Inland Empire Regional Composting Facility
Why Build It?

- Cost going Up
- Options going down
- Regulations
  - SCAQMD 1133.2
- Urban Encroachment

Biosolids Land Application in California

Status of County Ordinances

- Ban on All Land Application
- Practical Ban
- Ban on Class B
- Class B Land Application Allowed
- Developing Ordinances
- No Regulations/Ordinances Enacted
The Organics Management Strategy
Final Business Plan
August 2002

“A comprehensive strategy for implementing a coordinated, cost-effective approach to managing organics in a phased incremental manner consistent with sound public works engineering principles”
The Key Business Plan Policy Objectives

- Reduce biosolids handling and transportation costs
- Reduce reliance on out-of-agency solutions;
- Cost effectively recycle organic wastes using environmentally safe enclosed facilities;
- Local use of the fertilizer products will be a first priority;
- Reduce local air and water pollution;
- Implement strategies that minimize diesel truck trips
Inland Empire Regional Composting Authority

- 50/50 partnership with IEUA/LACSD
- Formed to gain control of biosolids management
- Gain control of costs and options
What is the IERCA?

- Joint Powers Agreement (JPA)
  - Between County Sanitation District No. 2 of Los Angeles County and the Inland Empire Utilities Agency
  - Ratified February 27, 2002
  - To acquire property and implement the [composting facility] project
Board of Directors

- 6 members (tie is possible), 2 alternates

<table>
<thead>
<tr>
<th>IEUA</th>
<th>CSD No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) IEUA Board Members</td>
<td>(2) District Board Members</td>
</tr>
<tr>
<td>(1) Agency GM or designated alternate</td>
<td>(1) District Chief Engineer or designated alternate</td>
</tr>
<tr>
<td>(1) Alternate Director</td>
<td>(1) Alternate Director</td>
</tr>
</tbody>
</table>

- Project Manager, Assistant Project Manager, Treasurer
Inland Empire Regional Composting Facility

- Existing Warehouse in Rancho Cucamonga
- >200,000 wet tons/year
  - Designed by Tetra Tech and CH2MHill
  - Construction 2004 to 2007
  - Started operations April 2007
- Total cost $95m ($15m for property and IKEA warehouse, $80m for improvements)
## Project Estimates vs Reality

<table>
<thead>
<tr>
<th></th>
<th>Assumptions</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility</td>
<td>$44m</td>
<td>$95m</td>
</tr>
<tr>
<td>Staffing</td>
<td>32-36 FTEs</td>
<td>25 FTEs</td>
</tr>
<tr>
<td>Biosolids/year</td>
<td>150,000 wt</td>
<td>150,000 wt</td>
</tr>
<tr>
<td>Tip fees</td>
<td>$26 wt (‘03)</td>
<td>$55 wt (‘16)</td>
</tr>
<tr>
<td>Startup</td>
<td>2005</td>
<td>2007</td>
</tr>
<tr>
<td>Compost Cust.</td>
<td>6-10</td>
<td>140</td>
</tr>
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</table>
Totals for 10 years

<table>
<thead>
<tr>
<th></th>
<th>2007 – 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biosolids Processed (wet tons)</strong></td>
<td>1,350,046</td>
</tr>
<tr>
<td><strong>Amendments Processed (wet tons)</strong></td>
<td>573,865</td>
</tr>
<tr>
<td><strong>Total Feedstocks Processed (wet tons)</strong></td>
<td><strong>80,000 Trucks</strong></td>
</tr>
<tr>
<td><strong>Compost Sold (cubic yards)</strong></td>
<td>36,000 Trucks</td>
</tr>
<tr>
<td></td>
<td>2,171,562</td>
</tr>
</tbody>
</table>
IKEA Before and After
Construction Started 2004
Receiving Building
Clockwise from top left, Building interior, screw conveyors, pug mill mixer in receiving pit, exhaust fan, exhaust system piping, and construction of biofilters.
Wildcat Trommel Screen

