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“Redefining Waste”

NERC
NORTHEAST RECYCLING COUNCIL

APRIL 7 – 8, 2015 » WILMINGTON, DELAWARE

Infinitus Energy

and the IREP Team of Professionals

extend a warm welcome to the attendees of the

NERC's Spring 2015 Conference

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“Dirty MRF” = Mixed Waste Processing

- Mixed waste processing (MWP) is a modern, integrated waste processing and recovery system
- Un-segregated mixed waste is processed using mechanical technologies to separate mixed recyclable materials from other waste

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History of MWP

- Dirty MRFs processed primarily commercial dry waste
  - i.e. Just chasing fiber (OCC and paper)
- Floor sorting at transfer stations: areas with high tip fees or lucrative paper markets – Or Both!
- Worked best when input came from homogenous sources like office complexes or retail

Photo credit: Bobcat

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History of MWP

Early Dirty MRFs:

- Low, inconsistent recovery rates
- Contamination issues
- Presented health and safety concerns
- Essentially manual and semi-automated floor sorting of garbage

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Why Mixed Waste Processing?

- State and local legislation driving higher diversion rates – 60% > 75% > 80% > *Zero?*
- Access to more materials – "Close The Loop"
- Improvement in sorting technologies
- Shifting operating costs
  - From the Curb to Controlled Environment?
- Convenience?
  - *"Or are we just lazy?"*

Examples of successful MWP facilities now exist

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Why Mixed Waste Processing?

- Communities are responsible for 100% of the waste stream, not just the valuable materials
- Voluntary source-separation collection programs can have low participation rates and depend on heavy education & outreach efforts
- Mandatory recycling programs may not be politically feasible

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Why Mixed Waste Processing?

- Single stream programs have increased voluntary recycling rates significantly; commercial lagging
- But, give folks a single cart/container and you are guaranteed a 100% participation rate

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Advances in Technology

"Technological advances in the processing equipment have just begun…Hand-picking materials is the equivalent of digging ditches without bulldozers."

