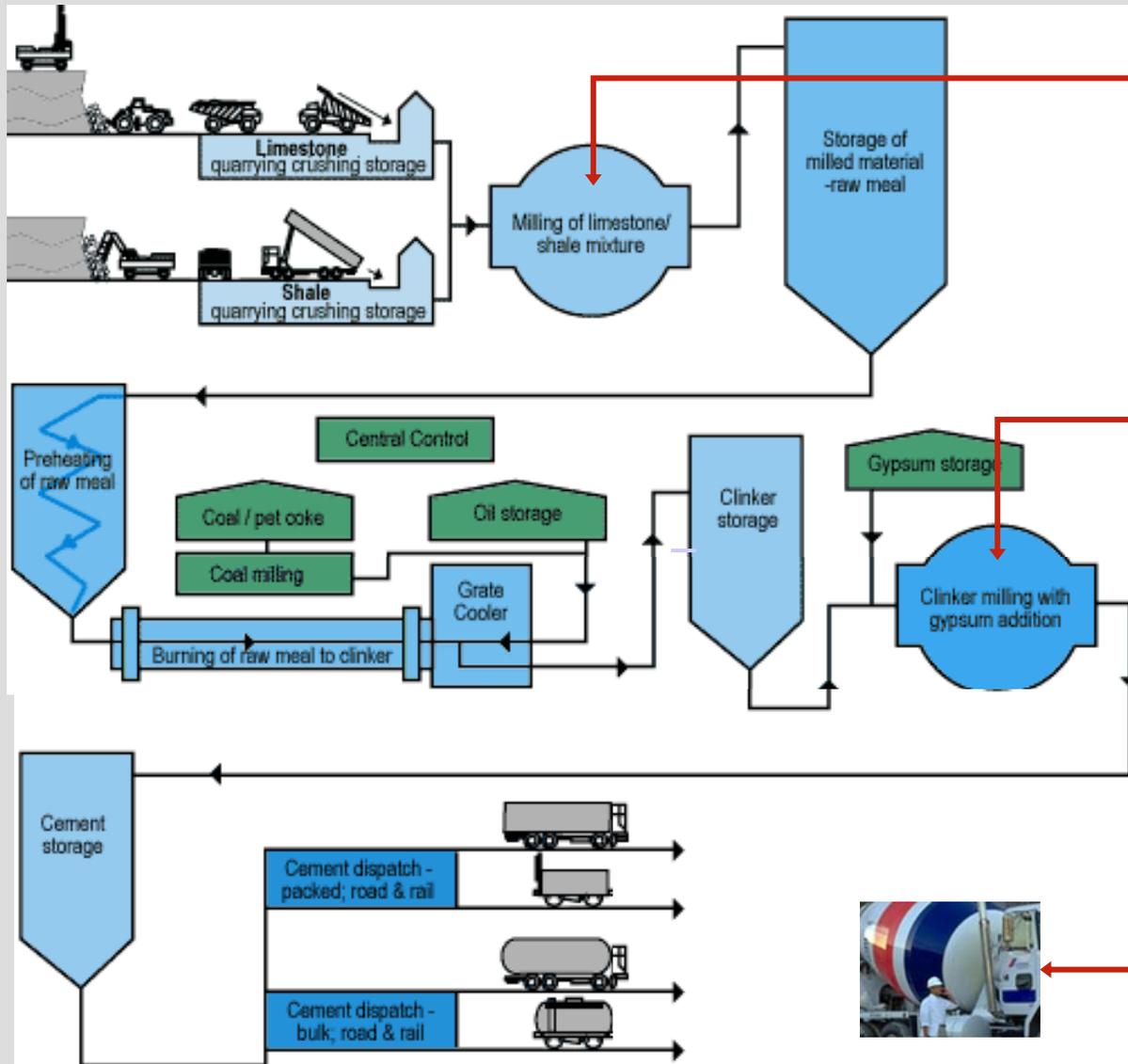
- 13 Plants with 12.5m tpy installed clinker capacity
- 60 Terminals
- 90+ ready-mix plants