Biofilter

Truck Scales
Started Operations April 2007
Aerated Static Pile Composting

Building centerline and equipment corridor

Interior wall

Exterior wall

Air Flow
Ops Activities
Housekeeping
Biofilter Maintenance

- Screening existing media to blend with new media
- Every 14 months
We Tons

Year

Throughput

biosolids   Amendments

We Tons

- 50,000 100,000 150,000 200,000 250,000

2007 2008 2009 2010 2011

3 months to repair, $1m
Column Protection

• Evaluated Structure
• Loader Improvements: LED, cameras, etc.
• Staff Training Protocol, Safety Award Program
• Visited Davenport Compost Facility, Iowa
• Evaluated Lighting Options (Metal Halide & LED)
• No Major Repeated Incidents
Original Design Flow Process

- Compost (21 Days)
- Screening / Baghouse
- Curing (28 Days)
- Product

Hopper

Trommel Screens

Doorway (Typical)

Screened Product

Hopper

Receiving

"Overs"
Current Flow Process

**TROMMEL SCREENS**

**PRODUCT (21 Days)**

**HOPPER**

**SCREENING / BAGHOUSE**

**CURING (28 Days)**

**150 TRIPS/DAY**

**SCREENED PRODUCT**

**120 TRIPS/DAY**

**DOORWAY (TYPICAL)**

**HOPPER**

**RECEIVING**

“OVERS”
Proposed Flow Process

COMPOST (21 Days)

SCREENING / BAGHOUSE

CURING (28 Days)

PRODUCT

HOPPER

DIVERTER

DOORWAY (TYPICAL)

SCREENED PRODUCT

DIVERTED PRODUCT FOR ADDITIONAL STORAGE IF NEEDED

“OVERS”
Conveyor Project

#24 Electromagnet Installed

#24 Gravity Take-Up (GTU), Closer View

#23 / 24 Feeding Hopper Installation

#24 Truss Rail Mod’s For Electromagnet
Project Benefits

- **Reduced Loader Traffic**
  - Wear and tear, safety etc

- **Solid Waste**
  - Reduced by 93%

- **Faster Processing**
  - Reduced to 5 days
  - 13 hours less ops/wk

<table>
<thead>
<tr>
<th>Tons/Yr</th>
<th>Solid Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>520</td>
<td>historical</td>
</tr>
<tr>
<td>39</td>
<td>after changes in 2015</td>
</tr>
<tr>
<td>481</td>
<td>Reduction</td>
</tr>
<tr>
<td>93%</td>
<td>percent reduction</td>
</tr>
</tbody>
</table>
Solar = 1.3m kwh/year

Battery Project
- Offset peak
- Expand Solar
Energy

- Solar installed 2008
- Wind power installed 2011 (RP-4)
- Participate in EnerNOC load shed program
IERCF Biofilter emissions testing
Source Test

- Biofilter Sampling
  - 150+ Samples Collected
  - Testing Over 5-days
  - High & Low Flow

- Testing Methods
  - Ammonia – Method 207.1
  - VOC – Method 25.3
    - Complicated & Timely Test Process

>97% Reduction VOCs and Ammonia
Branding

- IERCA’s SoilPro™ brand has been filed for trademark
- Launched website www.ierca.org
PRESIDENT COMPOST BENEFITS

- Adds valuable organic matter - improving soil structure
- Improves the moisture holding capacity of light, sandy soils
- Reduces the bulk density of heavy, clay soils — increasing moisture infiltration and aeration, slowing soil compaction
- Reduces soil erosion and nutrient leaching
- Provides plant nutrition, improving plant vigor

HOW MUCH PREMIUM COMPOST DO I NEED?

