

Reducing California's Petroleum Use by Converting Waste to Fuel ("WTF")



*REI's New 365 kW Ultraclean
PyroGas Electric Generator*



Syndiesel



Carbon Black

Liquid and Gaseous Fuels, Carbon Black, Activated Carbon, Agri-Char & Electricity

Remediation Earth, Inc. (“REI”)

- Technology and business development company
- 20+ years experience: custom engineered systems
 - Based in Westlake Village, California
- Proven commercial thermal conversion technologies*
 - Meets current emission limits; CA, US, EU & Japan
- Remediate wastes; higher value energy products
 - Pyrolysis I: convert waste to fuels, electricity- carbon black
 - Pyrolysis II: convert woodchips to “green” diesel & agrichar
 - Soon: produce “green” Hydrogen, bio-SNG, “green” electric

*Pyrolysis and anaerobic gasification technologies are not incineration

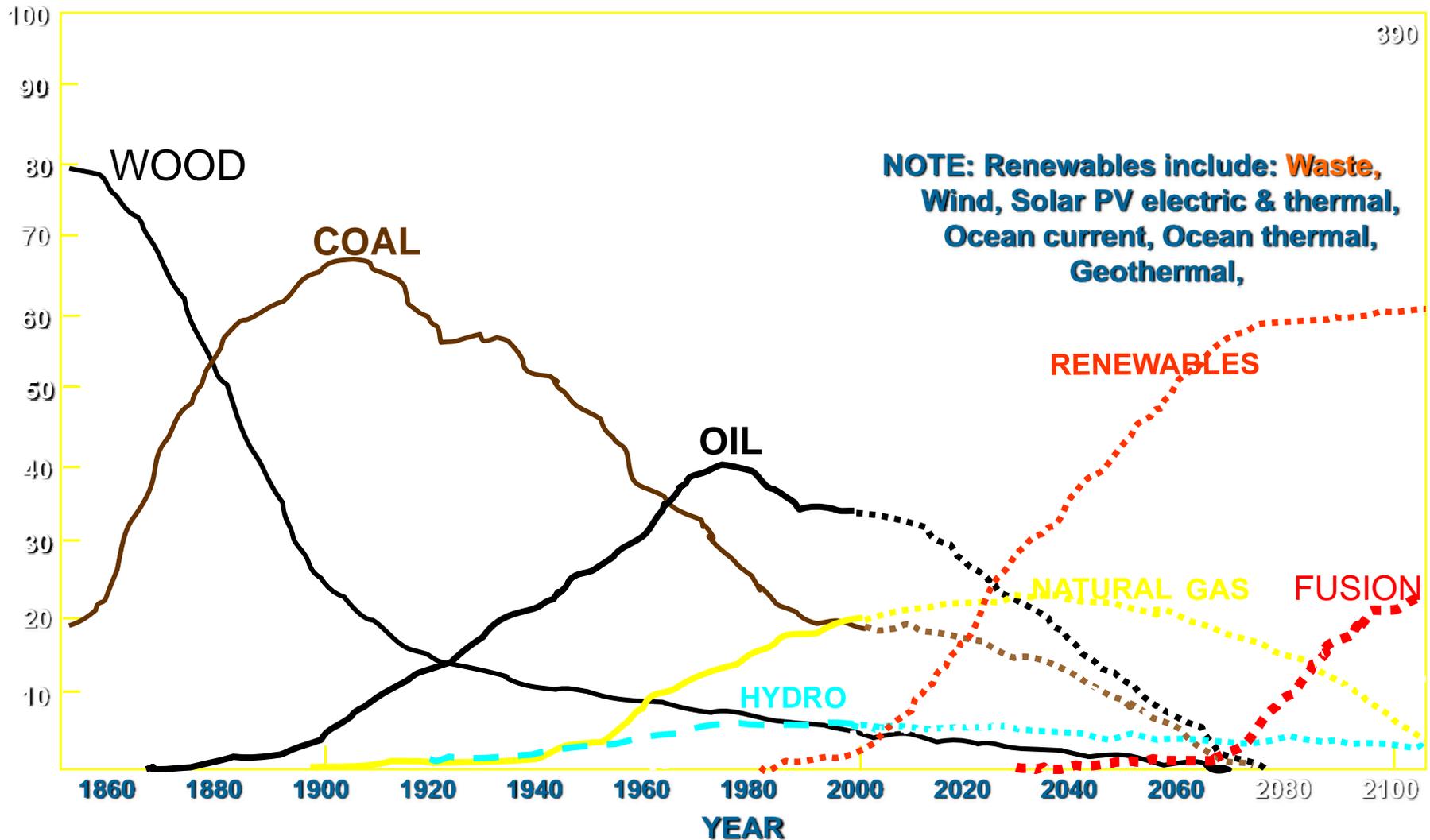
20 Years Modular System Experience



Skid Mounted: Intelligent Filtration System With Remote Monitoring

**Why Is Remediation Earth (“REI”)
Focusing on
Producing Fuels & Energy Products
From Renewables Waste?**

FUTURE GLOBAL ENERGY CONSUMPTION



SOURCE: International Institute of Applied Systems Analysis

*REI Uses *Anaerobic Pyrolysis- Not Incineration*

- **Incineration is combustion- by many “Aliases”**
 - Waste-to-energy (“WTE”), energy from waste (“EFW”)
 - Advanced thermal recovery (“ATR”), “mass burn”
- **The lines are “blurred”; people are confused**
 - WTE, EFW, ATR & mass burn all use stoichiometric O₂
 - Gasification/Pyrolysis uses little or no O₂- *not* combustion
- **Method of treating emissions is key**
