



MUSTANG POWER
TAJIGUAS EOS RECOVERY PARK
SANTA BARBARA COUNTY, CA

US Composting Council
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Mustang Renewable Power Ventures

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Tajiguas Eos Recovery Park

Agenda

- Santa Barbara County Waste Landscape
- Integrated Systems Approach
- Best Fit Technologies
- Compost + Energy
- Economics

Mustang Power is 1 of 4 finalists in the Santa Barbara County MSW Diversion RFP Competition

- Tajiguas Landfill 210,000 person wasteshed - est. capacity @ 2017
- 73% diversion rate-2009 (one of highest in state), including SS organics (green waste - open air composting) & new SS food waste collections (City)
- 27% disposal = ~200,000 tons per year Mixed MSW into landfill
- Mixed MSW Waste Study: ~30% compostable organics (food, green, other), ~30+% recyclables (glass, metal, paper, plastic), ~40% residual
- County and 4 Cities combined to issue RFP in 2009 after 7 years of analysis, feasibility study, community outreach, stakeholder consensus building. Criteria: >60% diversion, ~5 acre site at landfill, track record, <\$100/ton tipping fee, compliance with all regulatory reqts.

Mustang proposed an Integrated Systems Approach using AD

3 other finalists proposed thermal conversion technology solutions



What's so special?

- Geographically isolated
- County owns landfill
- Land is rare and expensive
- Environmentally conscientious community





