

# GCC Tijeras, NM Cement Plant

September 25<sup>th</sup>, 2013



## Welcome... vs

- Introductions
- Why?

# Meeting Objectives...vs

- Beneficial use of waste tires in New Mexico
- Define the problem (s)
- Identify alternatives
- Propose solutions
- Define next steps and key stakeholders

# Agenda...vs

- Presentation
  - Background
  - Tire Facts
  - Beneficial use of tires
  - Where are tires used
  - TDF ( Tire Derived Fuels)
  - Why the Cement Process as a solution?
  - Technology and benefits
  - Policy
  - Stakeholders and Partnerships
  - Steps to success
- Plant tour
- Brainstorming- Next steps...TBD
- Lunch with employees



## Background GCC Tijeras New Mexico...saa

- 54 years in the community
- Seventy-eight employees
- GCC values forging strong community bonds
- Collaboration to achieve mutual benefits in shared concerns
- Environmentally responsible and engaged
- Aware of potential problems with proper tire disposal

### *Proper disposal of used tire*

## Basic Tire Facts: Demographics...vs



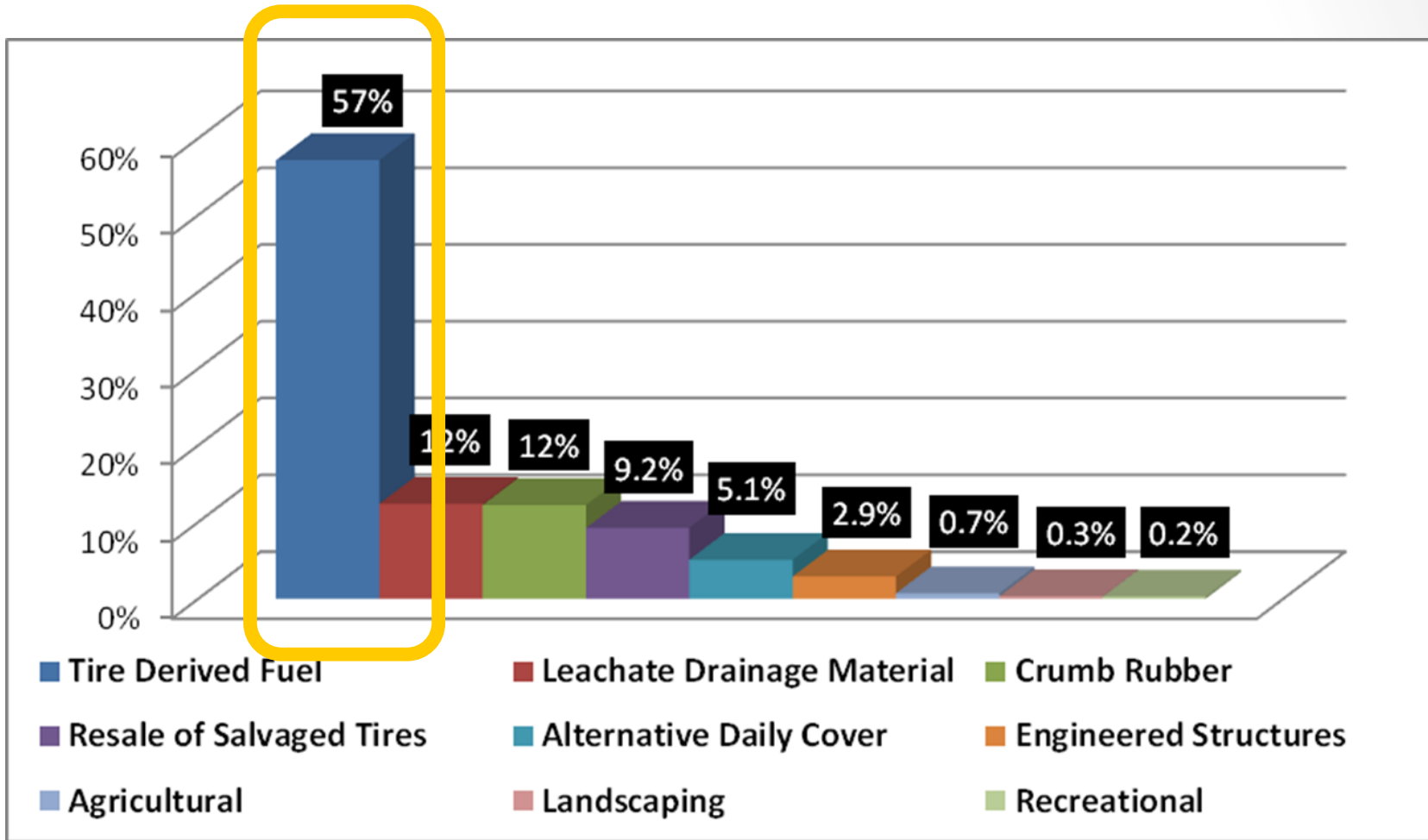
The US population generates 1.1 tire per year per person.