 - Mass burn- can only treat *fully combusted exhaust*
 - Thermal Conversion: intermediate step for gas cleanup
 - REI’s emissions: meets both CA & worldwide standards

**Thermal conversion process that uses no oxygen*

REI's Technologies Convert These Wastes . . .

PYROLYSIS I

PYROLYSIS II

Petroleum Product Waste

Organic Waste



Pyrolysis I

Hybrid Pyrolysis II

SynDiesel

"Green" Hydrogen

"Green" Electricity

"Green" Diesel

“Higher Value from Pre-separated Materials”

Pyrolysis I

- Gasification of MSW to power- not cost effective
 - At \$0.09/kWhr, \$90/ton + \$40 tipping = \$130/ton (2011)
 - Large 500 to 1000 ton/day systems problematic
- Separated plastics- MRF; \$550/ton- 4.2X revenue
 - 160 gallons/ton syn-diesel; \$400/ton @ \$2.50/gal (2011)
 - 160 lbs carbon black/ton (8%); \$120 @ \$0.75/lb (2011)
 - Tipping fee of \$30/ton
- 4 smaller 50 t/d units = 200 t/d; parallel processing
 - Quickly change output products; chase market “highs”
 - Less impact from yearly scheduled maintenance

*Note: MRF = material recovery facility; MSW = municipal solid waste
t/d = tons per day*

Pyrolysis I



28 Ton per Day Continuous Pyrolysis I Unit

REI's Fuel vs. Competitor's



Fast Pyrolysis Liquid

- Acidic/Corrosive
- 25% Water
- Biphasic
- Heated Storage
- 8.0 K BTU/lb
- Heavy Odor
- Not miscible in oil



REI Oil from Tires



REI Oil from Mixed Plastic



REI Oil from Medical Waste

- Miscible in oil
- Less than .05% Water
- Minimal Odor
- 18.0 K BTU/lb
- pH neutral
- Stores well



Number 2 Fuel Oil

- Fossil Fuel
- 19.6 K BTU/lb
- Minimal Odor
- A true oil
- pH neutral
- No water
- Stores well