# Flagship Plant – Victorville, CA



# Uses of Fly Ash in Cement/Concrete Production



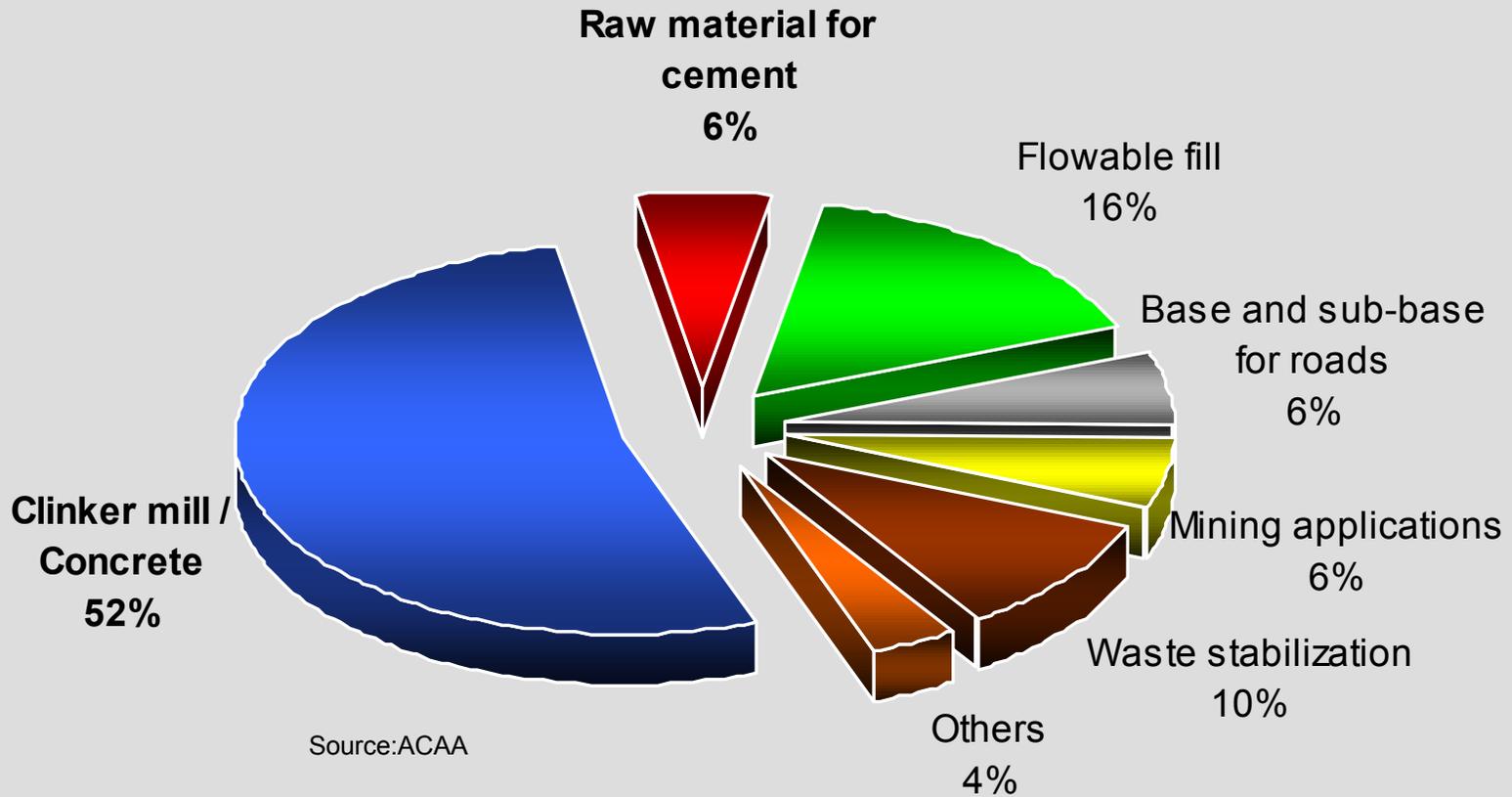
**Off-spec Fly Ash:**  
Use as a Raw Material  
(~5-20%)