New Mexico generates 2 millions tires per year

Many of these tires are diverted to landfills.

**Tires can be wisely reused**

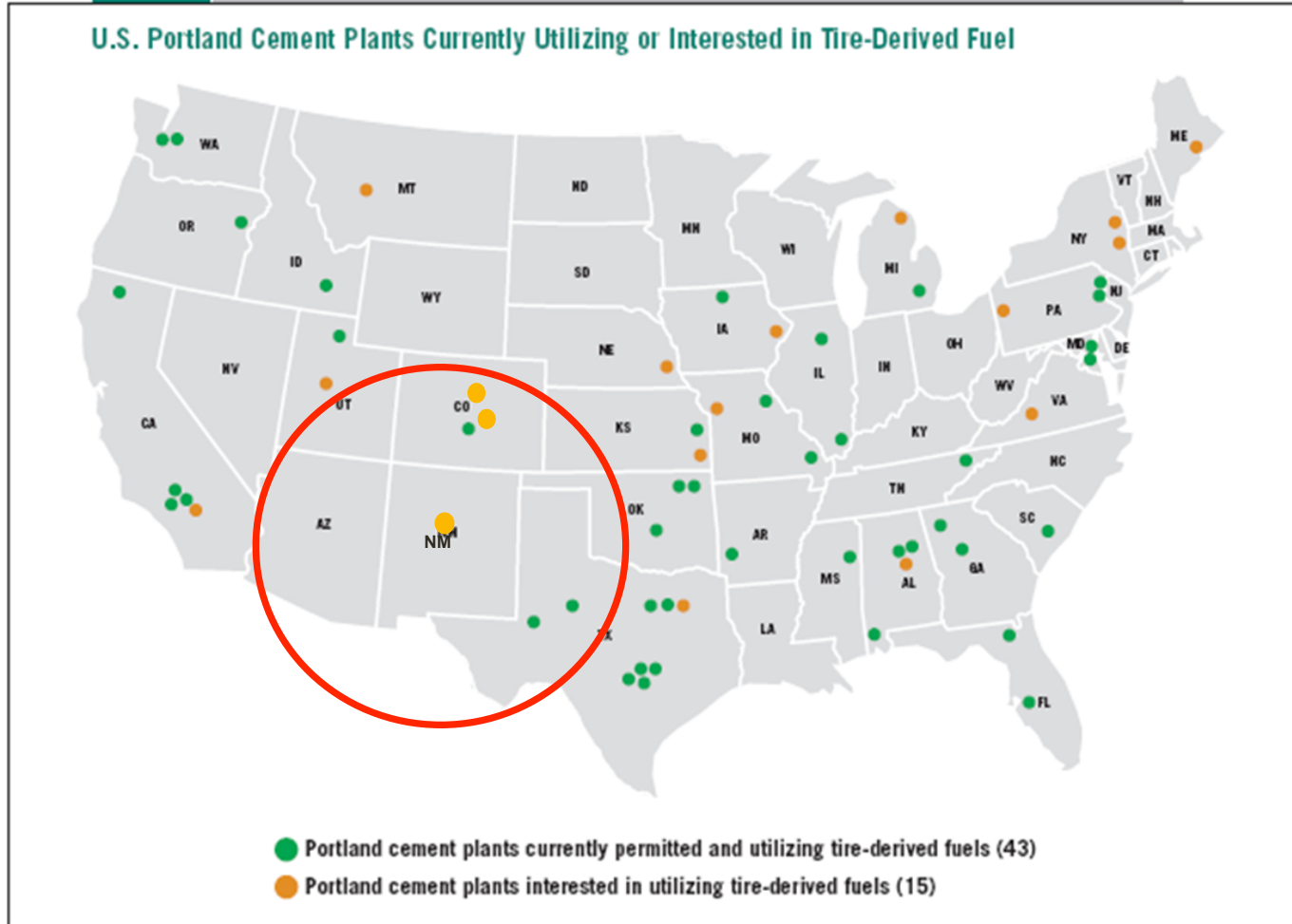
# Beneficial Use of Tires...vs



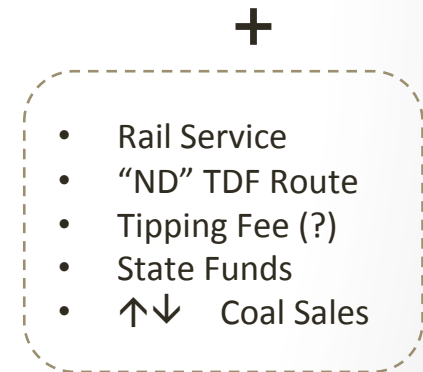
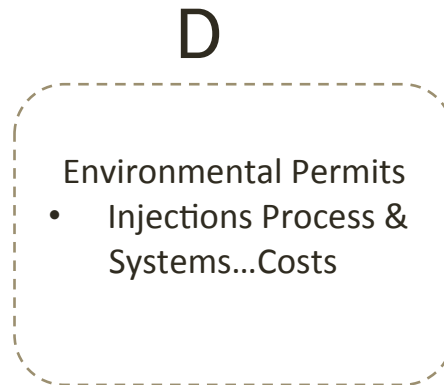
