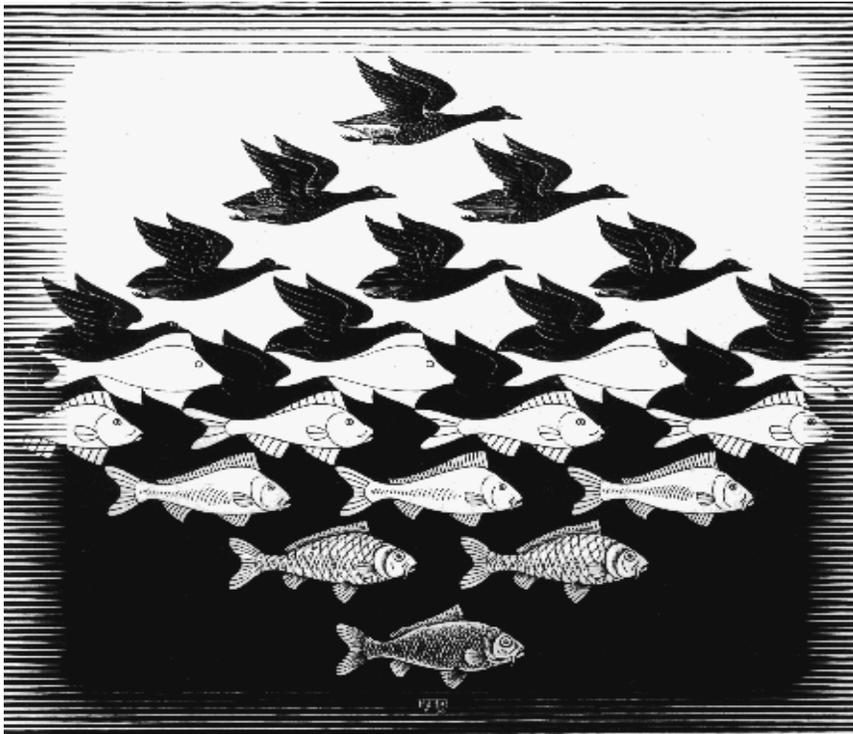




# The Southern California Conversion Technology Demonstration Project



**Mr. Coby Skye**

**Los Angeles County  
Department of  
Public Works**





# Overview

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- What are Conversion Technologies?
- Conversion Technology Benefits
- The Southern California Conversion Technology Demonstration Project
- Reference Facility Tours
- Conclusion



# Solid Waste Outlook in California

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- Every year, 42 million tons of trash are disposed of in California's landfills.
- Nearly 50% of the Counties in California are expected to exhaust their disposal capacity within the next 15 years, while new landfills take 10-15+ years to design/permit.
- More and more urban centers must export solid waste to remote locations, a condition being replicated in other U.S. cities.



# Drivers for Change

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- In the midst of a **Green Revolution**
- Driven by:
  - **Crises**
    - Energy
    - Fuel
    - Climate Change
    - Waste Management
    - Pollution
  - **Consciousness**
    - Conservation
    - Sustainability
    - Stewardship
    - Community



# Drivers for Change

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- **Energy** – CA energy crisis and NE blackout of 2003 have shown that the US must diversify energy resources and increase renewables.
- **Transportation Fuels** – Cost increases, air emission standards, and the need to break our dependence on foreign oil are driving the renewable fuel market.
- **Waste Management** – As population increases, the need for affordable and environmentally friendly waste management options will continue to grow.



# Drivers for Change

- **Climate Change** – Climate change/global warming have imposed additional burdens and public scrutiny on solid waste facilities. California's AB 32 was the first of many laws anticipated to be passed in the near future.

Table ES-2: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks (Tg CO<sub>2</sub> Eq.)

Gas/Source	1990	1995	2000	2001	2002	2003	2004	2005
CH <sub>4</sub>	609.1	598.7	563.7	547.7	549.7	549.2	540.3	539.3
Landfills	161.0	157.1	131.9	127.6	130.4	134.9	132.1	132.0
Enteric Fermentation	115.7	120.6	113.5	112.5	112.6	113.0	110.5	112.1
Natural Gas Systems	124.5	128.1	126.6	125.4	125.0	123.7	119.0	111.1
Coal Mining	81.9	66.5	55.9	55.5	52.0	52.1	54.5	52.4
Manure Management	30.9	35.1	38.7	40.1	41.1	40.5	39.7	41.3
Petroleum Systems	34.4	31.1	27.8	27.4	26.8	25.8	25.4	28.5
Wastewater Treatment	24.8	25.1	26.4	25.9	25.8	25.6	25.7	25.4