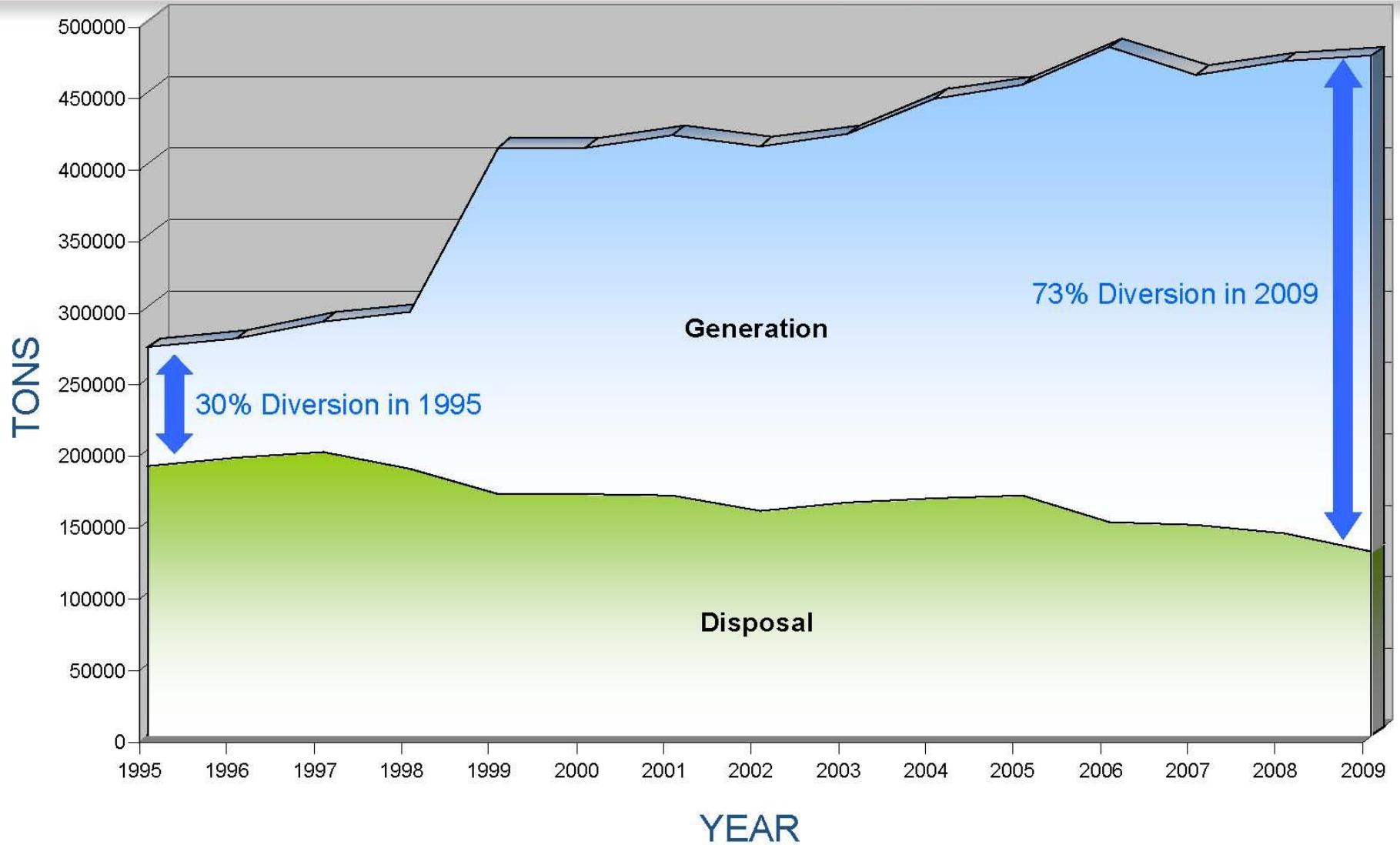
The Numbers



- **Countywide**
 - 400,000 in County (169,000 in unincorporated area)
 - 8 incorporated cities
- **Area considering CT**
 - 210,000 in Tajiguas Landfill Wasteshed (80,000 in unincorporated)
 - 3 incorporated cities