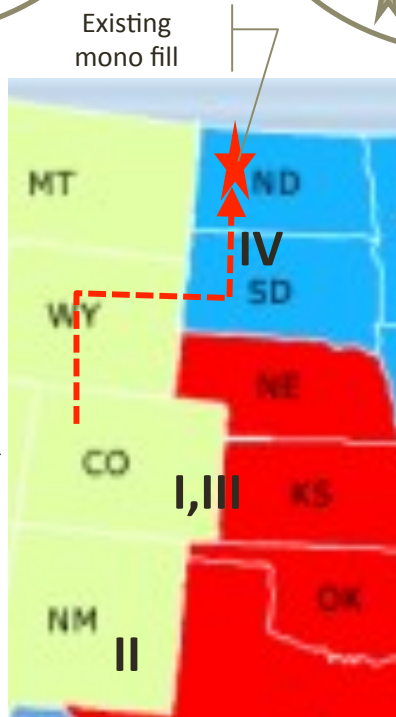
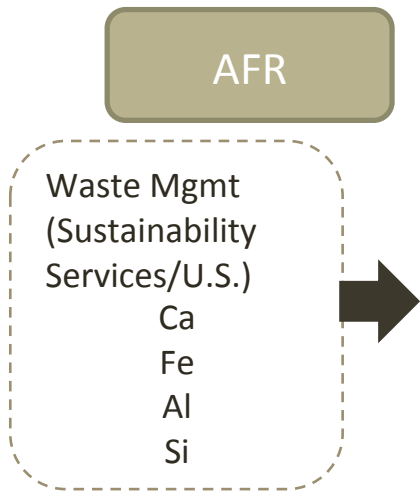
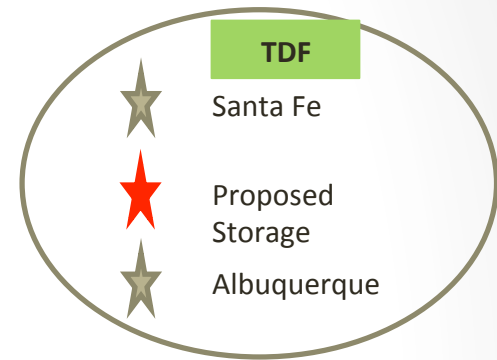
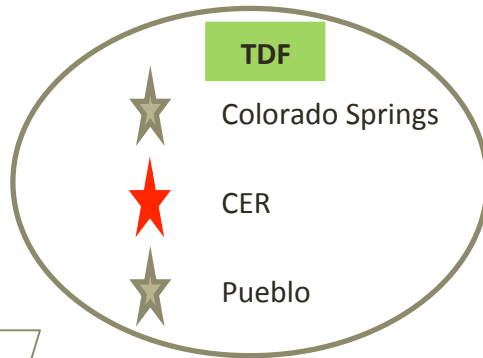
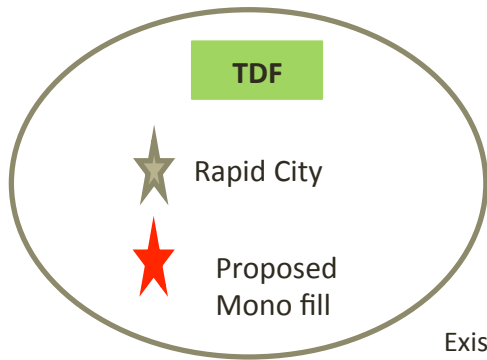
*The best way to get a large volumes of tires to the end of the environmental chain of custody*