October 1998 *Recycling Today* article

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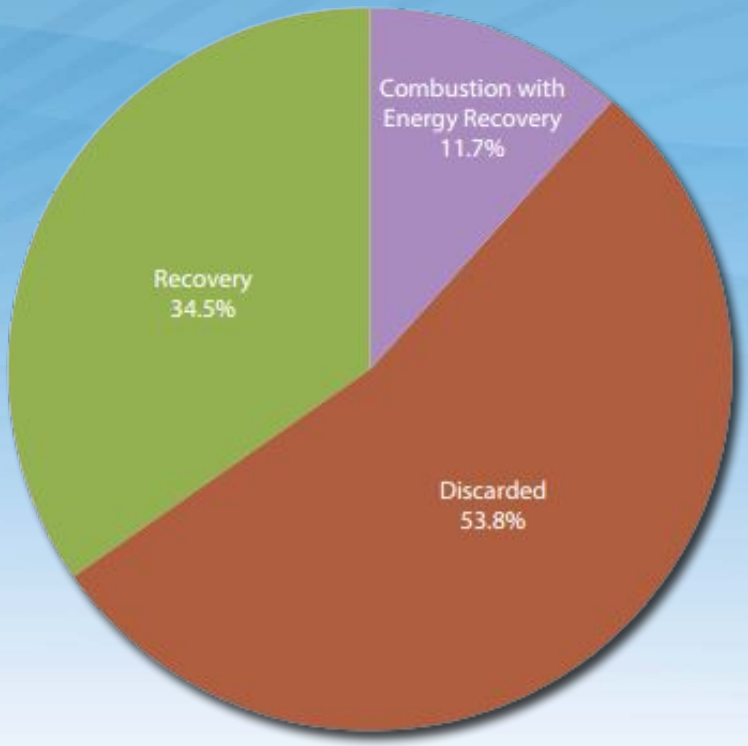
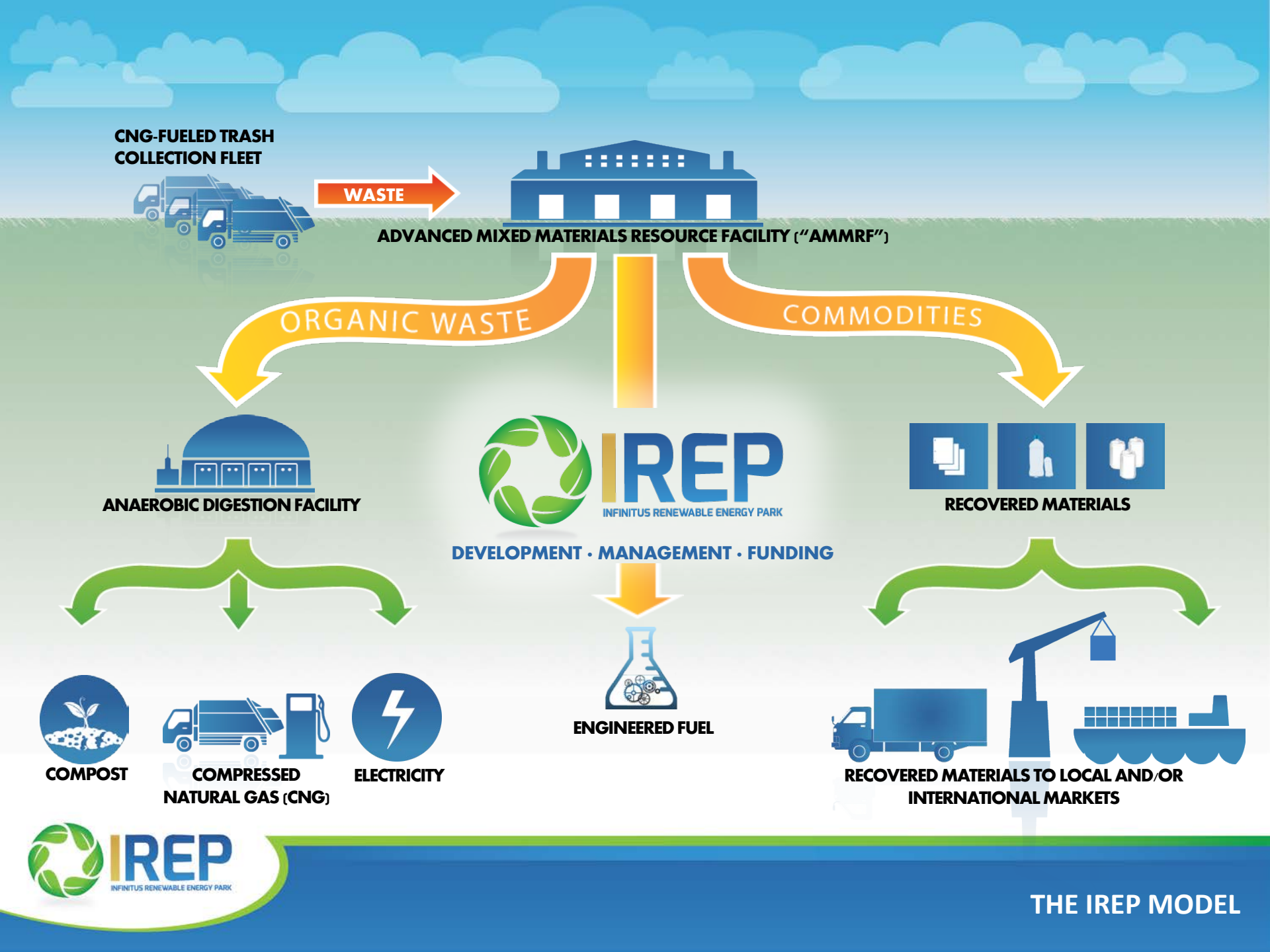
MSW Market Opportunity