Generation vs. Disposal

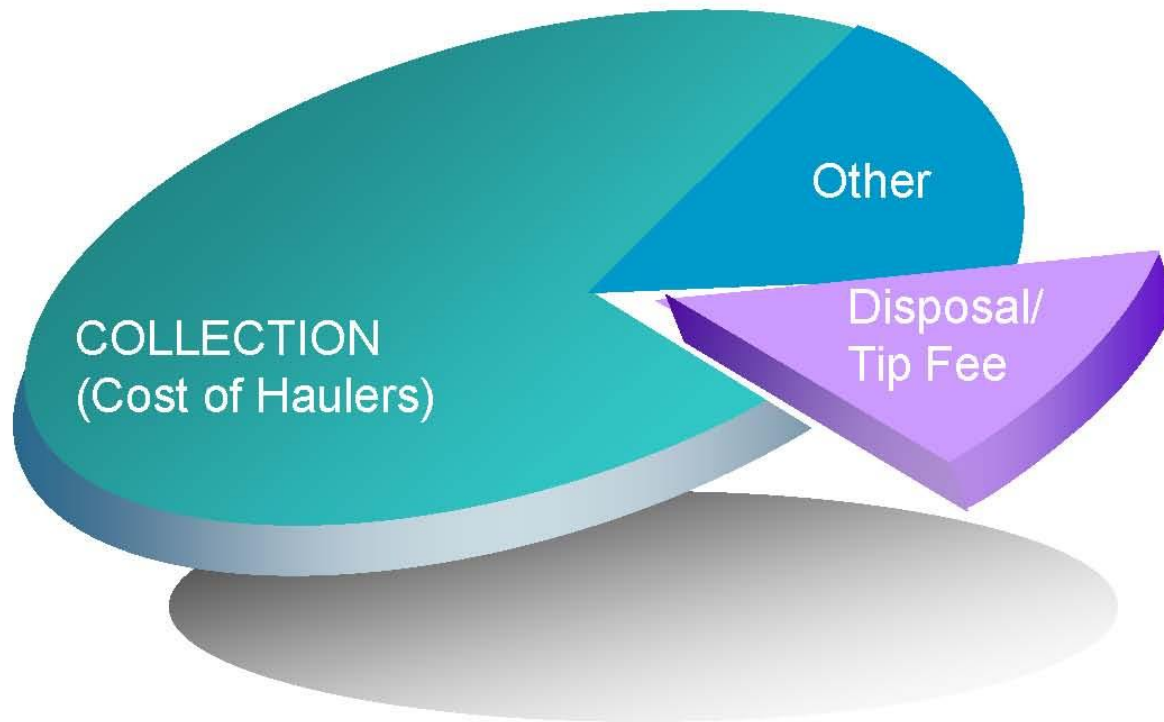




Project Background

- We need a long term waste management solution
- Projected increased costs for all alternatives
- Burying waste has potential environmental impacts and high mitigation costs
 - Land
 - Air
 - Water
- Our waste has a significant carbon footprint

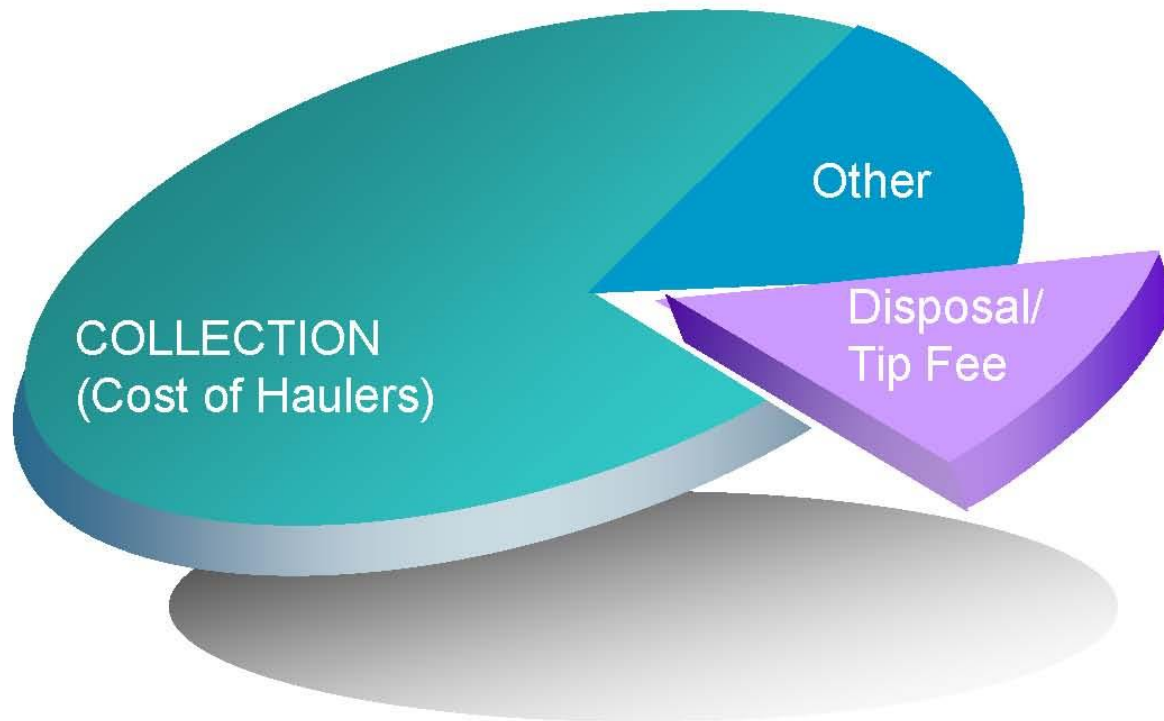
Financial Impact



- Trash bill includes three components:
 - Collection (65%-74%)
 - Disposal (11%-16%)
 - Other (10%-15%)



Financial Impact



- Future tipping fee of \$100 per ton would cost residential ratepayer about **\$2.50 more per month**



Proposals – Initial Review

- **Mustang Renewable Power**

- MRF & Anaerobic Digestion

- >60% Diversion

- ~30% in pulled recyclables

- ~30% reduced through digestion

- Addition of Thermal Gasification to process 40% residual

- Primary products

- Electricity

- Recyclables

- Compost

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Integrated Systems Approach



- **Mustang proposed an Integrated Systems Approach using 3 Best Fit Technologies - 2 Proposals: 1) MRF + AD; 2) MRF + AD + Gasification**
- **One Technology for each Waste Stream Component**

