Processing Advancements Within Reach for Achieving Significant Reductions in Carbon Fiber Cost of Manufacturing

JEC Europe 2013, Paris
ICS Carbon Conference
Agenda

- Introductions
- Historic Advancements of Scale & Integration
- A Different Approach: Rethinking Unit Operations
  - Reducing Environmental Losses
  - Reducing Purge Barriers
  - Reconfiguration
- Achievable Targets for the Future
Introduction: About Harper
About Harper

Core Skills:

 Scale up of New or Challenging Processes
  – 200°C – 3000°C
  – Atmospherically Controlled
  – Continuous Processing
 Construction Techniques in Metallic > Ceramic > Graphitic
 Integrated Systems Design – Plant Supply
 Complex Flows of Advanced Materials
 Precise Control of Gas - Solid Interactions
About Harper
Advanced Thermal Systems for Fiber Processing

- PAN based C-fiber
- Pitch based C-fiber
- Rayon based C-fiber
- Alternative Precursor Development
- Carbon Nano Tubes / Fibers
- Carbon Fiber Recycling

A Broad Experience Base in a Range of Carbon Processes
About Harper
Services to the Carbon Fiber Market

- **Equipment Supply (~40 Years)**
  - LT Furnaces, HT Furnaces and UHT Furnaces
  - Atmospherically Controlled Oxidation Ovens
  - Surface Treatment & Drying
  - Material Mass Transport & Waste Gas Treatment

- **Complete System Supply (~15 Years; >10 contracts)**
  - Systems Integration and Energy Recovery

- Feasibility Studies & Modeling
- Retrofits, Revamps & Upgrades
- Business Development & Consulting
- Training & Optimizations
Historic Advancements of Scale and Integration
Diminishing Returns on Economies of Scale: Carbon Fiber Conversion Process

- Complexity and Cost added through Waste Gas Treatment
- Significant Opportunity for Energy Recovery and Cost Reduction; through further Flowsheet sophistication

Capacity Expansion 2011 - 2012 Based on Faster Line Velocities; Higher Production Rates from 3m Single Muffle

- Modern Line Speeds
  At 10m/min – 20 m/min for a state of the art line

- Oxidation Oven Capacities
  More Than 500 – 800 kg/hr feed of PAN
  More than 500 m – 1000m Overall Heated Length
  4 Zones Minimum; Typically 6 – 8 Zones
  3m wide designs are the prevalent state of the art design
  Unsupported Heated Lengths typically less than 15m

- LT and HT Furnaces Understand Your Process and the Impact of Technical Specifications
  3m wide designs wide are prevalent state of the art design
  Unsupported Heated Lengths 15 m – 20m
  HT Temperatures Regimes <1450C, 1600C, and 1800C or greater
Assumptions:
- $10 USD / kg of CF for Precursor
- Production of 12k Carbon Fiber
- 6mm Spacing Per Tow
- 90 Minutes Retention in Ovens
- 90 Seconds Retention in LT Furnace
- 90 Seconds Retention in HT Furnace
- Calculated at Approx. 80% Availability
  (Actual Operating Facility likely closer to 60% - 70% Availability)

Cost Dynamics as a Function of Scale-Up

Economies of Scale
Cost Structure Per Unit Operations

Energy Input for Production
3000 TPY, 3000mm Wide
90 Min. Ovens, 90 Sec. LT, 90 Sec. HT
Total Operating Input Approximately 8,250 kW (20 kW / kg)

- Creel: 0.3%
- PreTreatment: 0.1%
- Ovens: 17.1%
- LT Furnace: 5.9%
- HT Furnace: 13.7%
- Electrolysis, Washing, Wash Dryer: 8.5%
- Sizing and Sizing Dryer: 8.9%
- Waste Gas Abatement - Ovens: 37.0%
- Waste Gas Abatement - Furnaces: 5.1%
- Winders: 0.8%
- Tension Stands: 2.5%
- Creel: 0.3%
- PreTreatment: 0.1%

Total Conversion Process Cost: ~45 MM USD
Capital Depreciation of $2.14 USD / kg (with 7 yrs S.L.D.)
Exclusive of Facility, Utilities, Installation
Challenges to Growth in Carbon Fiber Operations

1. Diminishing Returns on Economies of Scale
2. The Carbon Fiber Footprint
3. Investment in Technology Advancements
4. Supply Chain Risks
5. Optimizing the Project Development Timeline
Diminishing Returns on Economies of Scale

Cummulative Cost of Manufacturing Carbon Fiber

Assumptions:
- $10 USD / kg of CF for Precursor
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Cost Dynamics as a Function of Scale-Up

