

New Look @ Old Technology:
Cement KILNS & Challenges
Destruction Pesticide in Plastics



Arrowchase

Cement Kilns/Waste to Energy

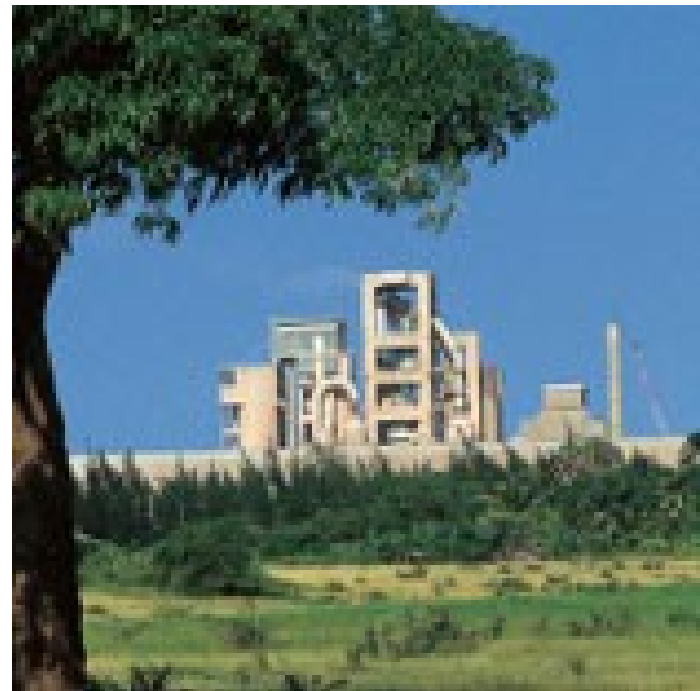
Once considered ultimate option

Research: *unlikely*
any emissions

HW/POPs

Energy: ACRC's "white
coal" brochure

Availability: Regional, short
transport distance



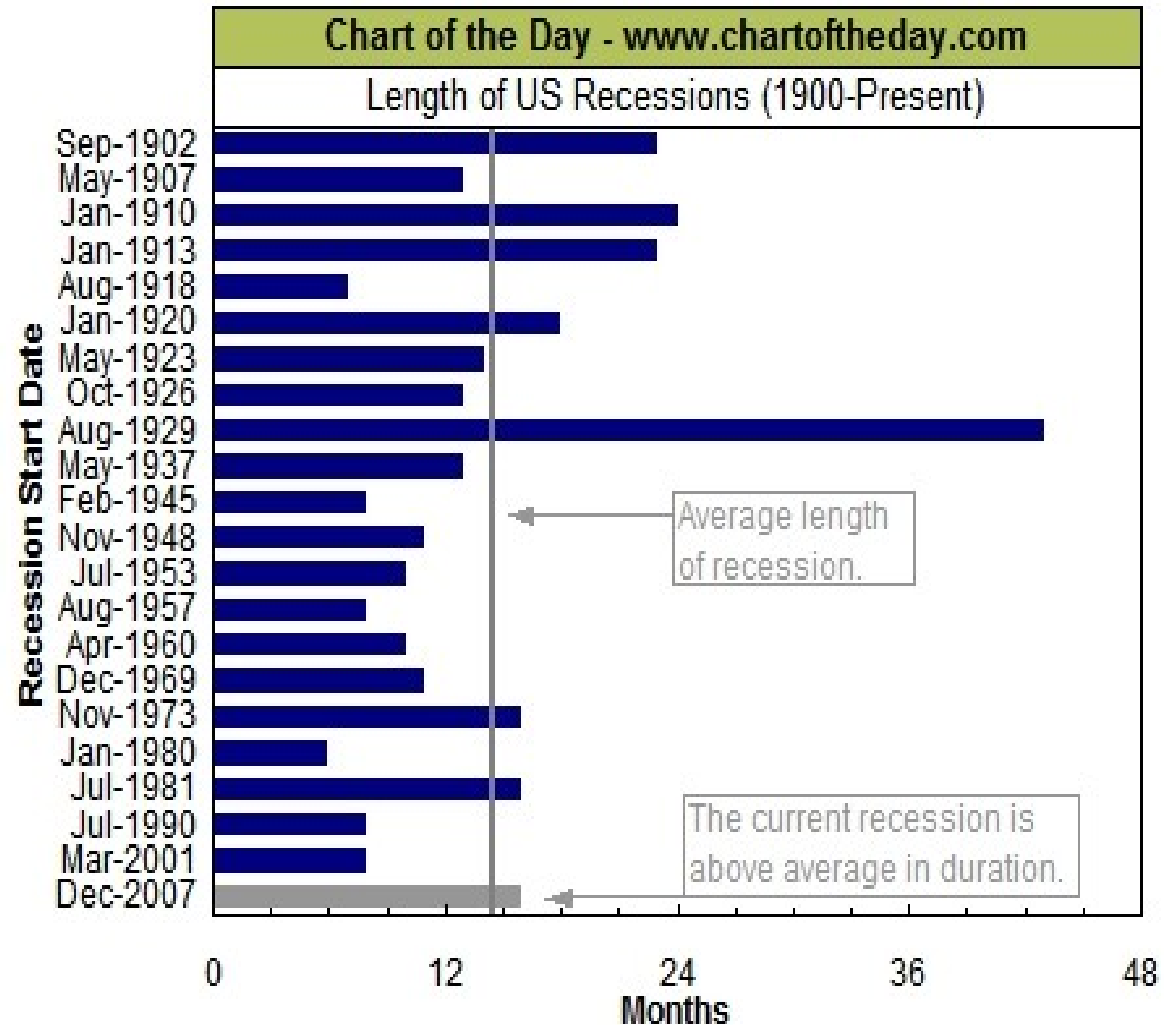
Through 1980 eyes and mindset...