1. Resource Recovery via **Materials Recycling Facility (“MRF”)** – ~30% recyclables (glass, metal, paper, plastic)
2. **Anaerobic Digestion** – converts organics (~30% food & green waste) into biogas and digestate. Biogas is ~ 60% methane; proposed for electricity production. On other projects we upgrade biogas to natural gas for transportation and pipeline grid injection
3. **Gasification** (an Alternative Proposal) – to convert the ~40% residual to electricity. This Alternative may not be feasible in CA under current regulatory environment. Can yield 95+% LF diversion



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Santa Barbara, CA

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Technical Approach – MRF

Materials Recycling Facility (“MRF”) – Van Dyk Baler / Bollegraaf

- Recovers commingled recyclables (~30%) from MSW



MRF Input = Mixed-MSW



MRF Output = High value recycled commodities for sale

- Sorts & Separates the Mixed MSW into Fractions:

1. **Organics (~30%)** for **Anaerobic Digestion (-> Electricity & Digestate)**
2. **Baled** recyclables of **Mixed Paper, OCC, Film Plastics, PET, HDPE, Mixed Plastics, Ferrous & Non Ferrous Metals**
3. **Bulk loose material** such as **Wood, Oversize Metals, Large Rigid Plastics, Carpeting, Padding**, etc.
4. Residual (~40%) for disposal or alternative conversion technology (gasification)

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Technical Approach – Mixed MSW (“Dirty”) MRF

- **Specifically designed** for Santa Barbara County’s waste characteristics to handle a **wide variety of waste** due to variety of waste sources.
- Capacity of **800 tpd** of MSW – > **220,000 tpy**
- Employs **49 full time employees**
- **High automation** design using:
 - **Bag Openers**
 - **Size Reducers**
 - **Trommels**
 - **Screens**
 - **Magnets**
 - **Optical Sorters**
 - **Air Separators**
 - **Eddy Currents**
 - **Balers**



Size Reducer



Optical Sorter



Overhead Magnet



Baler

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MRF Technology Partner



Van Dyk Baler, Inc.



➤ **70+ Dirty MRF's** Operating with Van Dyk / Bollegraaf Systems in **16 cities in Europe** recovering recyclables and/or producing RDF

- GERMANY – Berlin, Munich, Neuss, Erfstadt, Enningerloh, Mertesdorf, Eitting, Ellert
- SPAIN – Barcelona, Cordoba, Albacete
- ITALY – Roma, Aviano, Padova
- NETHERLANDS – Groningen
- CYPRUS – Larnaca

Van Dyk Baler/Bollegraaf has successfully supplied and installed equipment for over **140 MRF's** and **475 private firms** in the US and over **250 MRF's** and **1,200 private firms** in Europe

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MRF Technology Partner



Van Dyk Baler, Inc.