Value Added Products Per Ton

Pyrolysis I

- **Tires (100 per ton)**  *80 gallons #2 fuel oil
640 lbs carbon black, 300 lbs scrap steel
- **Mixed Plastics**
(45% PP, 40% 15% PS)  *160 gallons #2 fuel oil & synthetic diesel
160 lbs carbon black
- **Medical Waste**  *110 gallons “black” #2 fuel oil, syn-diesel
120 lbs carbon black
- **Electronic Waste**  *80 gallons “black” diesel
80 lbs carbon black
- **Municipal Solid Waste (MSW)**  *60 TO 80 gallons (see NOTE)
200 lbs char/ash, depending on content

Note: Minimum of 15% to 20% plastics (by wt) required in MSW for oil production

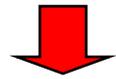
*** Deductions already made for 12% -14% oil used for parasitic needs**



Emissions from REI's Pyrolysis I Unit

Pyrolysis I

REI's EMISSIONS



Pollutant	Emission Limit Values		Measured Value
	EU	US	
Dioxins & PCB concentration Toxicity	0.2 ng-TE/m ³ 0.1 ng/m ³ N	13 ng/dscm	0.00006 ngTEQ/m ³ _N
Oxygen	11%	N/A	Calculated with 11%
Particulates	10 mg/m ³	24 mg/dscm	1.0 mg/m ³ N
Sulphur oxide	5 mg/m ³	29 ppmv	Below 3.57mg/m ³ N
Nitrogen dioxide	400 mg/m ³	180 ppmv	84.4 mg/m ³ N
Hydrogen chloride	10 mg/m ³	29 ppmv	6.7 mg/m ³ N
Carbon monoxide	10 mg/m ³		Below 1.39 mg/m ³ N
Water			10.2%
Emission gas temperature			178°C
Emission gas flow rate (Wet)	-	-	1270 m ³ N/h
(Dry)	-	-	1140 m ³ N/h

Complies With Emission Limits of EU, US & Japan

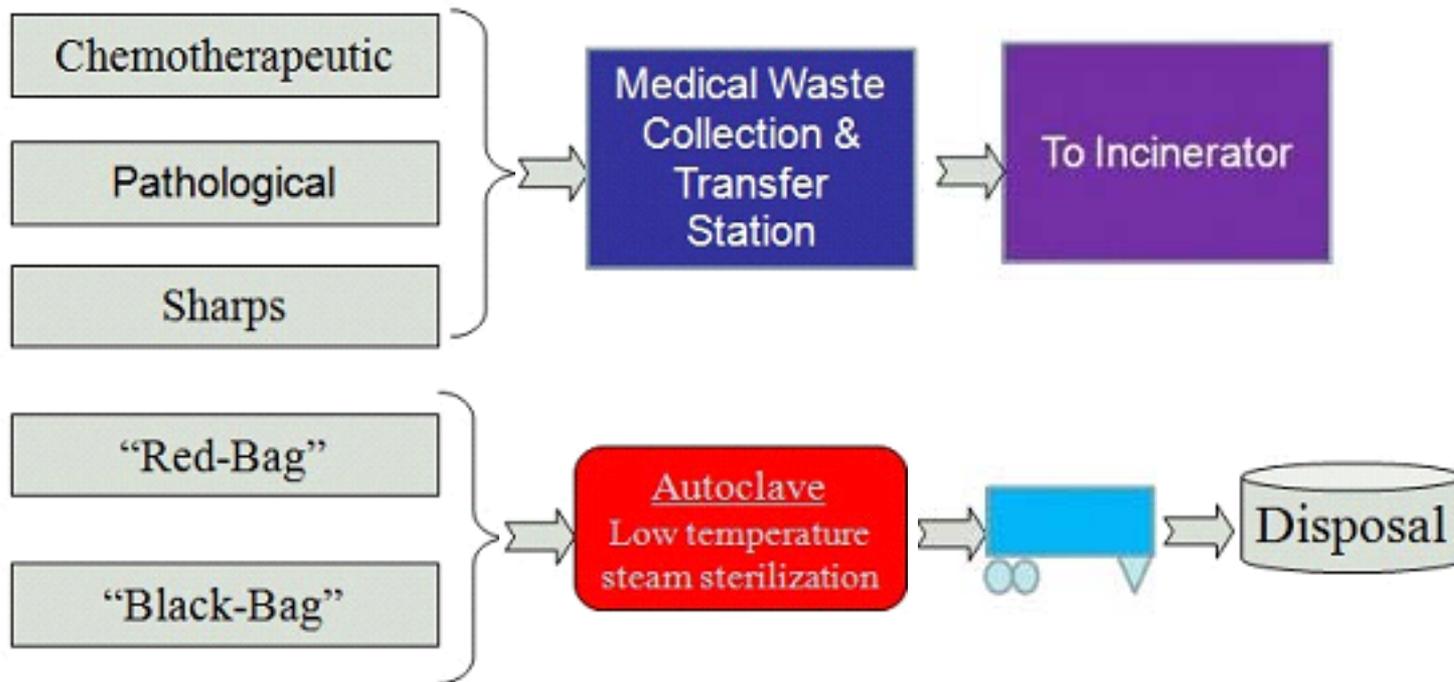
There are Many Potential Wastes.