# Where is Tire Derived Fuel (TDF) Used ?...vs Cement kilns represent the largest use of TDF

FIGURE 2



# AFR- U.S. Strategy...vs

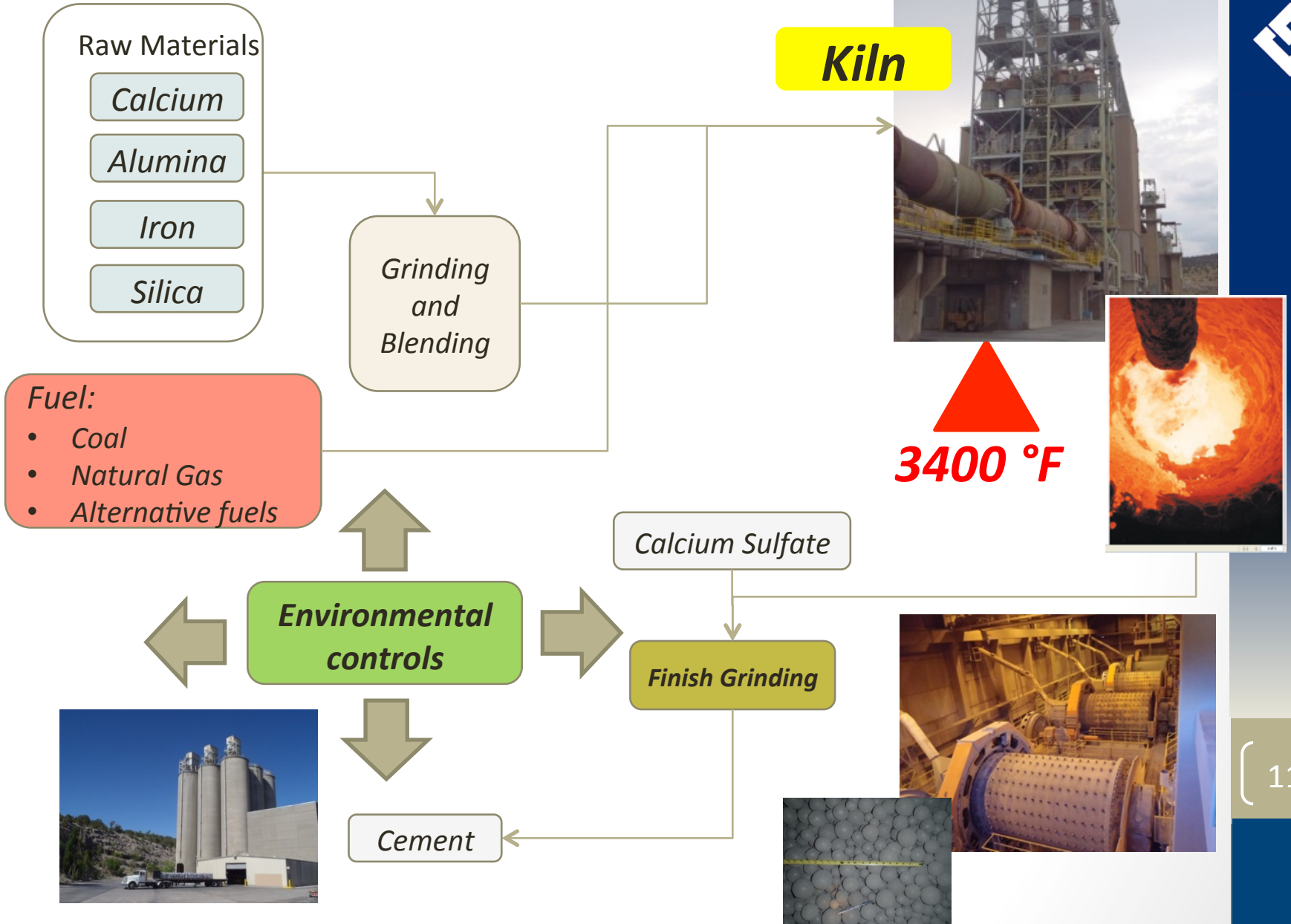


## Why use TDF in a Cement Kiln?...vs

- TDF Provides High Heat Value and Burns Cleaner than Traditional Fuels.
- Preserves Natural Resources; Every 100 Tires.
  - Saves between 1 and 1.5 tons of coal.
  - Saves 100 gallons of fuel.
  - Saves 200 pounds of steel or 400 pounds of iron ore.
- TDF Keeps Tires Out of Landfills
  - Reduces stockpiles and illegal dumping
  - Eliminates potential breeding grounds for rodents, snakes and mosquitoes.
  - Eliminate the potential of tire wildfires



