

# Metalkraft AS

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**METALLKRAFT**

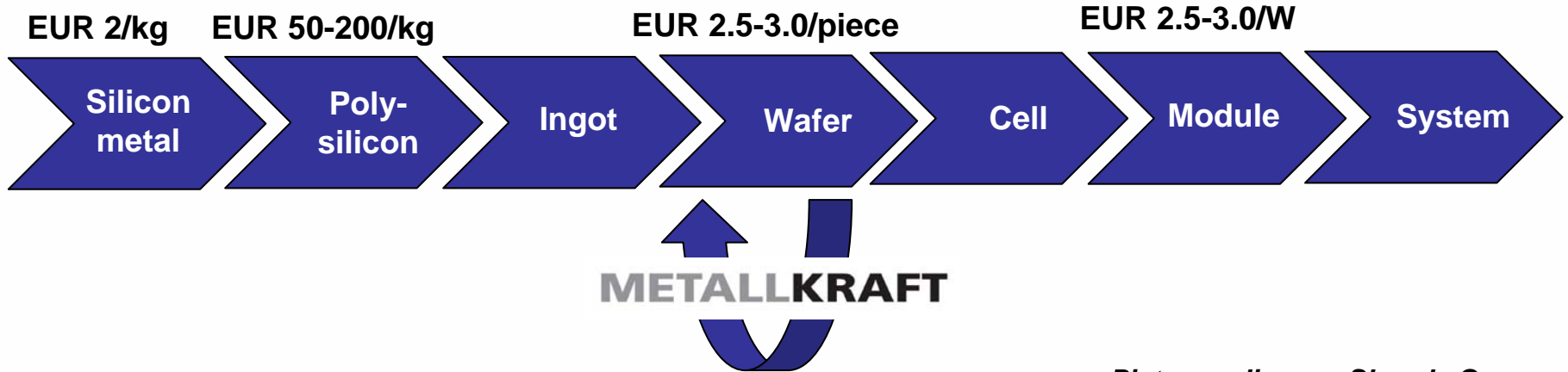
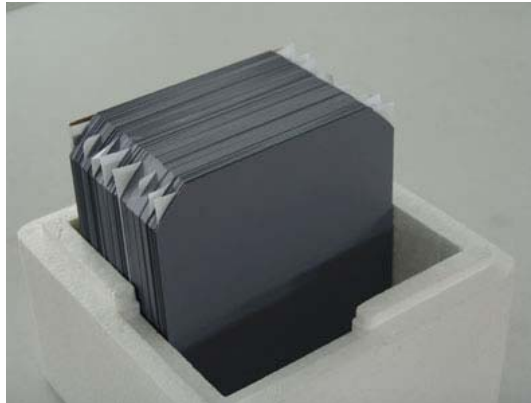
Advanced SiC/PEG  
slurry recovery