ONE CUBIC YARD OF COMPOST COVERS:

<table>
<thead>
<tr>
<th>Square Feet</th>
<th>Depth (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>648</td>
<td>½</td>
</tr>
<tr>
<td>324</td>
<td>1</td>
</tr>
<tr>
<td>162</td>
<td>2</td>
</tr>
<tr>
<td>108</td>
<td>3</td>
</tr>
</tbody>
</table>

CUBIC YARDS REQUIRED TO COVER 1,000 SQUARE FEET

<table>
<thead>
<tr>
<th>Layer</th>
<th>Cubic Yards</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>1.5 yd³</td>
</tr>
<tr>
<td>1</td>
<td>3 yd³</td>
</tr>
<tr>
<td>2</td>
<td>6 yd³</td>
</tr>
<tr>
<td>3</td>
<td>9 yd³</td>
</tr>
</tbody>
</table>

GUARANTEED MINIMUM NUTRIENT ANALYSIS

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Minimum</th>
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</thead>
<tbody>
<tr>
<td>Total Nitrogen (N)</td>
<td>0.75%</td>
</tr>
<tr>
<td>Water Insoluble Nitrogen*</td>
<td>0.75%</td>
</tr>
<tr>
<td>Available Phosphate (P2O5)</td>
<td>1.0%</td>
</tr>
<tr>
<td>Soluble Potash (K2O)</td>
<td>0.25%</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Nutrients are derived from composted biosolids (treated sewage sludge).

*Slow release nitrogen

Soil Amendment Ingredient List
Composted biosolids (treated sewage sludge), forestry products, yard trimmings, and stable bedding.

Information regarding the contents and levels of trace elements in this product is available on the internet at http://www.aaspco.org/metals.htm.

SoilPro Products Premium Compost is sold in bulk form, by the cubic yard or ton.

MANUFACTURED BY:

INLAND EMPIRE REGIONAL COMPOSTING AUTHORITY

12645 Sixth Street, Rancho Cucamonga, CA 91730 Telephone (909) 993-1500 www.ierca.org
COMPOSTING PROCESS

The Inland Empire Regional Composting Authority (IERCA) manufactures SoilPro Products Premium Compost at its indoor state-of-the-art composting facility. At this high tech facility, advanced engineering principles are used to accelerate the natural degradation process—enabling a finished product to be produced in just 2 to 3 months. Ongoing monitoring of the system allows for a consistently high quality soil amendment to be produced.

SoilPro Products Compost Products are rich in organic matter and nutrients, both of which are essential components of productive soils. SoilPro™ Products Compost Products are excellent for amending depleted soils, enriching planting mixes, and enhancing the growth of turf and ornamental plant species.

The enclosed composting process, essentially “pasteurizes” the product, allowing SoilPro Products Premium Compost to boast that it is free of viable weed seeds and plant pathogens.

DIRECTIONS FOR USE:

Flower and Ornamental Garden Beds: Apply a 1 to 2 inch layer of SoilPro Products Premium Compost to the soil and incorporate it to a depth of 6 to 8 inches. Plant flowers and water. Condition the soil this way every year 2 to 3 years.

Trees & Shrubs: Dig a hole to the approximate depth of the root ball and two to three times as wide. Mix 1 part SoilPro Products Premium Compost with 3 parts soil obtained from the planting hole. Place the tree or shrub in the planting hole and apply amended soil around the root ball. Firm the soil occasionally and water.

Topsoil Manufacturing / Upgrading: Mix 1 part SoilPro Products Premium Compost with 3 parts existing or purchased soil and blend uniformly.

Mulching: Spread a 2 to 3 inch layer around trees, shrubs, and flowers.

NUTRIENT RICH, WEED-FREE, CONSISTENT, EASY TO USE...

New Turf Areas: Apply 1 to 2 inches of SoilPro Products Premium Compost to the soil and incorporate it to depth of 6 to 8 inches, apply seed, then rake and water.

...COMPOST PERFECT FOR YOUR LANDSCAPE, GARDEN, OR TURF
Compost Production and Sales

Compost Sales

We Tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Base</th>
<th>CalTrans</th>
<th>Premium</th>
<th>Topper</th>
<th>Mulch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2008</td>
<td></td>
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<td>2009</td>
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<tr>
<td>2015</td>
<td></td>
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<tr>
<td>2016</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
• CalRecycle’s Regions
  1. Northern California
  2. Extended Bay Area
  3. Central California
  4. Southern California

• Urban areas clustered more in the south coast
• Proximity to high quality ag land less in the south
• More supply requires increased demand or more truck miles
Transitioning Into a New Market

Drought and Turf Removal

SoilPro Compost spreading on turf grass at a city park.

