

RENEWABLE Energy
FROM WASTE
CONFERENCE

Take Aways REW Conference Long Beach, CA

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Take Aways - Pre-Conference Workshop on Public Sector Planning and Implementation

- There are proven and unproven technologies to choose from
- Developing a WTE/CT project is not for the faint of heart --- be prepared for a long process
- Public sector: sell the project; include a site
- Private: line up your financing early
- Elected officials on board early and often

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Take Aways - Pre –Conference Workshop... (cont'd)

- 2-step RFQ then RFP preferred procurement approach
- Understand risks, allocate them to shoulders that can bear the weight
- 11 cement kilns in California
- If you can do it in California, you can do it anywhere....if not go to Nevada!
- Private activity tax-exempt debt can offer attractive source of debt for solid waste assets

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DAY 1

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Take Aways (cont'd)

- Collection is 60+ % of solid waste management costs
- Collection efficiency creates additional funding for processing and disposal!

Category	Percentage
Collection-MSW	41%
Disposal	31%
Collection-Recyclables	20%
Recycling Processing	8%

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Post Source Separation - ZWLF Choices

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    graph TD
      MSW([MSW]) --> MWPM[Mixed Waste Processing]
      Organics1([Organics]) --> MWPM
      MWPM --> RPF(Refuse Processed Fuel)
      MWPM --> MFR[Materials For Recycling]
      MWPM --> Org2([Organics])
      RPF --> WTE[WTE Facility]
      WTE --> Steam([Steam])
      WTE --> Power([Power])
      WTE --> Res1([Residue])
      Res1 --> Landfill1[Landfill]
      Org2 --> FoodScraps([Food Scraps])
      FoodScraps --> WWTP[WWTP]
      FoodScraps --> Composting[Composting]
      FoodScraps --> AD[Anaerobic Digestion]
      WWTP --> SA([Soil Amendment])
      Composting --> SA
      AD --> SA
      AD --> Biogas([Biogas])
      Biogas --> Trucks[Trucks and/or gas grid]
      AD --> Res2([Residue])
      Res2 --> Landfill2[Landfill]
      ORB[Oil Refineries  
Dedicated RE-Boilers  
Paper Mills]
      Org2 --> ORB
  
```

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Take Aways – Main Conference

Good News....	Bad News....
<ul style="list-style-type: none">• Fulcrum adds customer and equity• Fiberright breaks ground• Gasification in California• CalRecycle permitting pathway for cement kilns• Enerkem developing more• PHG in Tennessee	<ul style="list-style-type: none">• Ineos for sale• IREP closed• Tees Valley project stalled• Landfill still cheap• Energy prices low

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Take Aways (cont'd)

- President-elect Trump with Republican dominated Senate and House will affect Washington policy and Supreme Court appointments
 - Interesting times ahead
 - “Let’s give this a chance”
- RFS Fuel Standard has Republican support
- Position projects as infrastructure and job creation