Focus on:

Medical Waste & Mixed Plastics*

***sorted from municipal solid waste (“MSW”)**

Basic Flow Diagram of Hospital/Medical Waste Process (How most medical waste processors operate)



Note: Average plant send 35,000 ton/year sterilized medical waste to landfills.



PYROLYSIS II

ROTARY KILN USING PYROLYSIS WITH STEAM REFORMING

- **Can Operate on MSW, Bio-Solids, Agricultural Waste, Dairy Cow Waste, Bio-Solids, & Algae**
- **Available in 7, 20 & 75 Metric Ton per Day Systems**
- **Can Produce “Green” Hydrogen, Green Transportation Grade Diesel & Green Electrical Power**

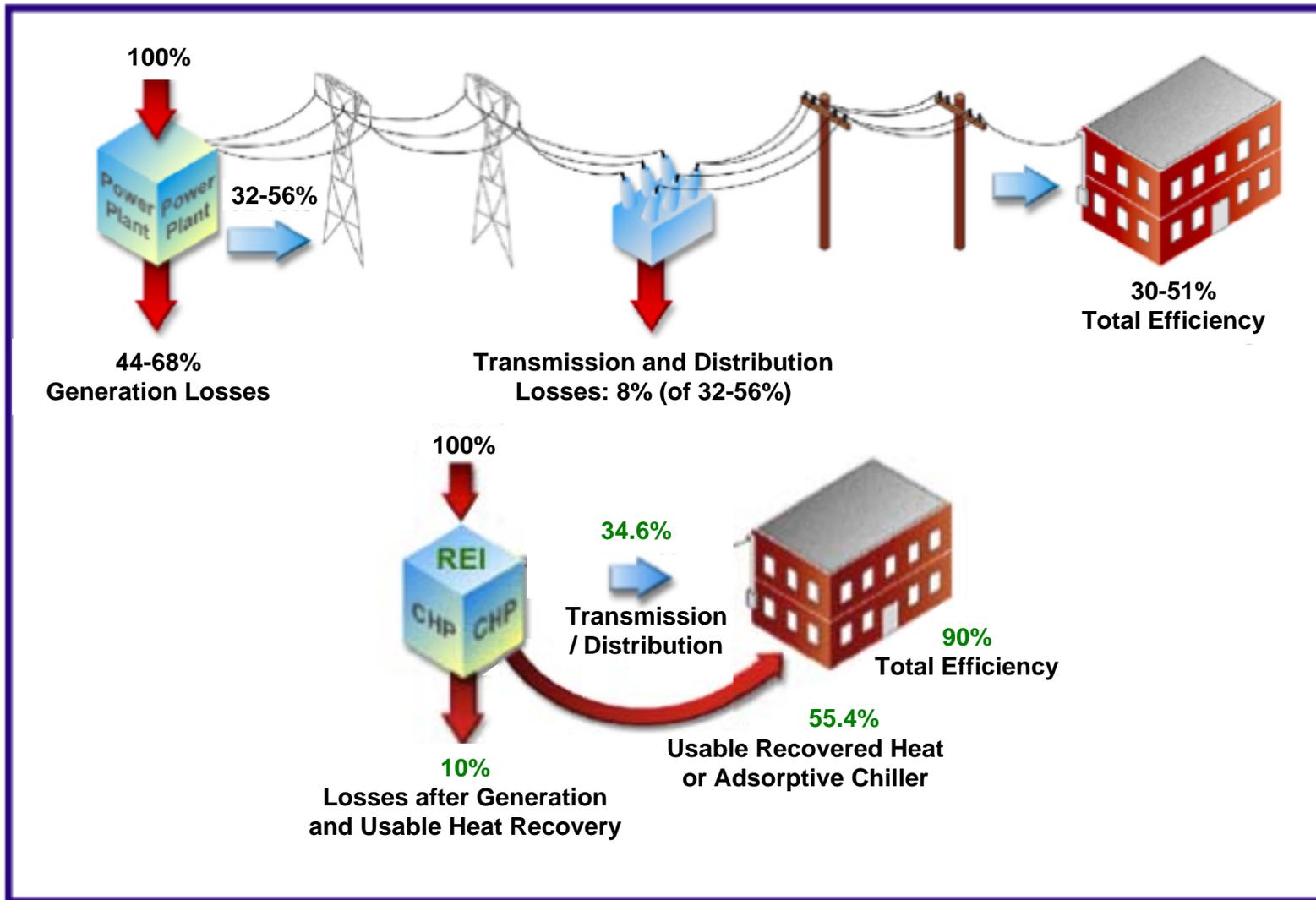
Prime Power Unit: Co-Generation or “CHP” Using Natural Gas, Bio-Gas or Pyro-Gas



REI's 365 CHP Unit with Ultra-Low Emissions

- ❑ **Combined Efficiency 90%**
 - **Electrical (34.6%)**
 - **Thermal (55.4%)**
- ❑ Renewable fuel sources (any clean gaseous fuel > 500 btu/ft³)
- ❑ SynGas from pyrolysis or gasification
- ❑ Bio-Gas from landfills, wastewater, treatment plants, concentrated animal feeding operations (CAFO)
- ❑ Can meet 2011 SCAQMD (CA) emission requirements
- ❑ Low noise: < (70 dB(A) @ 1M)

REI's Micro-CHP vs. Generic Power Plant (CHP = Combined Heat & Power)