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# Solar PV Value Chain

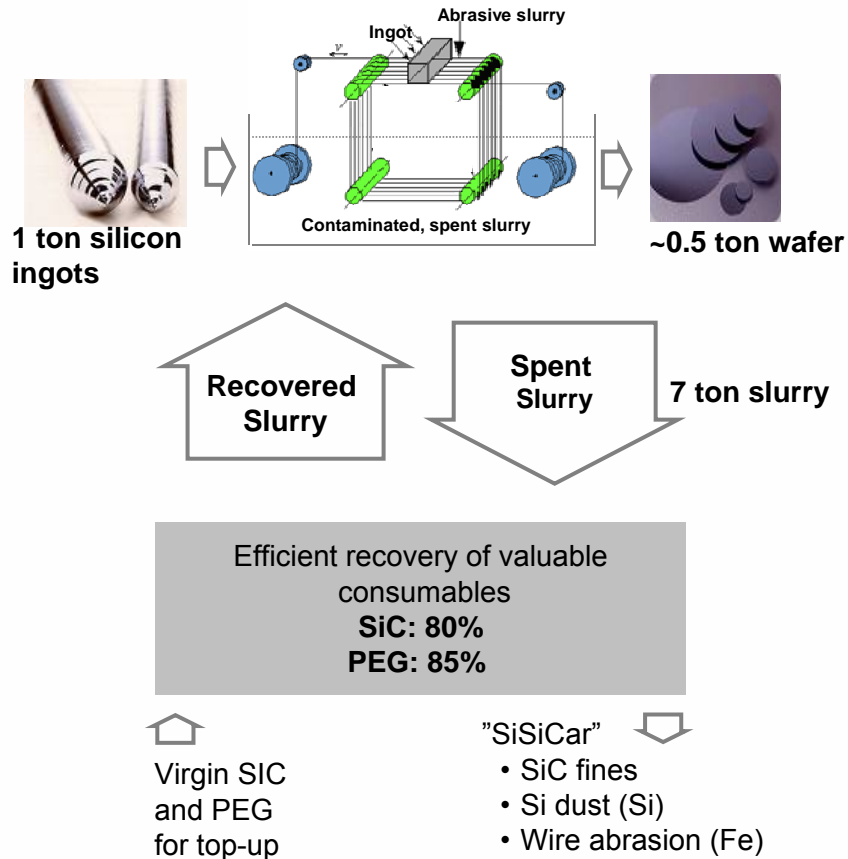


*Pictures: Jiangsu Shunda Group*

- **Patented process technology that fully recycles the spent slurry from silicon wafer slicing**
- **Two current and fully financed plants**
  - **Yangzhou, China – contract with solar wafer manufacturer Shunda**
  - **Kristiansand, Norway – contract with NorSun**
- **Contract with Renewable Energy Corporation (“REC”) for a new plant in Singapore confirms industrial capability**
- **Financing in place, including for commitments in Singapore**
- **Unprecedented potential from solar grade silicon recovery as this has not yet been achieved by the industry**