Only 34.5% of MSW Generated is recycled



A majority of the reusable resources in U.S. MSW remain untapped

Management of MSW in the United States, 2012 (per USEPA)


CNG-FUELED TRASH COLLECTION FLEET
WASTE
ADVANCED MIXED MATERIALS RESOURCE FACILITY ("AMMRF")
ORGANIC WASTE
COMMODITIES
ANAEROBIC DIGESTION FACILITY
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RECOVERED MATERIALS
DEVELOPMENT · MANAGEMENT · FUNDING
COMPOST
COMPRESSED NATURAL GAS (CNG)
ELECTRICITY
ENGINEERED FUEL
RECOVERED MATERIALS TO LOCAL AND/OR INTERNATIONAL MARKETS
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THE IREP MODEL

GRAND OPENING – APRIL 14, 2014

CNG-FUELED TRASH COLLECTION FLEET

WASTE

ADVANCED MIXED MATERIALS RESOURCE FACILITY ("AMMRF")

COMPLETED PHASE I

ANAEROBIC DIGESTIO

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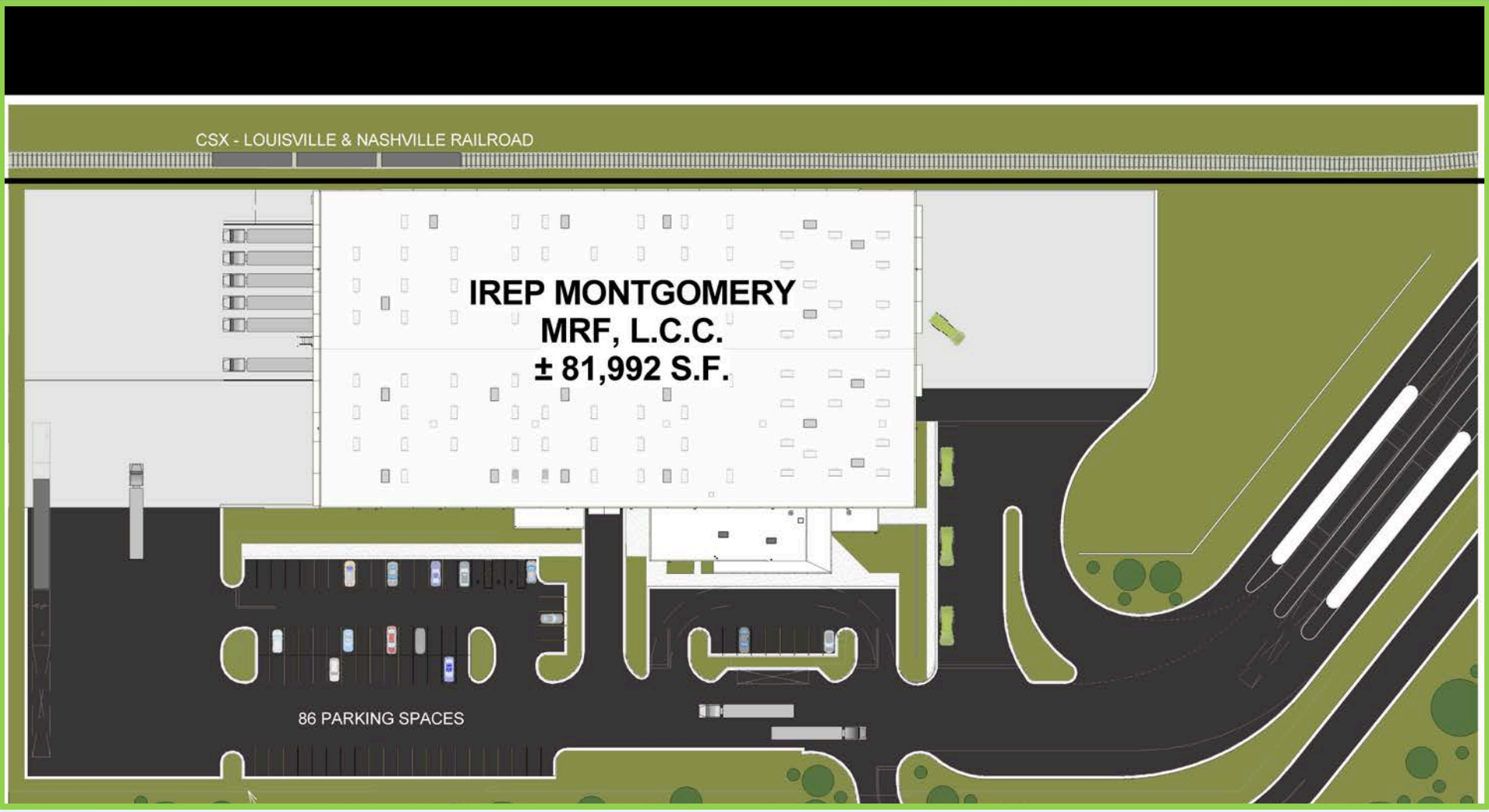