**FGD Gypsum**  
Used as an additive at the  
clinker mill

**Concrete Quality FA**  
Used as a substitute  
(~25%) in the concrete  
plants



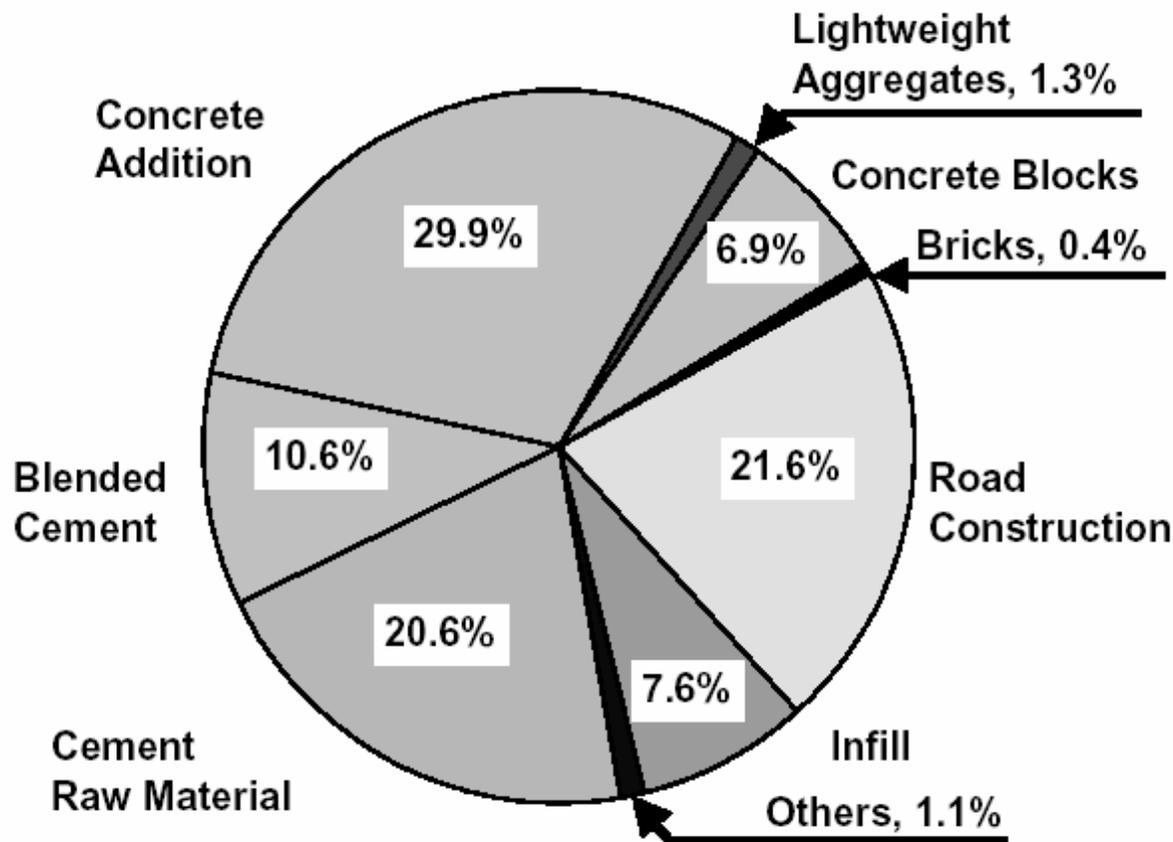
# Main uses of fly ash in the US



Source: ACAA