# Uniquely Positioned to Grow with Customers

## Slurry recycling process

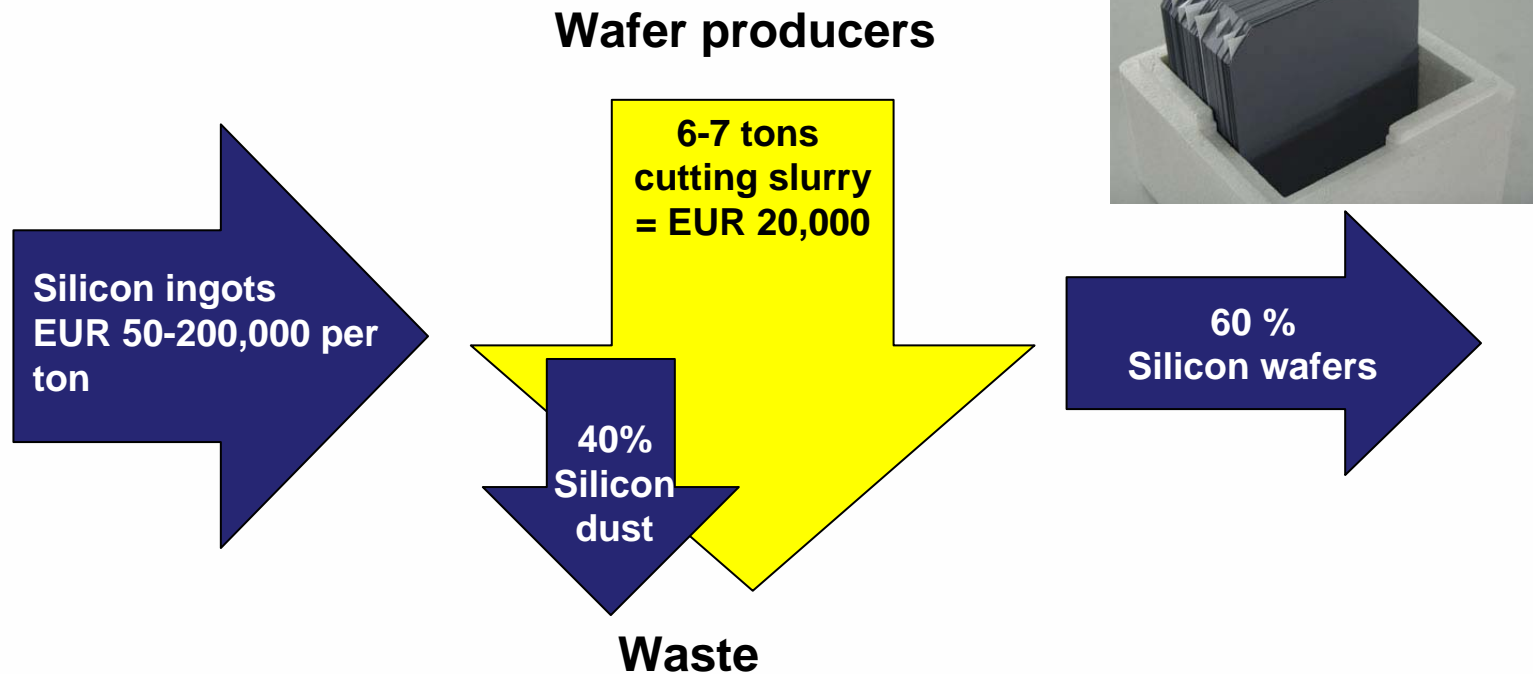


## Efficient recycling process

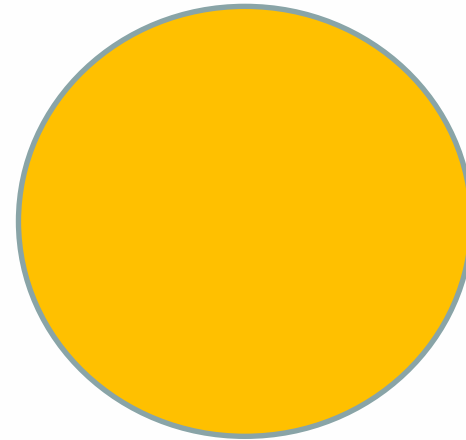
- High recovery rates, low energy consumption
- Environmentally friendly, closed loop process
- Competitive investment and operating costs
- Adaptable to new slurry specifications (e.g. F800)

## Environment

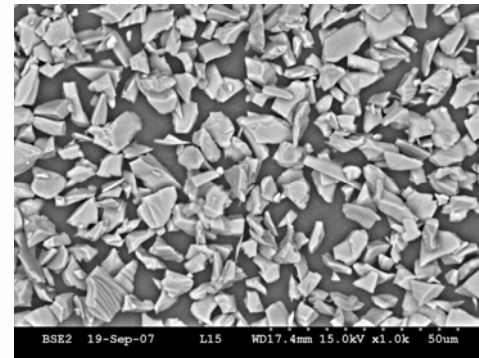
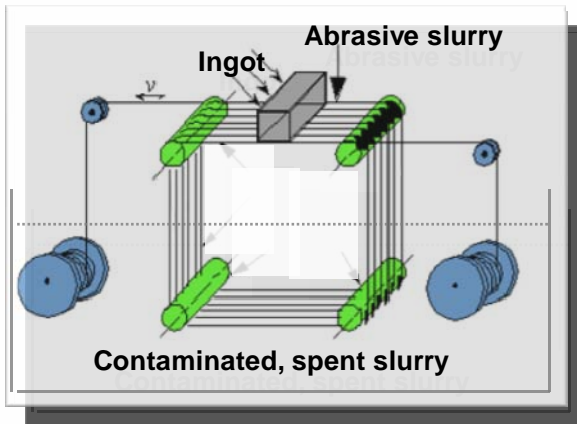
- Solar energy is a renewable energy source
- Solar energy has strong environmental credentials
- But, there are raw material inefficiencies