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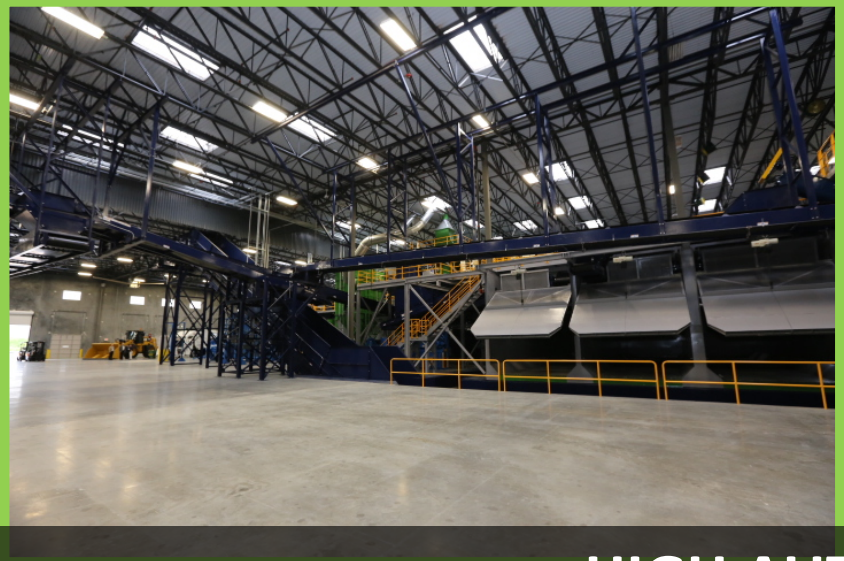
MRF SITE PLAN



HIGH AUTOMATION

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MONTGOMERY, ALABAMA

Acceptance Test

- Conducted by CDG Environmental Engineers selected by the City of Montgomery
- Performed May 5-9, 2014
- Confirmed processing rate of 32.36 tons per hour
- Confirmed overall waste diversion above 60%
- Confirmed recovery rates of:
  - Plastics: 96%
  - Mixed Paper: 95%
  - OCC: 97%
  - Tin/Steel: 94%
  - Aluminum Cans: 90%