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Take Aways (cont'd)

- Education and advocacy is important
- RNG = biomethane from food waste, WWTPs, Farms and landfill gas
 - RNG worth a lot...now!
- Waste is a local matter
 - State policies more important than Fed
- Bring your project to LA County!




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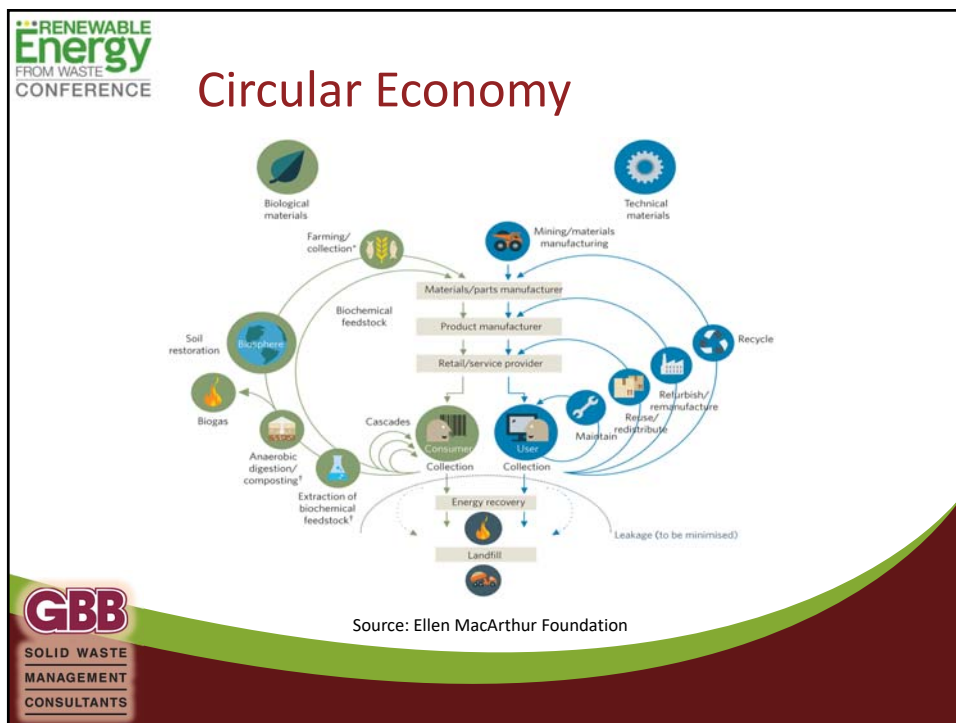
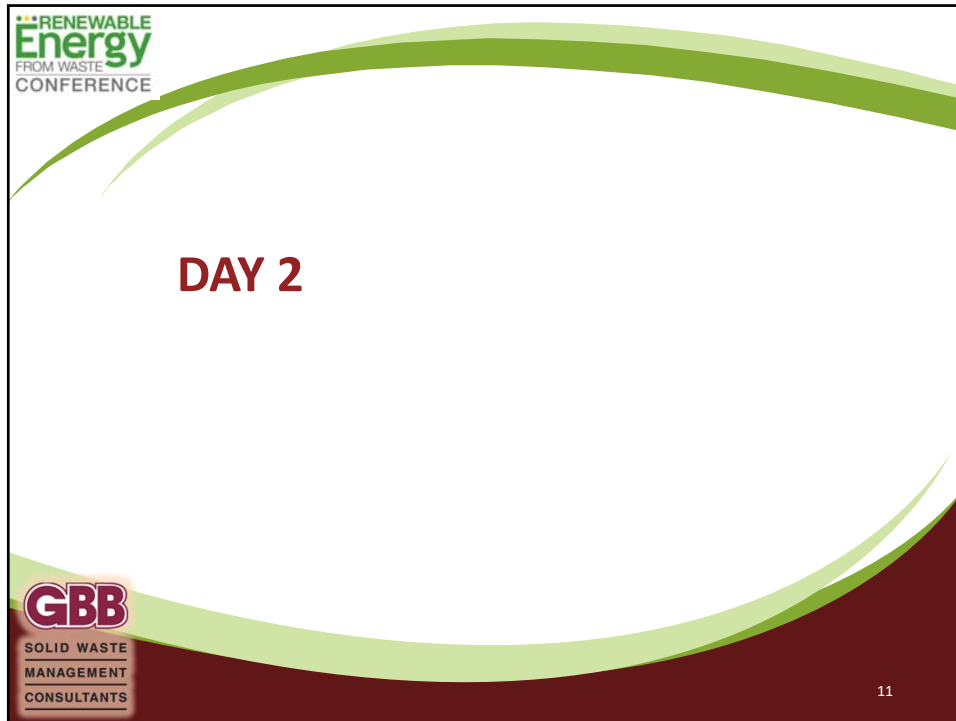



Take Aways (cont'd)

- Front-end processing is key in fuel production
- RePower South Chesapeake, VA for recyclables and high BTU engineered fuel
- Wasatch -- preprocessing at WTE creates big savings! – better combustion, lower fuel bills
- Growing interest in source separated organics (SSOs)
 - Co-collection in blue bags in Minnesota
- Sophisticated MBT processing in Europe - Bulgaria




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Take Aways (cont'd)

- Plastics are recyclable and have very high fuel value...so, why are we burying them?
- New 2014 EPA SMM Report
 - Energy recovery separated from combustion
- Smithfield Food taking big steps to bring sustainable bacon home!
- Cement kilns for EF and bottom ash
- Low prices for energy creates focus on materials and not on energy recovery




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Take Aways (cont'd)

- Public Private Partnerships
 - Share the risks and share the rewards
- PHG in Tennessee - partnership with the city, PHG and Rockwood (feedstock prep)
- Enerkem is transporting methanol in Edmonton, developing projects in Montreal, Rotterdam and Minneapolis
- Fiberight – broke ground in Maine
- Tax exempt financing lowers the cost of capital




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Take Aways (cont'd)

- AD for biogas can be produced in a number of different ways....that work!
- Companies are closing the loop fueling fleets with RNG and power production
 - Power needs to be used on site, not exported for sale
- Incentives are big – will they stay?
 - Low Carbon Fuel Standard – CA
 - RINS




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Take Aways (cont'd)

- Sourcing high BOD wastes away from WWTP to AD provides significant benefits
- Organics from MSW is the toughest to AD
 - Offers largest opportunity for diversion
 - Produce recyclables and clean compost
 - OWS: “It can be done!”
- For more in New England, public sector needs to get organized as consortiums



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CR&R Anaerobic Digestion Facility Perris, CA



- \$100 million facility
 - Eisenmann technology
 - 84,000 TPY first phase
 - 334,000 TPY when all built
 - High solids anaerobic digestion system
 - Feedstock includes food scraps and yard waste
 - Generating RNG for its truck fleet and sell to pipeline

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WASTE IS A RESOURCE

*If its not recyclable, and its not for
AD/composting....It's fuel!*

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See you at REW 2017
in Ft. Myers, FL!

Thank you!

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