# Main uses of fly ash in the US

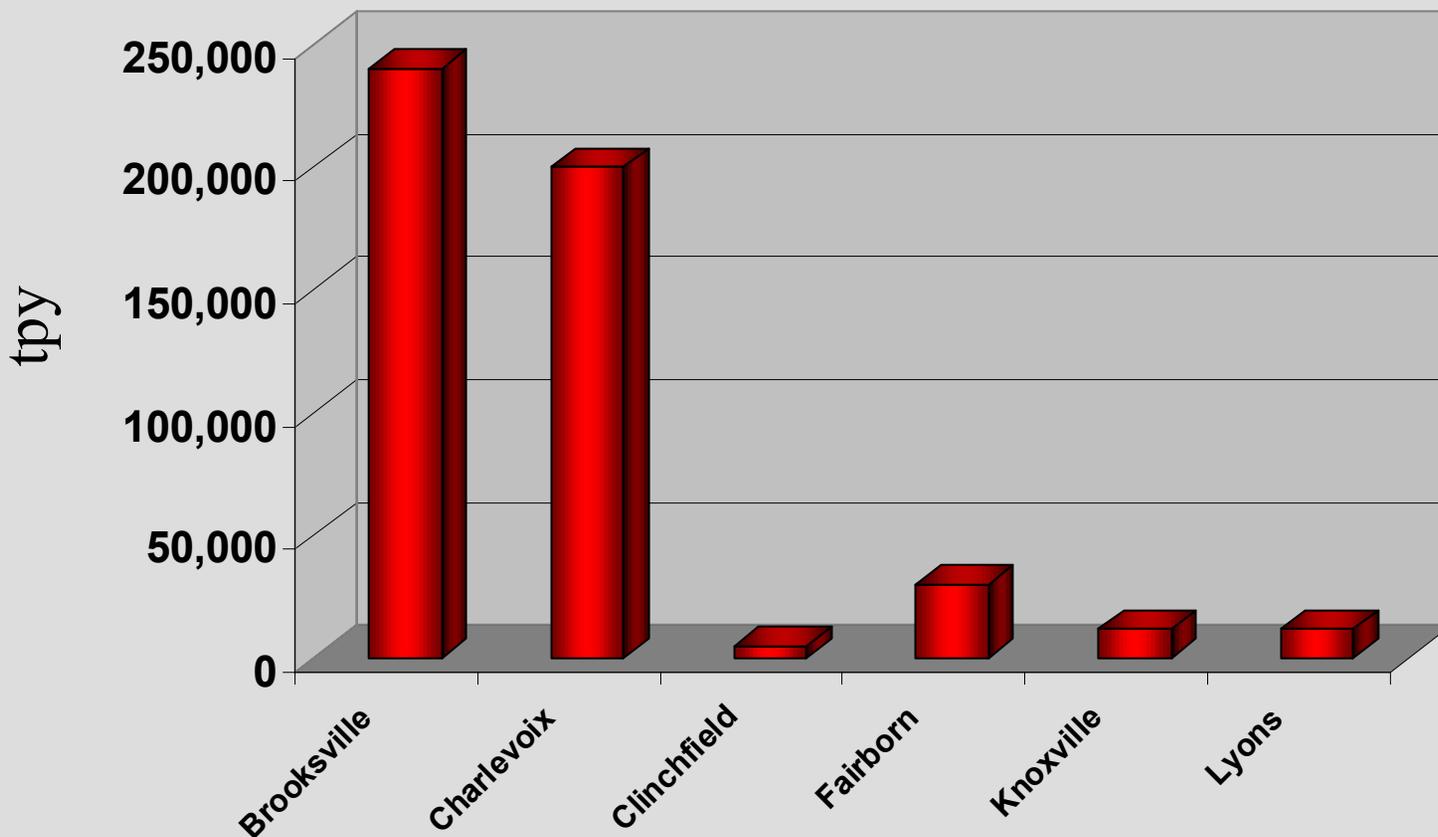


Utilization of Fly Ash in the Construction Industry and Underground Mining in Europe (EU 15) in 1999  
Production 37.6 Million Tonnes, Utilization: 18.2 Million Tonnes