Asymptote Indicative of Diminishing Returns
CO2 Emissions Variation by Scale and Integration

Within a Given Production Rate, larger CO2 footprint comes from Smaller Line Sizes and Less Sophisticated Off Gas Treatment

Sample Data from harperbeacon.com
Challenges to Capturing Growth: The Carbon Fiber Footprint

Primary Results from Sample Evaluation:

<table>
<thead>
<tr>
<th></th>
<th>Production Rates:</th>
<th>Line Sizes:</th>
<th>CO2 Emissions*:</th>
<th>Theoretical CO2*:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500 – 2250 TPY</td>
<td>1750 &amp; 3000 mm Wide</td>
<td>23.4 – 9.7 kg CO2 Per kg CF</td>
<td>2.7 (average) kg CO2 Per kg CF</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(*Energy to Produce Purge Gas Ignored)</td>
<td></td>
</tr>
<tr>
<td>CAPEX</td>
<td>$2.17 – $4.55 USD / kg of CF</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>OPEX</td>
<td>$6.27 – $14.58 USD Per kg CF</td>
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<td></td>
</tr>
</tbody>
</table>

- A CO2 Foot Print that is 3x – 9x the theoretical value leaves much room for improvement and optimization.
- The practical consequence of a lower CO2 footprint will be reduced operating costs (per kg of CF)

Sample Data from harperbeacon.com
State of the Art - Dynamics

• Larger capital expense for larger capacity lines
  (Of Course)

• But, Higher Capacity Lines achieve lower energy requirements (lower OPEX). Production requires less kilowatts per kg/hr of produced carbon fiber

Large Capital Investment is Offset by Lower Operating Cost Over Payback over time, 3 year – 7 year Return On Investment (ROI).

Courtesy Of: Oak Ridge National Laboratory Carbon Fiber Technology Center
Oxidation Oven Power Requirements

Oxidation Oven Heat Balance is driven by:

1. Exhaust Losses – Hot Air Leaving the Oven at Temperature, Replaced by Cold Air Flowing Into Oven Zone
2. Mechanical Energy (Mixing of Atmosphere, Fans)
3. End Losses (Heater Flowing Out of Furnace with Material Cooling at Turnaround Rolls) Air Seal Losses
4. Wall Losses – Heat Flowing Through the Insulated Walls
Oxidation Oven Power Utilization

Oven Power Consumption (kW)

- Turnaround Loss, 253, 7%
- Mechanical Energy, 969, 25%
- Wall Loss, 356, 9%
- Exhaust, 2127, 55%
- End Loss, 138, 4%

Assumptions:
- 1500 TPY Production
- 12k Carbon Fiber
- 6mm Spacing Per Tow
- 90 Minutes Retention in Ovens
- Oven Operating with Minimum to Moderate Heat Recovery from Waste Gas
Oxidation Oven Power by Scale

**Power Ox Ovens**

kwhr Per kg CF

- **1750mm Wide Oven Set**
- **3000mm Wide Oven Set**

**Capacity (TPY)**

- 400
- 600
- 800
- 1000
- 1200
- 1400
- 1600
- 1800

**Power (1750mm Wide Oven Set)**

**Power (3000mm Wide Oven Set)**
LT & HT Furnace Power Requirements

Furnace Heat Balances are driven by:

1. Material Load (Heating of Fiber and Zone by Zone to Temperature – Much Greater Than Just the Sensible Heat of Carbon Fiber)

2. Energy Being Carried Out: by Exhaust Vent, by Vent Conduction, by Purging of Shell and by Purging of Process Atmosphere


4. Wall Losses – Heat Flowing Through the Insulated Walls

5. Conduction of Energy through Muffle and Elements

6. Cooling Water Losses
LT Furnace Power Utilization

Assumptions:

- 1500 TPY Production
- 12k Carbon Fiber
- 6mm Spacing Per Tow
- 90 Seconds Retention in LT
LT Furnace Power by Scale

Power LT Furnace
kWhr Per kg CF

- 1750mm Wide LT
- 3000mm Wide LT

Capacity (TPY)

- Power (1750mm Wide LT)
- Power (3000mm Wide LT)
HT Furnace Power Utilization

Furnace Power Consumption (kW)

- Vent Conduction, 19, 2%
- Vent Radiation, 7, 1%
- Throat Radiation (NET), 61, 7%
- Muffle Conduction (NET), 40, 5%
- Terminal Conduction, 101, 12%
- Process Atmosphere, 61, 7%
- Furnace Atmosphere, 74.1, 9%
- Sight Port Radiation, 4, 0%
- Wall Losses, 292, 33%
- Product Load, 211, 24%