# Conversion Technologies: A Potential Solution

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- Conversion technologies are an array of emerging processes capable of converting post-recycling residual solid waste into useful products and chemicals, green fuels like ethanol and biodiesel, and clean, renewable energy
- These technologies may be thermal, chemical, or biological, but are not incinerators – there's *no combustion* of the waste
- Conversion technologies are successfully used to manage MSW throughout Europe and Japan, but commercial developments in the U.S. are still in design stage

# Sample Conversion Technologies

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## *Thermal:*



- Pyrolysis is the thermal processing of waste in the absence of oxygen
- Gasification is the thermal processing of waste using heat, pressure, and steam to convert materials directly into a gas

# Sample Conversion Technologies

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## *Chemical:*

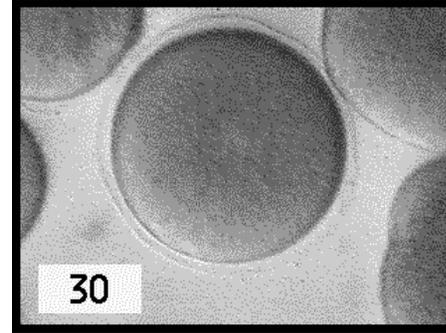
- Acid Hydrolysis is the chemical decomposition of waste using acid and water to split chemical bonds



# Sample Conversion Technologies

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## *Biological:*



- Anaerobic digestion is the bacterial breakdown of organic materials in the absence of oxygen
- Aerobic digestion is, essentially, composting

# Sample Conversion Technologies

Facilities vary technology to technology, feedstock to feedstock and vendor to vendor. No two are alike.



Some images reprinted from CIWMB staff presentation, December 2001,  
and from City of Los Angeles' RENEW LA Plan, July 2005



# Benefits of Conversion Technologies

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1. Ability to manage excess biomass and organic wastes (up to 80% of landfilled material)
2. Reduce dependence on landfills and waste exporting, maintaining local control
3. Locally produce renewable energy and green fuels, including ethanol, biodiesel, & electricity
4. Promote energy independence from foreign oil
5. Create high quality “green collar” jobs
6. Reduce greenhouse gas emissions, from disposal and transportation avoidance as well as fuel/electricity offsets
7. *Turn a liability (solid waste) into a valuable resource*



# Conversion Technologies and CA's Environmental Initiatives

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- Conversion can help California achieve a number of Statewide goals, including:
  - AB 32 / Climate Change
  - Renewable Portfolio Standard
  - Alternative Fuels/Low Carbon Fuel Standard
  - Bioenergy Action Plan Goals
  - Energy Security/Independence
  - Hydrogen Highway
  - AB 939 / Solid Waste Disposal Capacity and Landfill Reduction



# Latest Developments in Conversion Technologies

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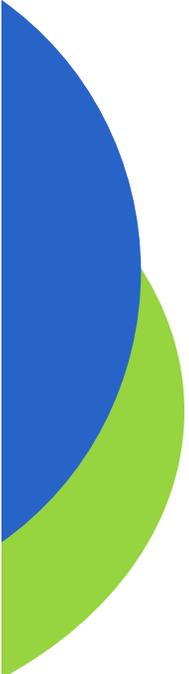
- Numerous cities - from New York, NY to Santa Barbara, CA - have initiated studies and request for proposals relating to conversion technologies.
- St. Lucie County, FL is proposing to build an plasma arc conversion technologies facility. The 100,000 ft<sup>2</sup> facility is expected to process 3000 TPD, depleting their existing landfill (4.3 million tons in 18 years), and generating about 120 MW of electricity, 1/3 of which will be used by the facility.
- Blue Fire Ethanol has received \$40 million in grants to develop a greenwaste to ethanol acid hydrolysis facility at a Southern California landfill.



# Southern California Demonstration Project

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- On Aug. 18, 2005, the L. A. County Solid Waste Task Force adopted the Phase I *Conversion Technology Evaluation Report*, which evaluated hundreds of technologies
- This Report detailed a step-by-step plan to develop a **Conversion Technology Demonstration Facility**
- In Phase II, a team of experts and technical consultants closely scrutinized technologies, and found conversion technologies hold significant promise



# Southern California Demonstration Project

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- The Demonstration Project creates a ripple of regional benefits:
  - Concrete performance data for various technologies with respect to emissions, byproducts and marketability of products
  - A rigorous analysis of the **technical**, **economic** and **environmental** feasibility of technologies
  - Forging permitting and legislative pathways for future projects
  - A catalyst for private sector investment, especially by validating the technologies and reducing development risk (*bridging the "Valley of Death"*)
  - Impetus for development of conversion technologies throughout the region

# Southern California Demonstration Project

Currently there are **four** conversion technology suppliers recommended for consideration for the final demonstration project.