# Cement Process...saa

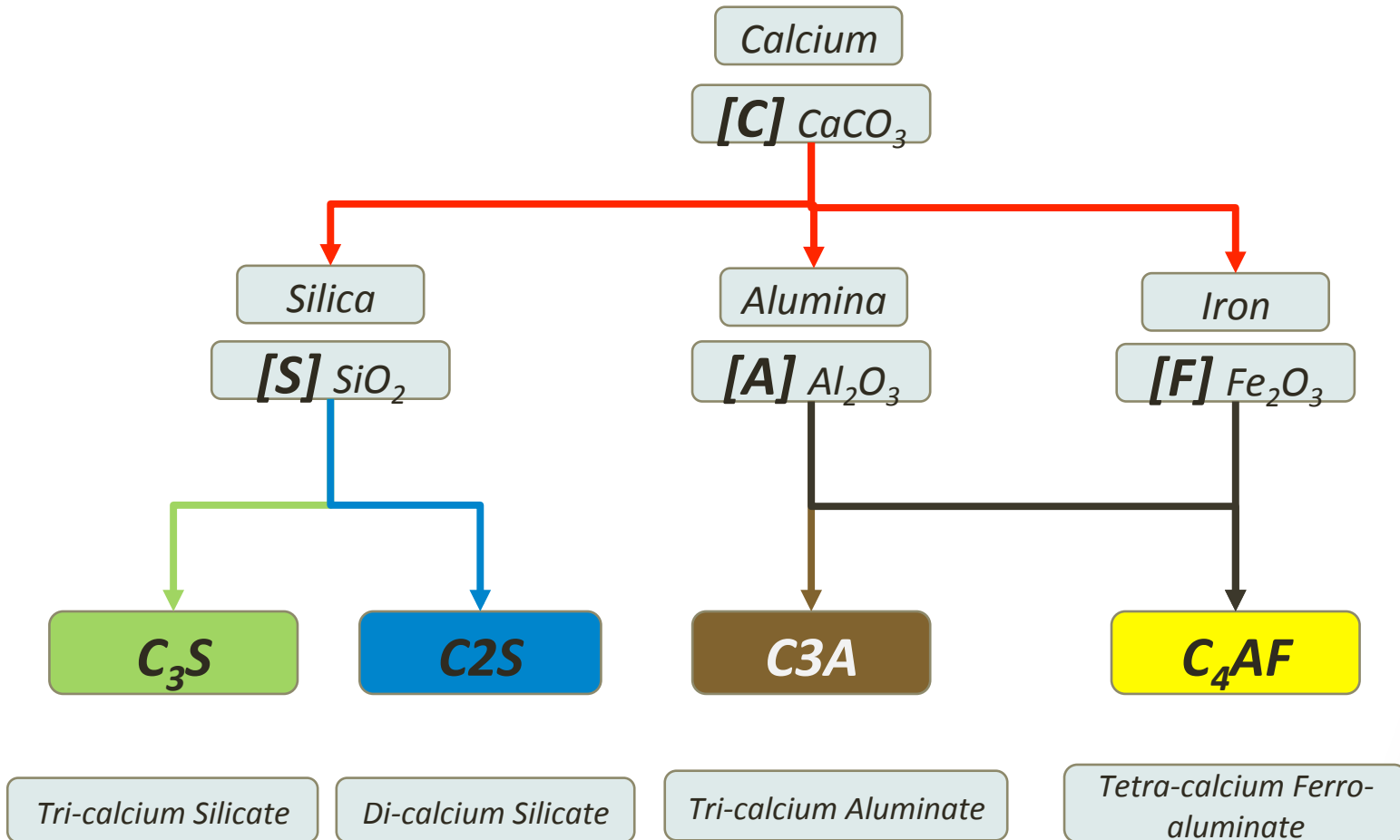


# Process Reactions Basis on Temperature

Temperature (°C)	Process	Reaction
100	Drying	Free water evaporates, water of crystallization driven out
<b>600</b>		
900-1000	Calcining	CO <sub>2</sub> driven out $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ First reaction of components
<b>1100</b>		
1250	Sintering	Formation of liquid phase Al <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub> and their compounds
max 1450	Clinkering	Formation of clinker minerals ( reaction of CaO with SiO <sub>2</sub> , Al <sub>2</sub> O <sub>3</sub> and Fe <sub>2</sub> O <sub>3</sub> )
<b>1400</b>		
1280 -1200	Cooling	Crystalization of the clinker phases C <sub>3</sub> S, C <sub>2</sub> S, C <sub>3</sub> A and C <sub>4</sub> AF