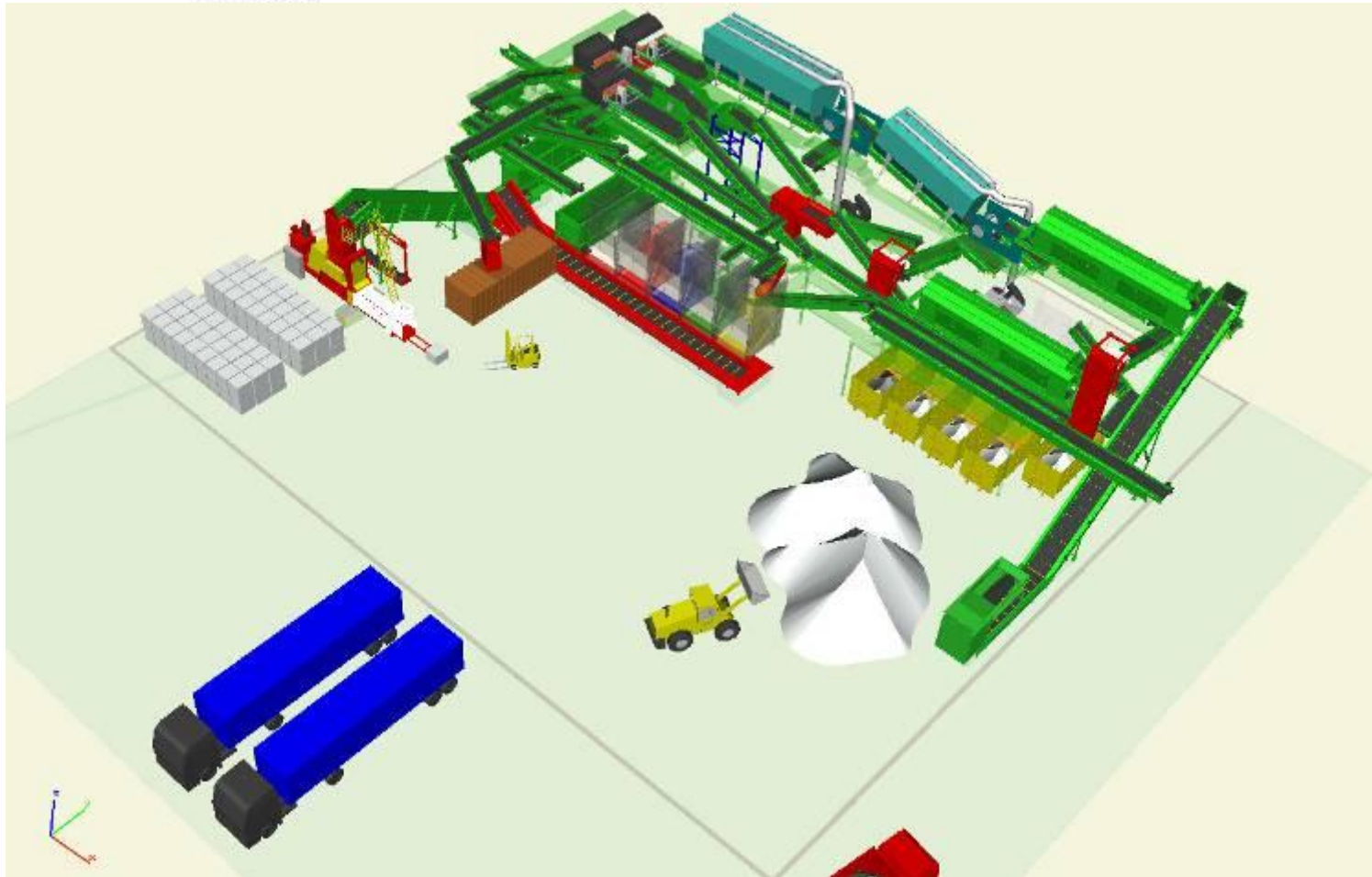


Dongara Municipal Solid Waste Dirty MRF Facility in Toronto, Canada

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MRF Technology Partner



Van Dyk Baler, Inc.



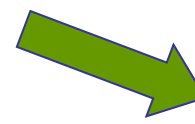
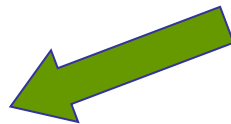
Rendering of the Bollegraaf / Van Dyk MRF System proposed for Santa Barbara County

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Technical Approach – Anaerobic Digestion

Anaerobic Digestion (“AD”) Facility – BEKON Energy Technologies



**BEKON Dry
Fermentation
AD Facility**



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AD Technology Partner



BEKON Energy Technologies, Inc.