SoilPro Compost spreading onto a corn field.
Transitioning into Agriculture

MARKET SEGMENT COMPARISON

LANDSCAPE  AGRICULTURE
Buying **SoilPro Products**

Urea is a synthetic source of (N) and has a commercial cost of around $0.50 per lb. depending on the volume purchased.

The drawback to using just urea is the results are short-term and crop soils need more than just (N) for long-term health.

When you buy **SoilPro Products**, you get 48 lbs. of (N) content per ton, 2/3 of which is slow release, PLUS rich amounts of Phosphorus, Potassium, Organic Matter, as well as Iron and other essential micronutrients.

<table>
<thead>
<tr>
<th>Load</th>
<th>per Ton</th>
<th>$/lb N</th>
</tr>
</thead>
<tbody>
<tr>
<td>$350.00</td>
<td>$14.00</td>
<td>$0.29</td>
</tr>
<tr>
<td>$400.00</td>
<td>$16.00</td>
<td>$0.33</td>
</tr>
<tr>
<td>$450.00</td>
<td>$18.00</td>
<td>$0.38</td>
</tr>
<tr>
<td>$500.00</td>
<td>$20.00</td>
<td>$0.42</td>
</tr>
<tr>
<td>$550.00</td>
<td>$22.00</td>
<td>$0.46</td>
</tr>
<tr>
<td>$600.00</td>
<td>$24.00</td>
<td>$0.50</td>
</tr>
<tr>
<td>$650.00</td>
<td>$26.00</td>
<td>$0.54</td>
</tr>
<tr>
<td>$700.00</td>
<td>$28.00</td>
<td>$0.58</td>
</tr>
</tbody>
</table>

*Load cost includes material And transportation.*
Agriculture Market Benefits

- High volumes
- Winter demand – Steadier outbound flow throughout year
- Inventory relief
- Surge availability
Agriculture Market Cons

- Low price
- Timing constraints – Windows of opportunity between planting/harvest
- Cyclical – Not regular
- Location – Distance from facility to AG
IMPACT OF BIOSOLID COMPOST ON ALFALFA YIELD

RESULTS AND DISCUSSION

- Yields increased with increasing compost rate: 3.55, 3.63 and 3.87 Mg ha⁻¹, for treatments 1, 2 and 3, respectively.
- The highest compost rate was the only treatment (#3) that yielded significantly higher (P ≤ 0.1) than all mineral fertilizer and control treatments.
- Patterns of treatments effect on yield were consistent among all cuttings (data not shown).
CONCLUSION

✓ Broadcasting 11.2, 22.5 and 33.7 Mg ha⁻¹ of biosolid-compost increased alfalfa yield compared with the untreated control by 3.5, 6.0 and 12.9%, respectively.

✓ Sufficient nutrient levels in soil nutrient analyses and no yield response to applied mineral P and K fertilizers suggest that the yield increase with the highest rate of biosolid-compost is most likely not due to correction of a nutrient deficiency but rather some other factor such as improved of water retention with compost.

✓ Heavy metal content in the plant and soil due to the highest rate of biosolid-compost were similar to the control treatment or slightly higher and well within acceptable levels.
SoilPro Premium on a Park in the City of Paramount

April 2008

May 2008
Professional Associations

- Association of Compost Producers
  - State Chapter – 100 company members
    - Increase the value and volume of compost used in the state
    - Promote education
    - Help with AB341 goals

- United States Composting Council
  - National organization
  - Federal and state legislation
  - Compost promotional programs
  - Education and training
Awards

- Governor Brown – California
  - Governor’s Environmental and Economic Leadership Award
- American Academy of Environmental Engineers
  - Leadership in Engineering
- United States Composting Council
  - Composter of the Year
  - Excellence in Marketing Program Presentation
- California Resource and Recycling Association
  - Dave Hardy Leadership in Organics
- Environmental Protection Agency – Pacific Region
  - Environmental Award
- California Association of Sanitation Agencies
  - Technological Innovation Achievement
- Solid Waste Association of North America
  - Excellence in Composting Systems
  - California Water Environment Association
Questions or Comments?