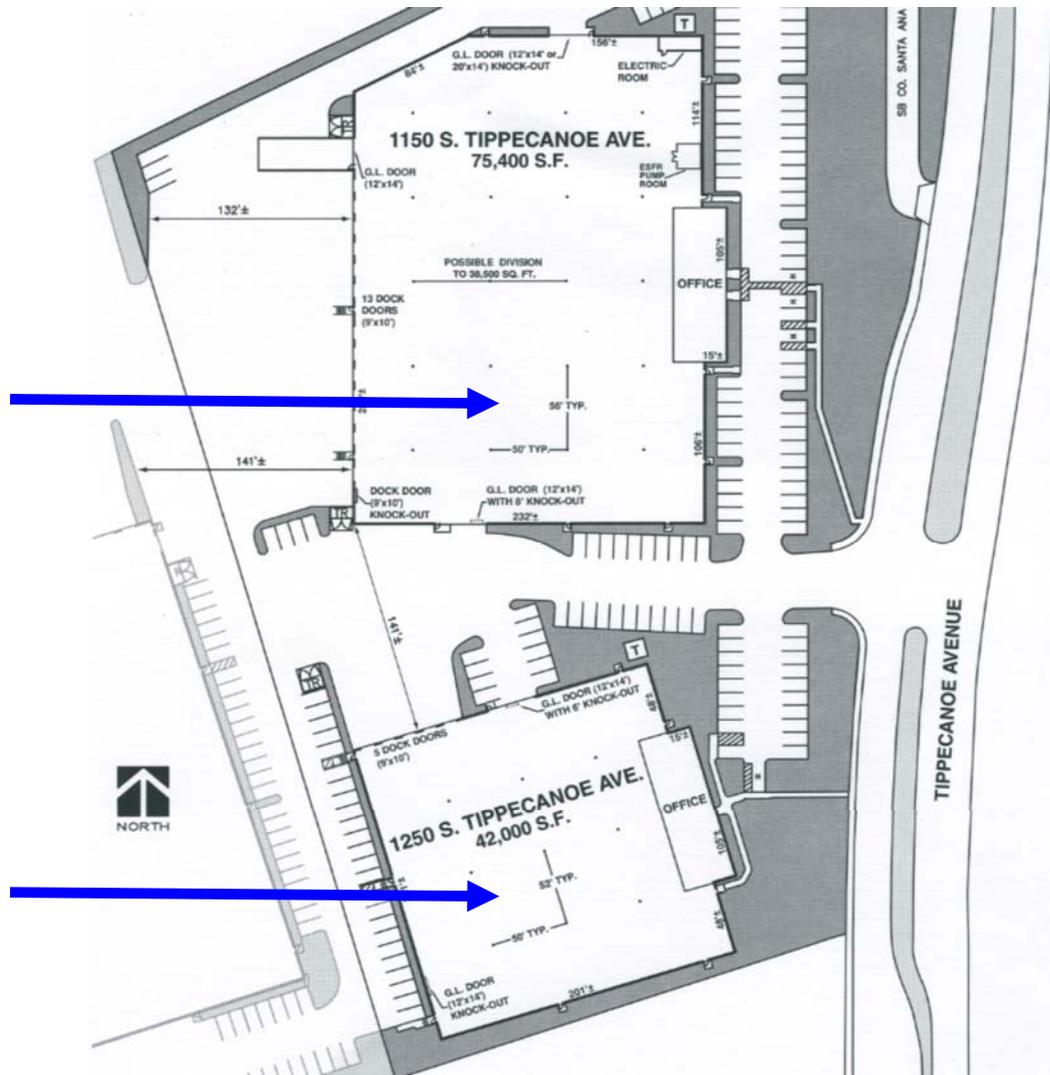
San Bernardino Site: Four Pyrolysis Plants (25-ton/day each)



IEE's "Clean" MRF



REI's Pyrolysis Site





Project Statistics

- REI will add three more 27.5 ton/day pyrolysis systems (“Project Two, Project Three & Project Four”) in the months after Project One becomes operational.
- Project One will generate annual revenues of approximately \$7.5 million per year, growing to \$31 million per year when all four 27.5 ton/day pyrolysis systems are operational.
- Project One initially will generate 24 full-time jobs for California residents.
- Projects Two, Three & Four each will generate more California jobs.



AB 118 Program Funding

- **Need \$5 million in funding to produce WTF.**
 - **Build out first of 10 facilities**
 - **Make diesel fuel substitutes: CA waste**
 - **Create California jobs**
 - **Maximize California**
 - **Bring innovative technology to CA first**
 - **before any other state**



Thank You

Contact:

Daniel K. Moscaritolo

President & CEO

or

Peter Kokiousis

Chief Operating Officer

REMEDICATION EARTH, INC.

4607 Lakeview Canyon Rd, #438

Westlake Village, CA 91361

805-453-1111 cell

805-522-9100 office

805-522-9199 fax

<http://www.RemediationEarth.com>