Montgomery, Alabama

Before MRF

- ✓ Failed orange bag recycling program due to lack of participation

After MRF

- ✓ 100% participation

- ✓ 100% to landfill
- ✓ 60% overall waste stream recovery, City-wide

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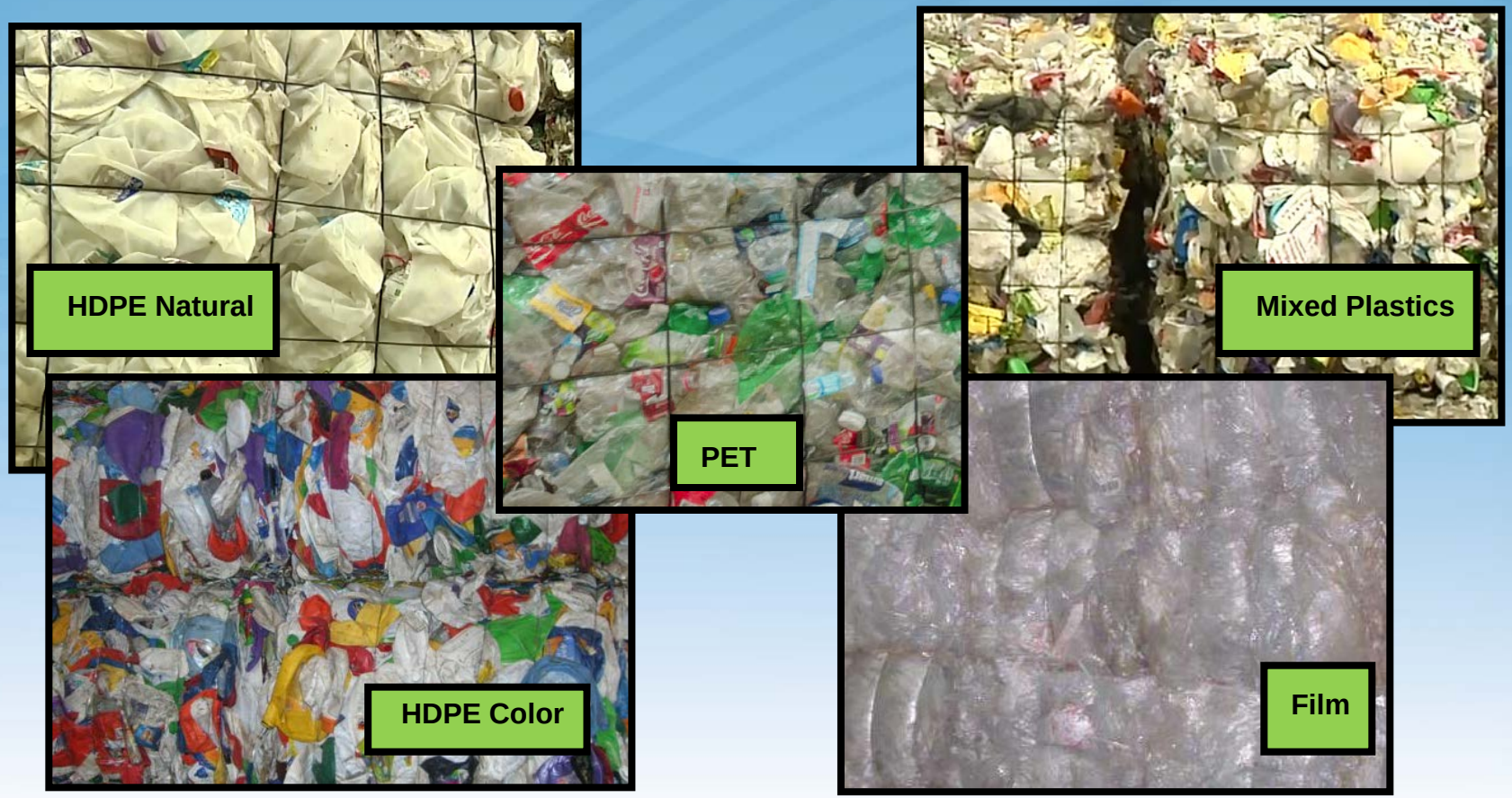
RECYCLABLES – Recovered Fiber

(Actual IREP@Montgomery Photos)

RECYCLABLES – Recovered Plastics

(Actual IREP@Montgomery Photos)