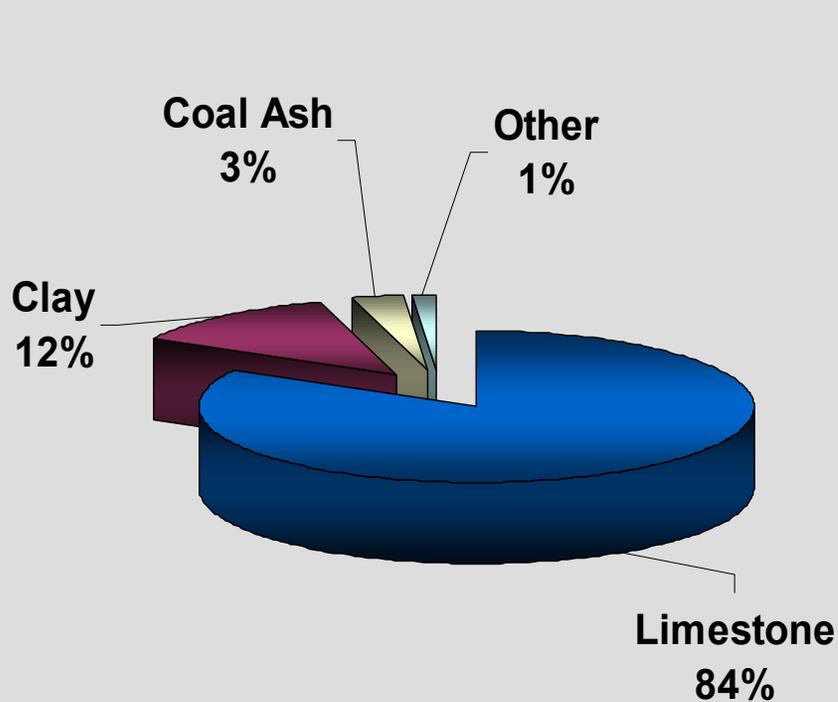


# Current utilization of fly ash in cement manufacturing

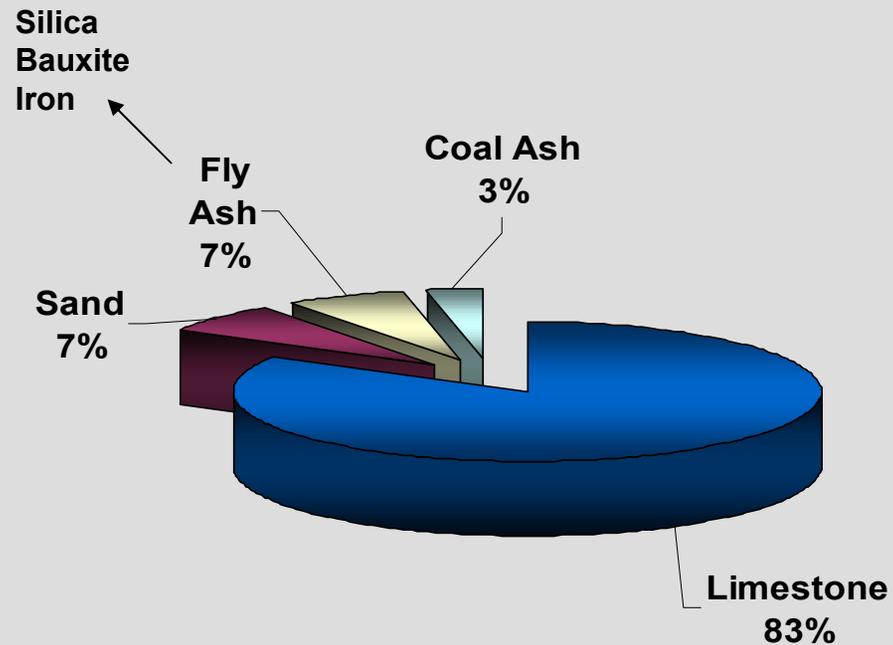
CEMEX, Inc. US Operations  
Fly Ash as Raw Feed  
(LOI ranges from 7-70%)