# The Wafer Cutting Process



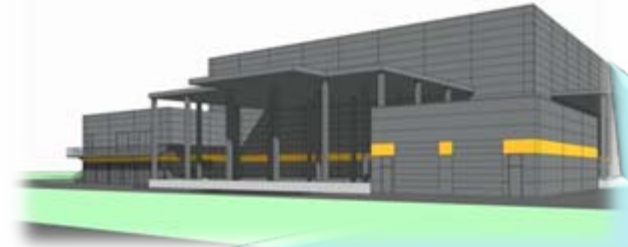
Human hair  $\approx 45 \mu\text{m}$



SiC F800  $\approx 6.5 \mu\text{m} \pm 1 \mu\text{m}$



# Metalkraft Expansion



## Singapore

20,000mt May 2010

40,000mt September 2010

Max. capacity 40,000mt

Customer: REC

## Yangzhou

20,000mt March 2009

Max. capacity 80,000mt

Customer: Shunda

## Kristiansand

6,000mt November 2008

Max. capacity 12,500 mt

Customer: NorSun

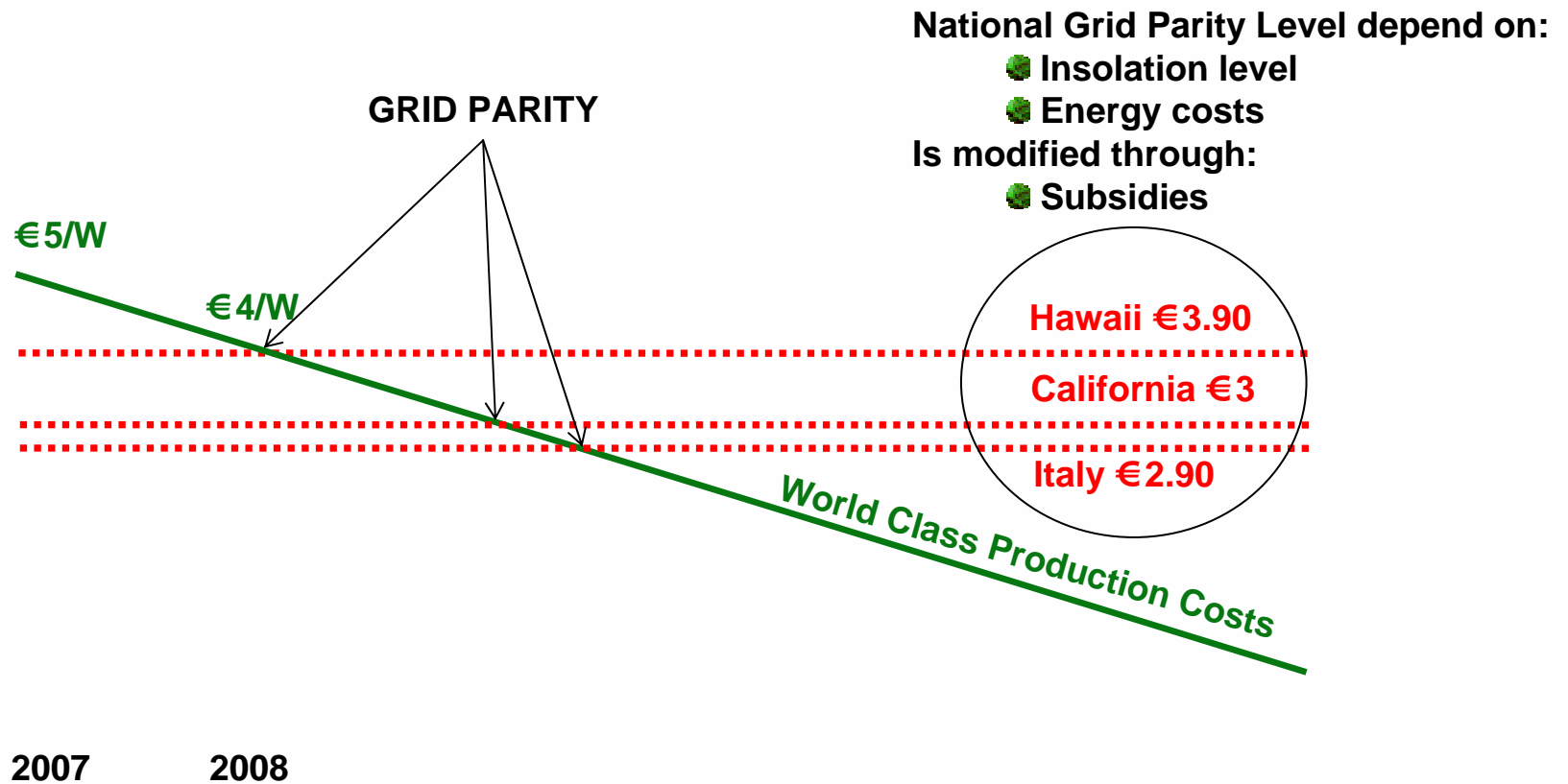




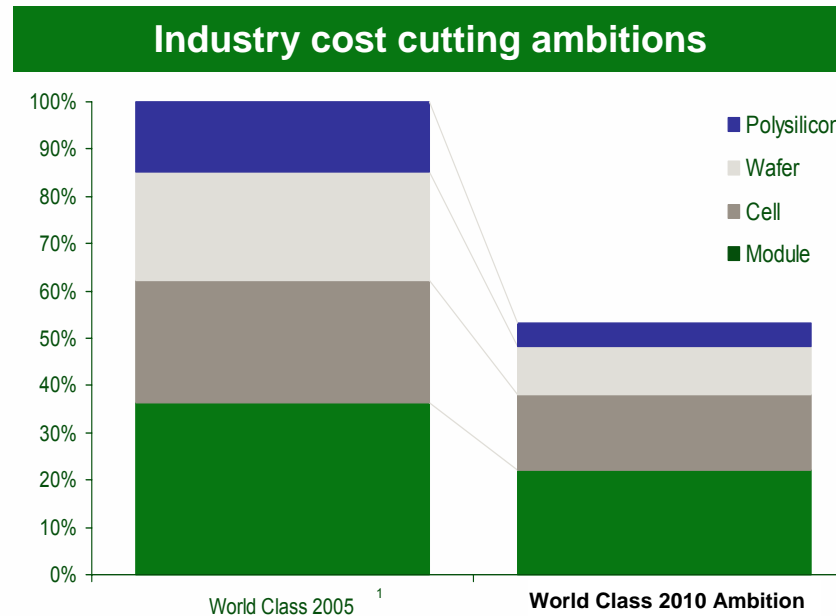
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# Main Market Drivers



# Recycling Valuable SiC and PEG to Reduce Solar Power Costs



## Recycling is key enabler in solar cost race

- Industry aims to halve costs 2005 – 2010
- Slurry costs represent ~35% of total wafer cost