Vendor	Technology Type
Arrow Ecology	Anaerobic Digestion
International Environmental Solutions	Pyrolysis
Interstate Waste Technologies	Pyrolysis/ Gasification
Ntech Environmental	Gasification



# Southern California Demonstration Project

There are also **four** Material Recovery Facilities (MRF) under consideration for partnership with the chosen technology supplier.



MRF	Location
Del Norte Regional Recycling and Transfer Station	Ventura County
Perris MRF/Transfer Station	Riverside County
Rainbow Disposal Co., Inc. MRF	Orange County
Robert A. Nelson Transfer Station and MRF (RANT)	Riverside County

# Southern California Demonstration Project

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- **MRF co-location** would have numerous benefits, including:
  - Land for development
  - Readily available feedstock
  - Pre-processing capacity
  - Appropriate zoning
  - Environmental benefits
  - Feedstock is material that would otherwise have been disposed
  - Transportation avoidance

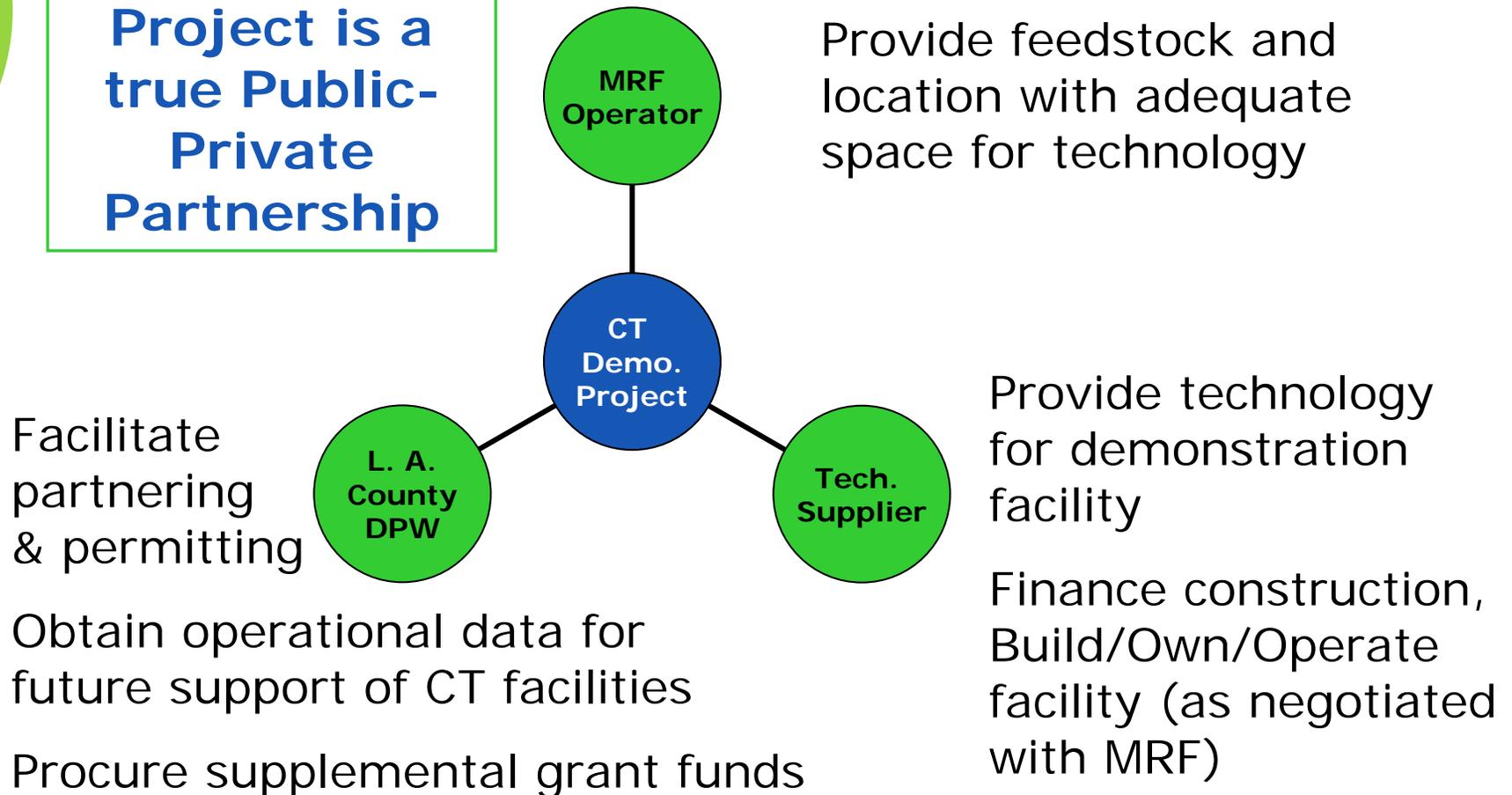


# Southern California Demonstration Project

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**Project is a  