# Off-spec FA could exceed 2 million tpy by CEMEX



Raw Materials without Fly Ash



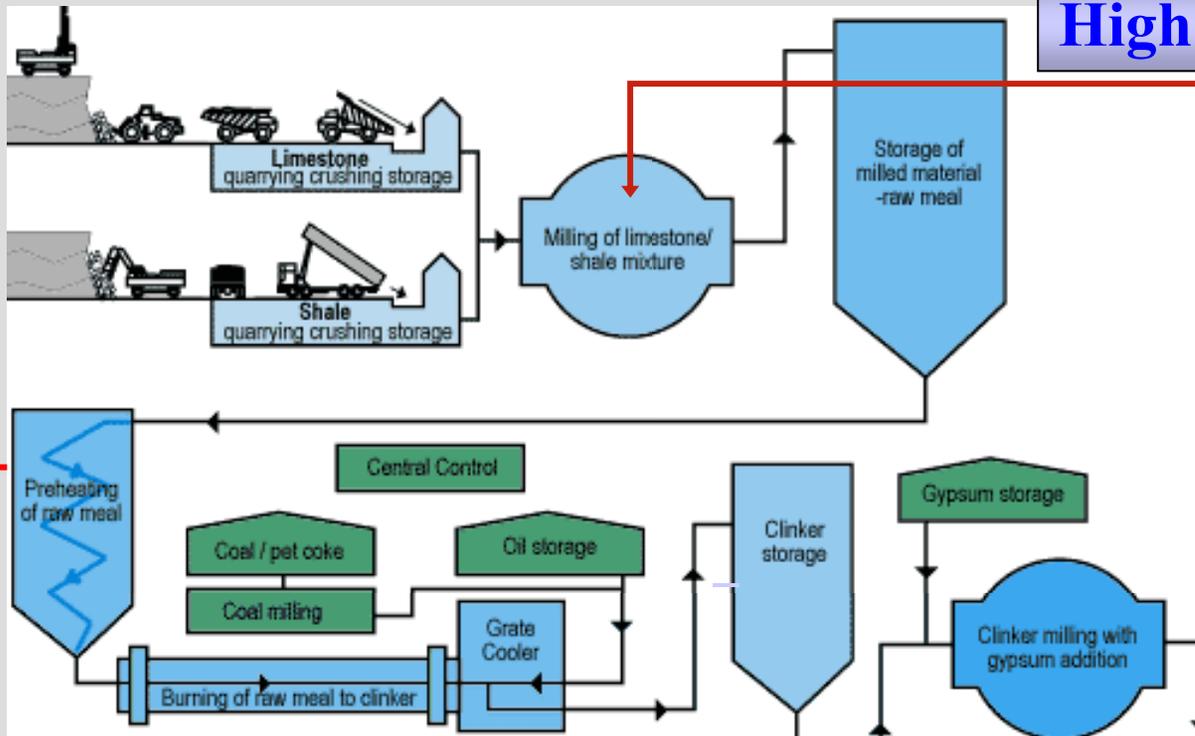
Raw Materials with off-spec Fly Ash



# Technical challenge – unburned carbon in fly ash

## CO Emissions

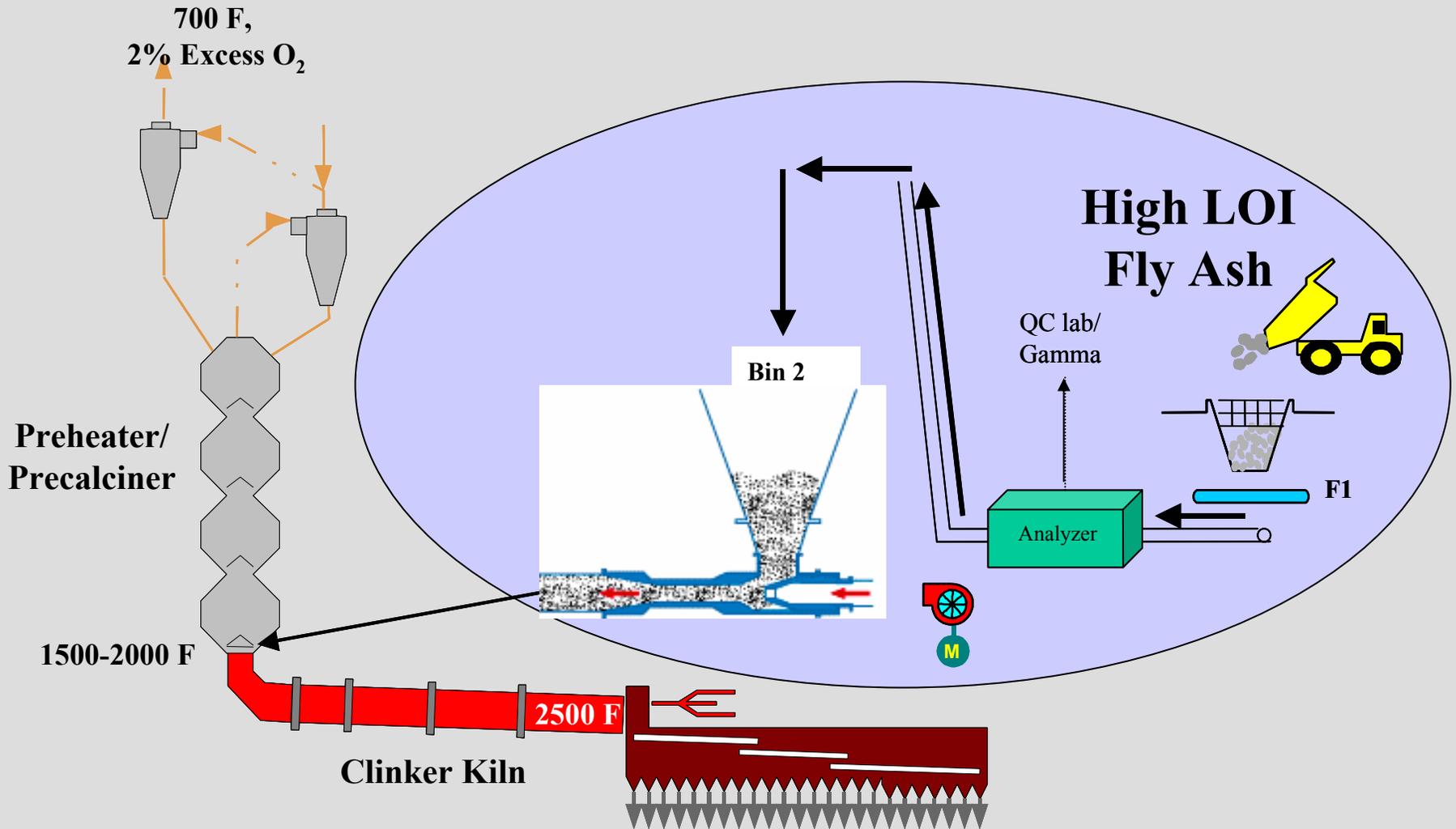