# Metalkraft Cost Cutting Contribution

## Costs of 1 ton new slurry



## Costs of 1 ton recycled slurry

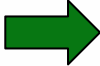


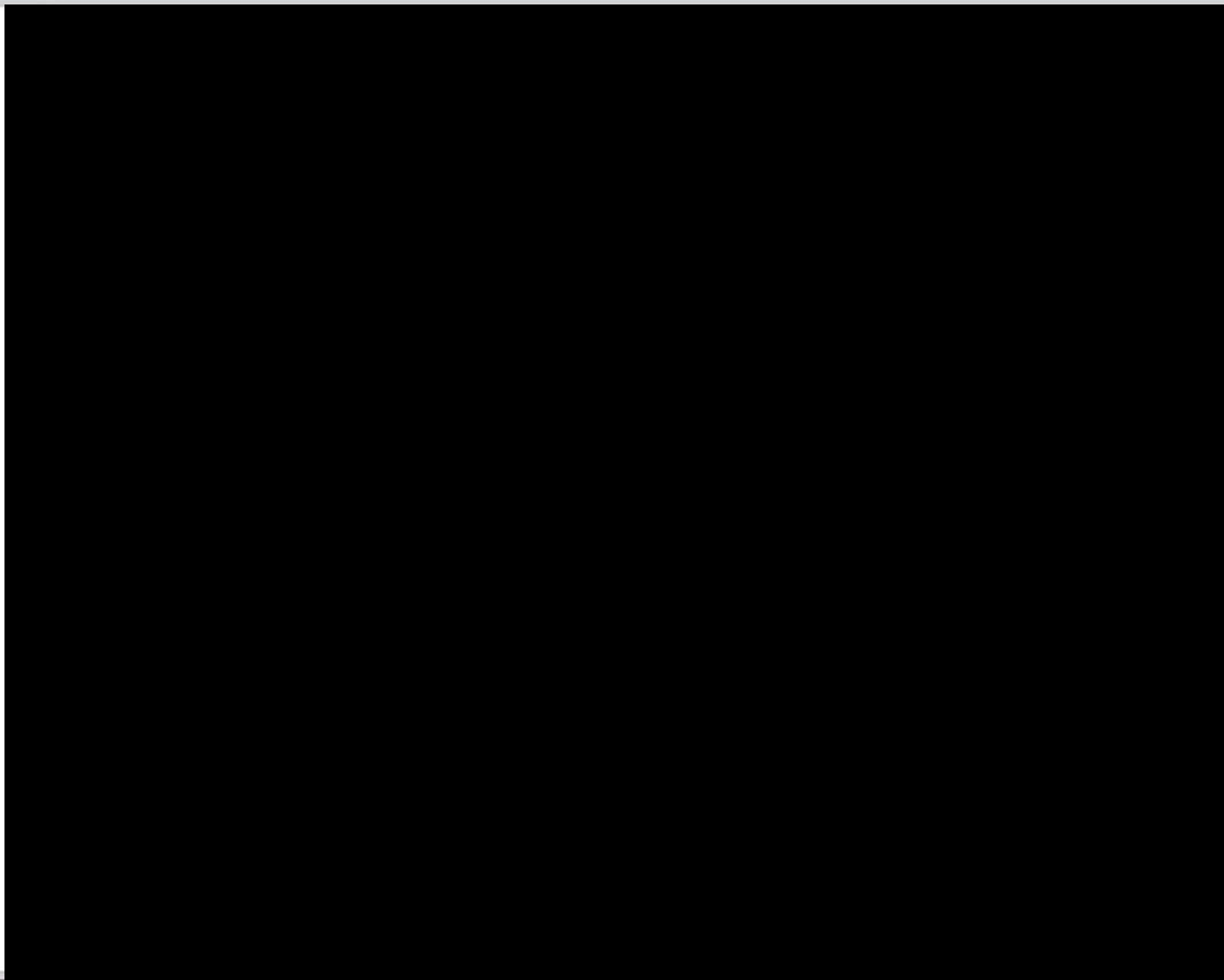
+  
no disposal  
costs

+  
environmental  
benefits



## Current Market Drivers

- Increased emphasis on renewable energy for environmental, diversification and security reasons
    - **EU strongly committed to generous feed-in tariffs**
    - **Changed US administration results in massive emphasis on renewable energy**
    - **Growing Chinese consumption**
    - **Future emphasis on carbon footprint in trade and tariffs**
  - Turbulence in financial markets also affecting solar PV
    - **Revaluation of companies**
    - **Inventory clean-up started in 4Q2008**
    - **Shake-out of financially weaker companies**
    - **Increased professionalization of increasingly competitive industry**
-  **Rapidly growing market (30-40%)**  
**Proper recycling operations demanded for environmental and financial reasons**



# Thank you!

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