- **Leader** in Anaerobic Digestion Dry Fermentation technology since 1999 with headquarters in Munich, Germany. **14 Commercial Scale** facilities currently in operation in Germany, Italy and Switzerland. **7 additional** facilities under construction or in planning.
- One of the tonnage **leaders** in processing waste via Dry Fermentation – **299,000 tons per year**. Dry Fermentation AD consumes least amount of water. Best Tech for CA
- **Proven Technology** with **15 Patents**
- Venture capitalist firm of **Kleiner Perkins Caufield & Byers** is a BEKON investor



Munich, Germany Facility

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AD Technology Partner



BEKON Energy Technologies, Inc.

- **14 Commercial Scale** facilities currently operating in Germany, Switzerland and Italy processing Organic Waste into Compost & Energy



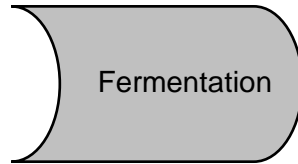
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Technical Approach – Anaerobic Digestion

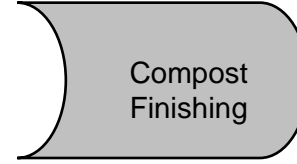
The process has four steps to convert waste into energy and compost...



- Mixed MSW processed in Dirty MRF: organics (yard, food, other compostable waste) recovered as wettest fraction, routed via belts to final screen & AD



- Organics screened once more for film plastics, then placed into fermenter along with previously-fermented material
- Methane extracted over 28 days
- 65,000 ton site = 16 digesters



- Digestate removed
- Portion re-used for next batch
- Balance to aerobic composting for pathogen destruction



- Finished compost is screened again, then land applied or sold as topsoil
- Non agricultural quality digestate used as general fill
- Biogas used for electricity or upgraded to grid



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Technical Approach – Anaerobic Digestion



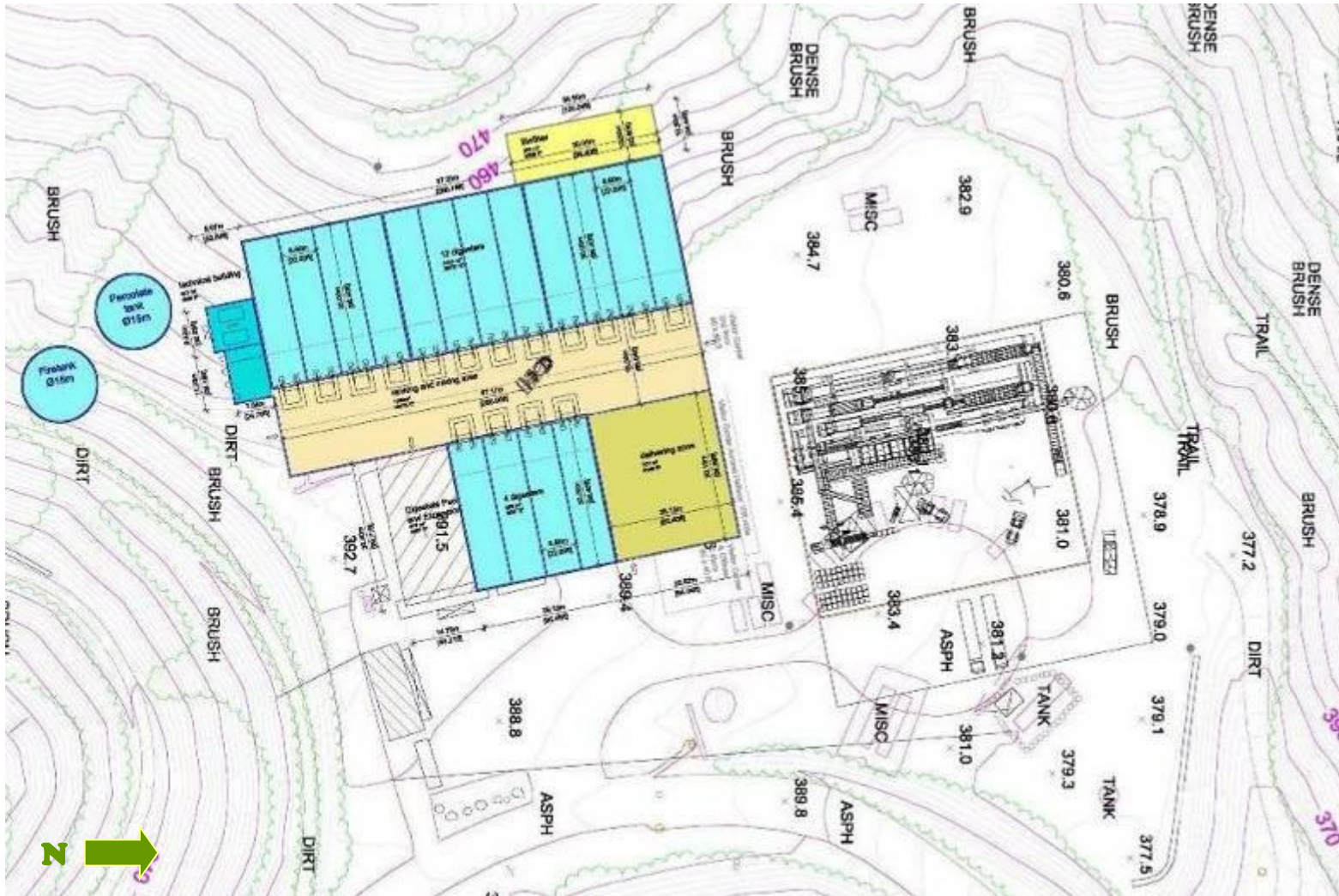
Highlights of the BEKON Dry Fermentation AD Facility