Cement
clinker
formed
mix of
calcareou
s +other
mix
@~1450
°C

- ❑ Retention Times
- ❑ Clean Air Act...most significant-1970
- ❑ RCRA passed - promulgated 1977-80's
- ❑ FIFRA completely revamped 1972
- ❑ Major cancellations persistent pesticides...mid-late 70's
- ❑ Collection of Obs. Pstcdes. began 1980
- ❑ Collection of Pstcd. Containers 1984
- ❑and something else....

Economics Change the Landscape

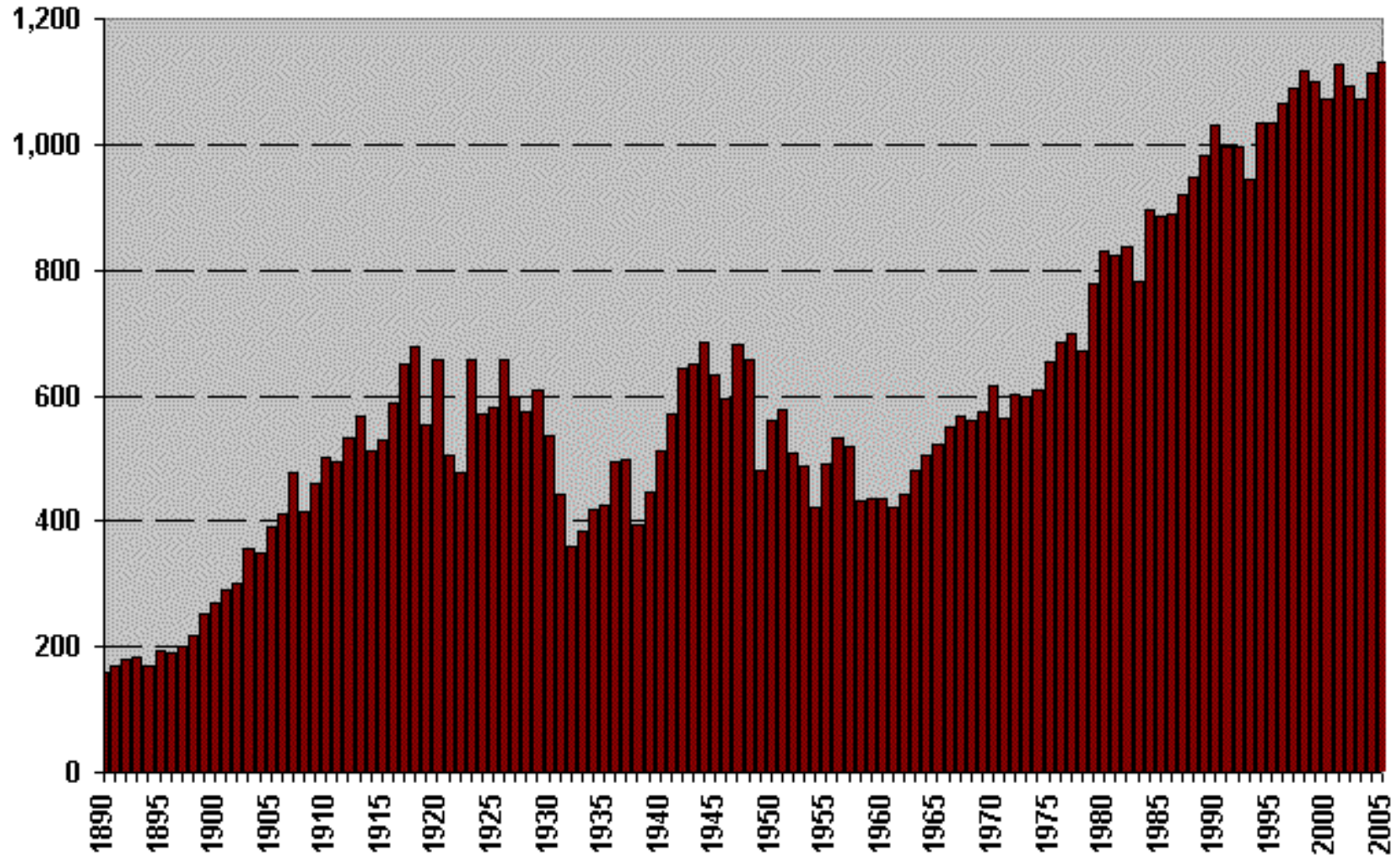
- Sharpest Recession since 1929
- Decreased demand for building materials
- Cement kiln managers focus on efficiencies.