## High LOI



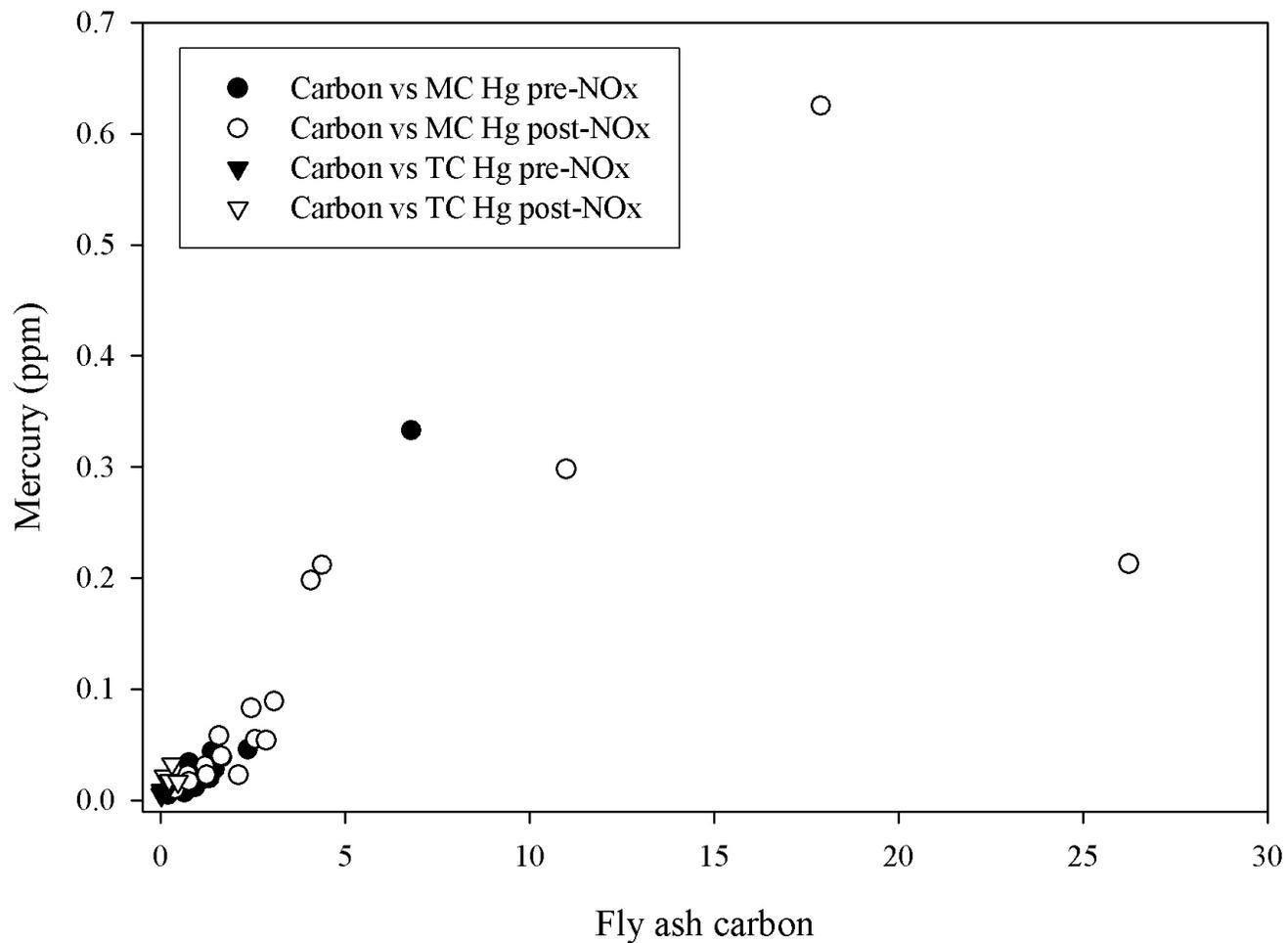
Use as a Raw Material

- Energy savings
- Productivity
- CO<sub>2</sub> reductions

# Potential process solution



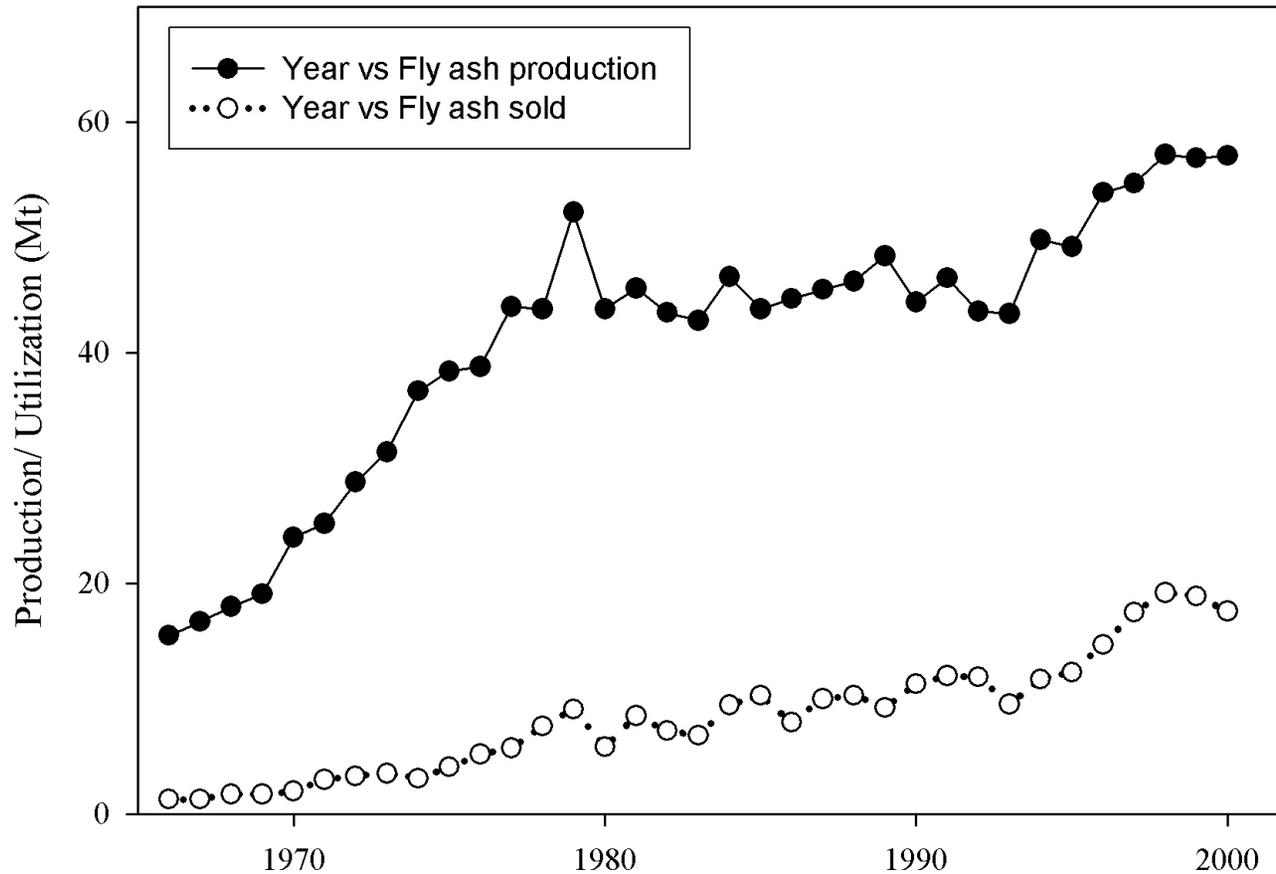
# Other considerations - metals



Courtesy of Jim Hower, University of Kentucky, Center for Applied Energy Research



# National fly ash trends (USGS Data)



Courtesy of Jim Hower, University of Kentucky, Center for Applied Energy Research





Cement Sustainability  
Initiative

<http://www.wbcdcement.org/agenda.asp>