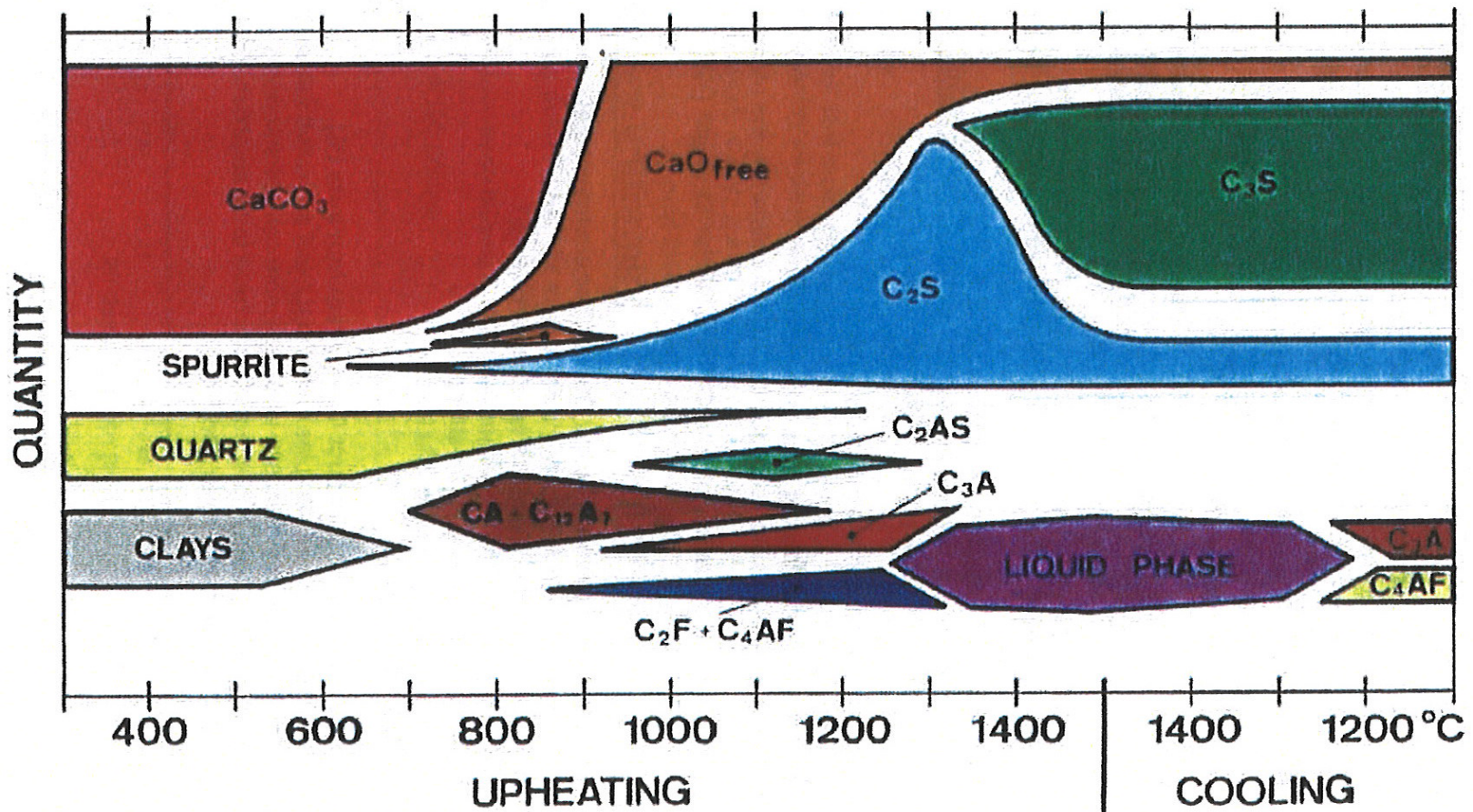


# Clinker Phases Compounds



# Clinker temperature phases

Quasi Quantitative Variation of Minerals with Temperature





# Efficient vs. Inefficient Combustion Conditions...saa

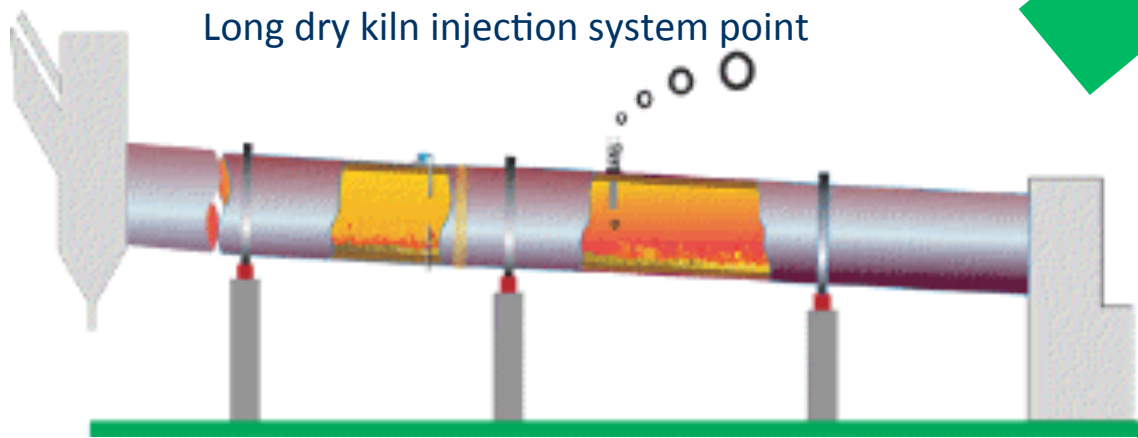


Controlled Burn  
(a cement plant currently burning TDF)