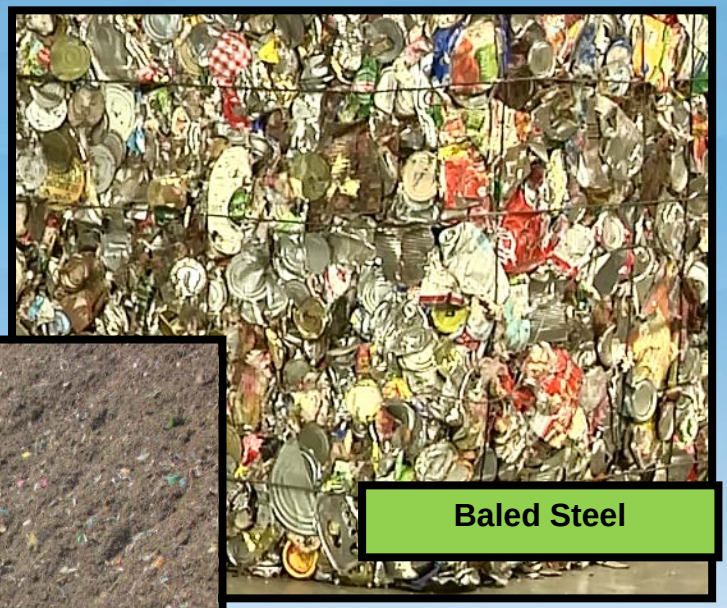


"We find no statistical difference in the IREP material as compared to single stream material."

-KM Plastics, Buyer

RECYCLABLES – Recovered Metals/Other

(Actual IREP@Montgomery Photos)



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Participation Rate vs. Efficiency

National Recovery Rate:	**10-34.5%***	
(Montgomery 2012 – 1%)		
IREP Landfill Diversion Rates		
Raw Material Fraction:	**30-40%**	**(current phase)**
(Traditional Recyclable Material)		
Organic Fraction:	**20-30%**	**(future phase)**
(Utilized in AD and Compost)		
Engineered Fuels	**10-15%**	**(future phase)**
(Fiber and Polymer Residue)		
Total IREP Landfill Diversion:	**60-85%**	
AVERAGE:	**75%**	

**Management of MSW in the United States, 2012 (per USEPA)*

AMMRF System Advantages

- Bale quality from our AMMRF technology allows us to compete in high quality markets including China
- New technology for Montgomery sends PET with liquids in the bottle to the PET bin
- Fiber (mixed paper/OCC) quality very important during lower demand months such as summer, including no glass in bales
- Aluminum recovery rates are currently 95+%

IREP@Montgomery Benefits

(at full implementation of model)

- Environmental and Operational Impacts
  - Up to 85% reduction in material to landfill (at system optimization)
  - 95% of organic fraction from MSW diverted to AD system to produce CNG
  - City will operate one of the Country's first carbon negative collection fleets
- Financial Impacts
  - Up to $1.6 M annual savings in landfill operations
  - Projected $2.2 M net annual reduction in collection fleet operating costs
- No capital investment required by the City
  - No capital investment from the City- 100% Private Investment
  - No risk to the City- no funds expended until project systems are delivered
    - Municipal obligation for tipping fee payment upon delivery of the facility
  - Recovery rates and system performance guarantees in Contract

CHALLENGES

Operating Challenges

- Lack of cardboard in the waste stream (scavenging)
- Mixed waste processing requires aggressive training and labor transitions
- No labor pool for mixed waste processing even at the managerial level
- Changing the mindset of personnel trained in similar environments with other waste companies to understand we are a manufacturing company and process
- City and Private Organization must become a partnership and not adversarial

Industry Challenges

- Opposition from both the paper and metals industry
- Misinformation in the marketplace
- Backlash from the recycling industry and political organizations to maintain source separation ("We are teaching our kids to NOT recycle")

THANK YOU

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