true Public-  
Private  
Partnership**





# Southern California Demonstration Project

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- The culmination of Phase II is the development of one or more successful Demonstration Projects, on track to begin negotiations this Fall, with groundbreaking estimated for 2009
- Phase III, beginning 2008, will focus on development of commercial scale facilities in Los Angeles County
- *More info & updates @*  
[www.SoCalConversion.org](http://www.SoCalConversion.org)



# Reference Facility Tours

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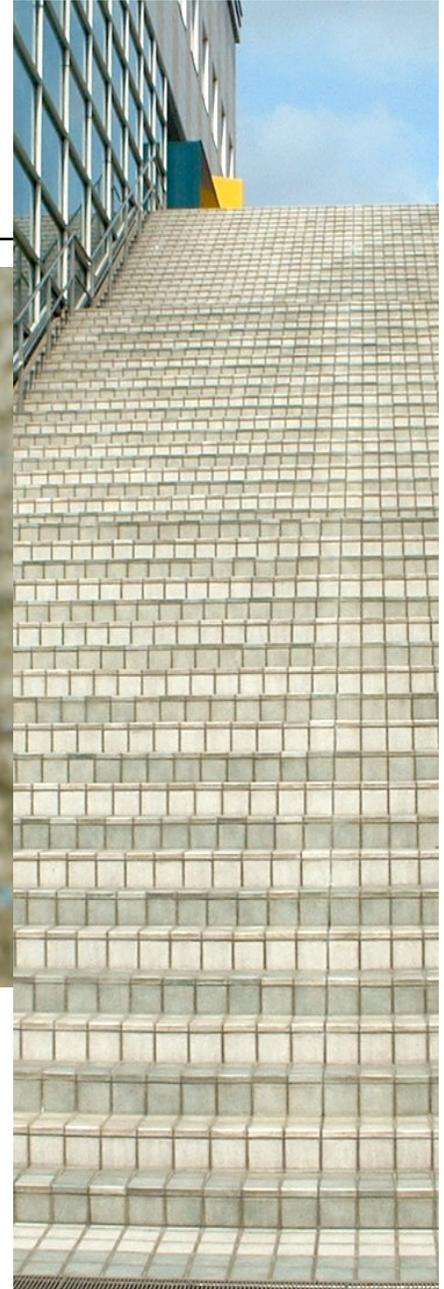
- Requirement of participation in the County's process was to have an operating reference facility:
  - pilot scale or larger
  - utilizing MSW or closely related feedstock
  - proven track record of operation
- Visiting and evaluating these reference facilities is a critical due diligence step and provides a greater level of confidence for all parties

# Reference Facility Tours



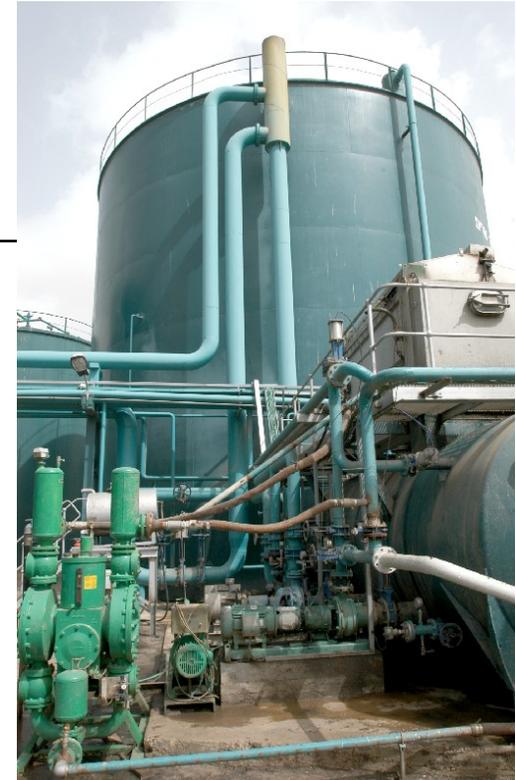
Site visits allowed us to compare waste streams...