vs. Uncontrolled Burn

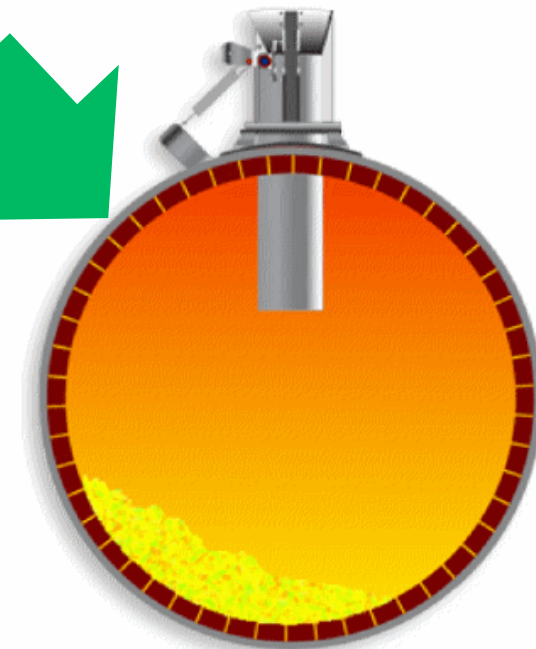
# Technology alternatives...saa



Air injection to improve combustion



Injection system



## Benefits...saa

- Fuel replacement
- NOx reduction
- SOx reduction

## How Much TDF Can Tijeras Plant Use?...saa

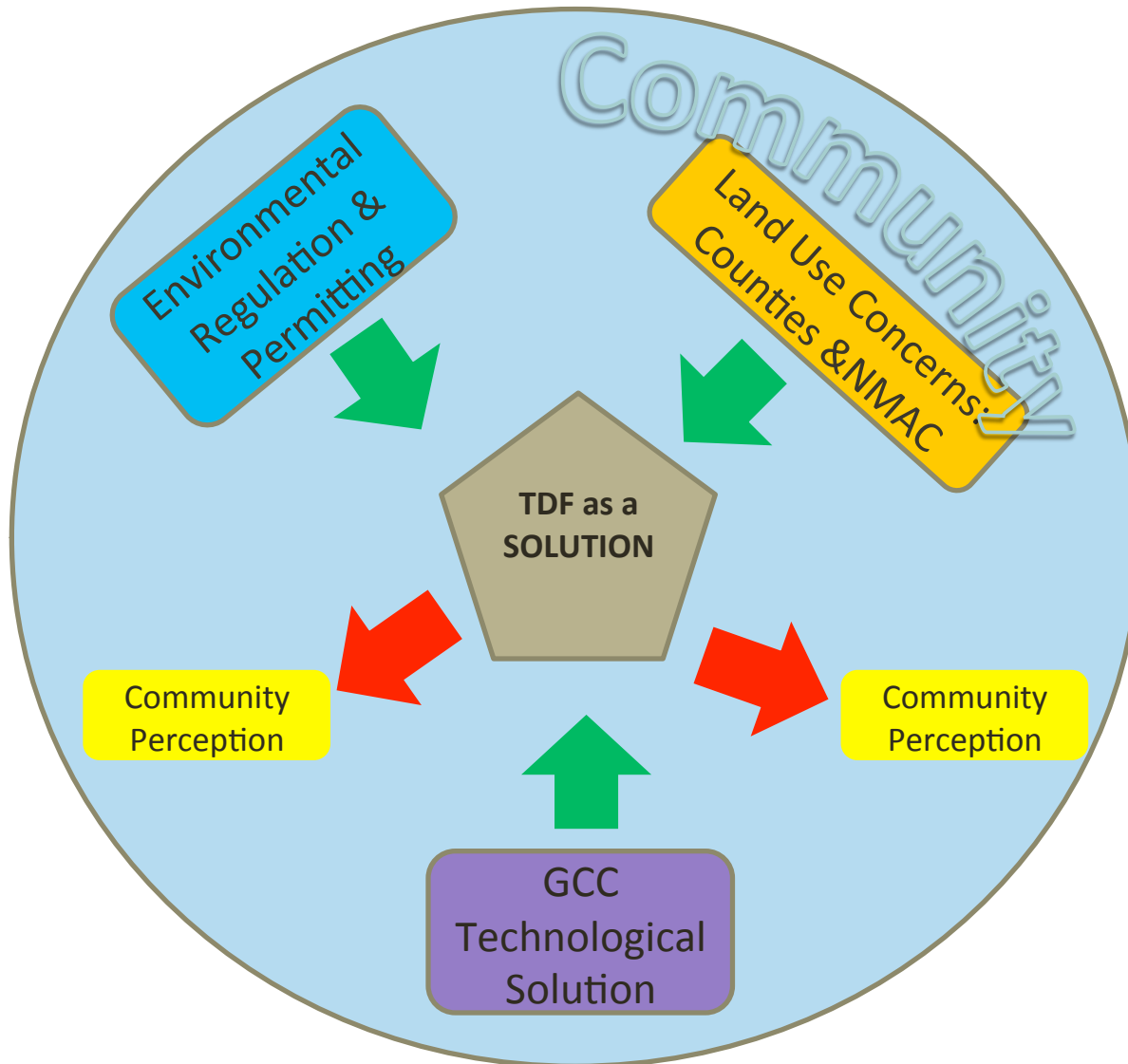
- One tire per kiln revolution
- 7,000 mtons of TDF annually per kiln
- Approximately 14,000 mtons of tires annually

**About 1,400,000 tires per year**

# Policy on TDF in Cement Process...vs

- Supported by the Portland Cement Association:
- Supported by the United States EPA;
  - *“The combination of long residence time and high temperatures makes cement kilns an ideal environment for TDF (tire derived fuel) use. Emissions are not adversely affected compared to baseline fuels and often represent an improvement.”*
- Supported by The Mojave Desert Air Quality Management District in California
  - *“TDF use is an NOx RACT (Reasonably Available Control Technology) for cement kilns.”*

# The Stakeholder Approach...vs



- Favorable transportation cost of TDF
- (\$3MM-\$5MM) GCC Tijeras Plant capital investment
- Regulatory permitting
- Stakeholder education
- Ready access to tire supply



## Steps to success: Public/Private Partnerships...vs

- TDF is a valuable alternative for beneficial end use of scrap tires.
- Identify tire inventories as valuable resources.
  - A benefit to the counties
  - A benefit to New Mexico business
- Develop public/private partnerships
  - Partners for a Clean New Mexico
  - New Mexico Association of Counties
  - Municipalities League
  - Local research; contacts
- Question(s) to answer
  - How can this benefit the NM communities?

# Thank You



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