- **240 tpd** Capacity of MRF &/or Source Separated Organics – **65,000 tpy**
- Employs **4 full time employees**
- **Generates > 2MW** of power – **10.7 Million kWh** of renewable power annually
- AD Digestate is converted to **17,000 tpy** of **landscape fill, compost** or **Refuse Derived Fuel (“RDF”)** for **beneficial** uses
- Compost Value/Quality TBD – potential land application or turf grass
- MRF + AD Proposal achieves a **diversion rate of ~60%**

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Technical Approach – MRF + Anaerobic Digestion

- **Site Plan** of the Van Dyk MRF and BEKON Dry Fermentation AD facility at Tajiguas... occupies ~**3 acres** of land.



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Technical Approach – MRF + Anaerobic Digestion

- **Rendering** of the Van Dyk MRF and BEKON Dry Fermentation facility at Tajiguas



➤ MRF + AD INTEGRATED SYSTEMS APPROACH

➤ Pricing is based on the construction and operating costs of the MRF and AD Facility.

➤ Pricing is based on a Minimum Annual Delivery of 192,000 tons per year

➤ Delivery Tonnage assumed fixed for 20 years

➤ Tipping Fee: \$<60/ton

➤ Total CleanTech Jobs: 60 (49 MRF, 4 AD, 7 Mgmt/Admin)

Who is **Mustang Renewable Power Ventures**?

- Experienced **Brownfields** and **Industrial** Developer, Real Estate Projects Include 3 Former Landfills (\$2.0 Billion in projects; 1.5 million SF in California Central Coast; Local Developer with Local Knowledge)
- Track Record of **Success** with **Complex Regulatory Permitting** involving:
 - Environmental **Regulatory Agency Approvals**
 - California Department of Toxic Substances Control (DTSC)
 - California Department of Resources Recycling and Recovery (CalRecycle, formerly CIWMB)
 - Regional Water Quality Control Boards
 - Air Quality Management Districts
 - County Health Departments
 - Extensive **Community Outreach**

Mustang Renewable Power Ventures is developing waste diversion projects in California with proven European technology.

Executing a Green Vision

- **Best Fit Technologies for Distinct MSW Streams**
- **Green/Clean Tech Jobs**
- **Greenhouse Gas/Emissions Reduction**
- **60-95% Waste Diversion**
- **Generate Clean Power**



**Triple Bottom Line – Planet, Community,
Cities and County Economic Sustainability**