Price of Coal Falls During Recession

Million Short Tons

EIA



Should Have Been the Beginnings of Alt. Fuels WW

- Most hazardous wastes were still going to landfills
- FAO identified >500,000 tons Obsolete Pesticides
- Pesticide containers-transition from steel to plastic
- Plastics just beginning major uses in agriculture
- Modern cement plants built/upgraded around world, including in developing countries
- Many of newer sites have no indigenous coal
- WHAT HAPPENED?

Significant Milestones

- 1990-95 United States: ACRC utilizes cement plants in different locations for destruction of plastic pstcd. containers. Kiln managers equate 3R cntrs. with haz waste and price themselves out of the alt fuel market.
- 1996 Tanzania: GTZ uses kiln to destroy DNOC.+drums
- No DNOC residues detected
- Cost \$4300 USD/ton (Schimpf 1998)

Significant Milestones

- ~1985 Malaysia: GTZ disposal obs. stocks.(Schimpf 1990)
 - ▣ 2,4-D + 2,4,5-T destroyed
 - ▣ No residue detected in dust samples
 - ▣ No record: pesticide destroyed, conc. of a.i.(s), feed rate or DE/DRE
- 1987 Pakistan: AID destroyed 17,000 l. organophosphates.
 - ▣ Viscosity of sludge caused DRE standard HCl not to be met

Significant Milestones

- 2003 Poland: 12 obs. pesticides test burned.
 - ▣ No pesticides detected in stack gas/clinker
 - ▣ Did not report DE/DRE and other op parameters(Stobieki et.al 2003)

- 1990-2000 WW: Concern for dioxins-furan production in kilns provokes concern from activists. Sensitive project developers withdraw from using kilns. Kiln costs for community outreach soar,
(Gossman, D, WorldCement)

- Plastics disappear from alt fuels programs due to

Today: What is different?

- Independently Verified Burns: Viet Nam, Sri Lanka ++ with proven DRE (Karstensen, KH 2005, 2007)
- Most significant downturn in economy since 1929, kiln fuel managers look for alt fuel to replace coal.
- Plastics with some contamination no longer equated to Haz Waste (IN SOME PLACES).
- Environmental benefit seen for not shipping obs. stocks to Europe/NA.
- Alt Fuels assist with GHG management, seen as environmentally beneficial.



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