# Reference Facility Tours



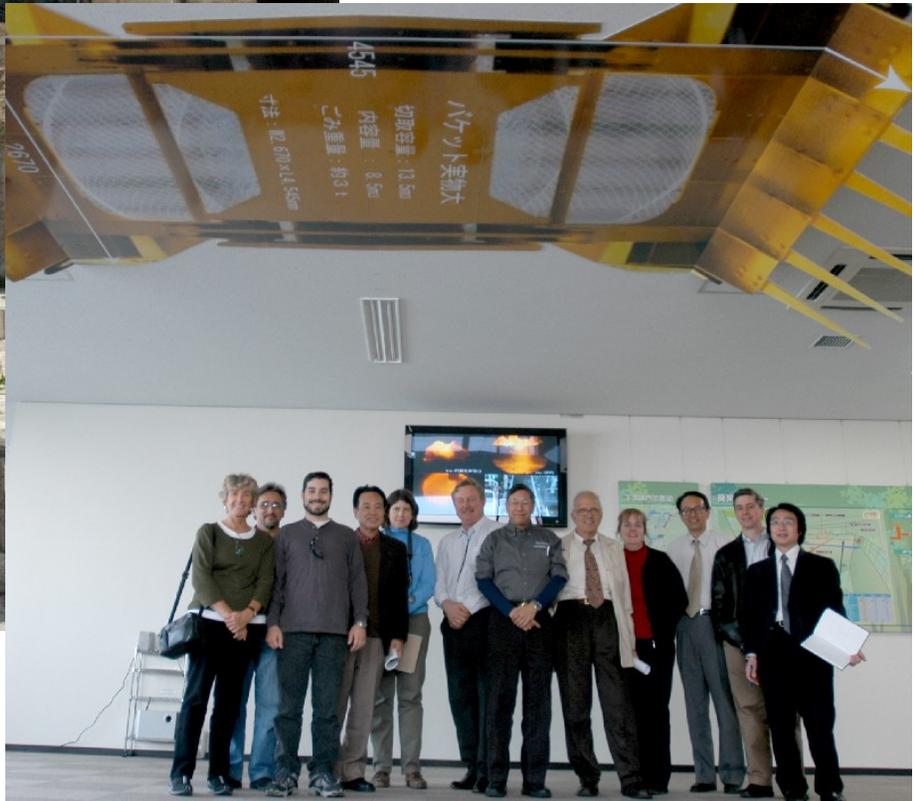
...evaluate products and byproducts...

# Reference Facility Tours



...assess applicability and interface issues...

# Reference Facility Tours



...and meet with local regulators and other stakeholders.



# Reference Facility Tours: Lessons Learned

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We learned a lot about other cultures and regulatory/political environments.

For example:

- **Japanese cultural discipline and recycling program regimen yields high participation and low contamination rates, incomparable to U.S.**
- **High disposal costs and landfill taxes of over \$50/ton drive innovation and promote alternatives**
- **Head-to-head comparison of mass-burn combustion and thermal conversion technologies highlights advantages of conversion**
  - emissions
  - ash or slag handling
  - flexibility of end product



# Reference Facility Tours: Value

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First hand visits provide a wealth of tangible benefits to a project and are a crucial step prior to development of a full scale facility.

Benefits include:

- Independent verification of technology
- Assessment of regulatory/policy differences
- Feedstock composition and pre-processing evaluation
- Direct meetings with regulators, community members and other stakeholders



# Conclusion

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- Conversion technologies can be used to stretch limited landfill capacity, reduce greenhouse gases, generate valuable products, renewable electricity and green fuels, & transition to a less polluted, more sustainable world.
- We have the potential to revolutionize the way solid waste is managed, transforming waste that is currently an economic, environmental and political liability into a valuable commodity and resource.



## Contact Information

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For copies of the  
County's Evaluation Reports, visit:

[www.SoCalConversion.org](http://www.SoCalConversion.org)

-  Sign up for future updates, including data and findings from our demonstration project, on our **e-Notify system**, linked from the website above.