Assumptions:
- 1500 TPY Production
- 12k Carbon Fiber
- 6mm Spacing Per Tow
- 90 Seconds Retention in HT
- 1800C Design of r HT
HT Furnace Power by Scale

Power HT Furnace
kwhr Per kg CF

Capacity (TPY)

1750mm Wide hT
3000mm Wide HT

11.500
11.000
10.500
10.000
9.500
9.000
8.500
8.000
7.500
7.000
6.500
6.000
5.500
5.000
4.500
4.000
3.500
3.000
2.500
2.000
1.500
1.000
0.500
0.000

8.000
8.500
9.000
9.500
10.000
10.500
11.000
11.500
12.000

400 600 800 1000 1200 1400 1600 1800

Power (1750mm Wide hT)
Power (3000mm Wide HT)
Different Approach: Rethinking Unit Operations
Efficiency Advances – Within Reach

- Don’t Try to Reinvent the Process – Optimize Existing Unit Operations
  Minimize the Timeline for Technology Development and Deployment

- Assess and Minimize Environmental Losses
  - Improved Insulation Profiles
  - Minimize Surface Area and Wall Losses
  - Minimize Exhaust Losses
Rethinking Oxidation Oven Advancements

• Use of Hot Make Up Air at Ovens – Recovered Energy from TOX (Of Course)

• Measurement of Atmospheric Concentration per Zone -- Allows for Higher Concentrations of Waste Gases within Oven and Reduction of Total Exhaust Flow From Oven – Can results in 50% or Greater Reduction in Exhaust Air From Oven

  Process Control Technique Exclusive to Harper International Oven Systems – Only Capable with Advanced Sealing

• Measurement of Total Air Room Air Ingress at Slots through the use of Flow Meters to measure Exhaust and Makeup air (Room Air Ingress at Slots is a result by Difference)

  Process Control Technique Exclusive to Harper International Oven Systems
# Oven Advancements

<table>
<thead>
<tr>
<th></th>
<th>Traditional Line</th>
<th>Oven Improvements</th>
<th>Additional Insulation in Ovens</th>
<th>All Advancements, Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>TPY</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Operating Hours Per Year</td>
<td>Hrs</td>
<td>7200</td>
<td>7200</td>
<td>7200</td>
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<tr>
<td>Oven Operating Power</td>
<td></td>
<td>3843.0</td>
<td>2682.6</td>
<td>2604.6</td>
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<tr>
<td>Recirculation</td>
<td>kW-hr</td>
<td>969.0</td>
<td>872.1</td>
<td>872.1</td>
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<tr>
<td>Exhaust</td>
<td>kW-hr</td>
<td>2127.0</td>
<td>1063.5</td>
<td>1063.5</td>
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<tr>
<td>Wall Losses</td>
<td>kW-hr</td>
<td>494.0</td>
<td>416.0</td>
<td>416.0</td>
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<tr>
<td>Sensible Heat of Fiber</td>
<td>kW-hr</td>
<td>253.0</td>
<td>253.0</td>
<td>253.0</td>
</tr>
</tbody>
</table>
Viable LT / HT Furnace Advancements

Three Primary Advancements to Yield Energy Reduction (In Order of Increase Developmental Risk)

1. Increase Insulation in HT to Reduce Thermal Losses; Reduction of Cooling Water at HT; Reduction of Terminal Losses (Low / No Risk)

2. Use of an Interconnect Chamber --between LT and HT Furnaces; reduces Losses and Reduced N2 Usage; Further Reduces Number of Vent Lines and Vent Line Losses; (Moderate Risk)

3. Use of Fold Over Design to Reduce Wall (Roof to Floor) Losses between the LT and HT and / or allow power sharing from HT to LT (Equipment Development Risk – ‘Ergonomics’)

Effectively, Furnaces are Leaky Boxes Losing Energy Through:

- Wall Losses (Controlled by Insulation Profile)
- Slot Losses (Controlled by Purge Chamber Design)
- Exhaust Losses (Carried Away with Gases)
Rethinking LT HT Furnace Power Utilization

**Total Surface Area** = (X m²)

**Reduced Surface Area** ~ (70%X m²)

With reduction of Purge Chambers Losses
## LT / HT Furnace Advancements

<table>
<thead>
<tr>
<th>LT Furnace</th>
<th>Slot Width</th>
<th>mm</th>
<th>300</th>
<th>1750</th>
<th>3000</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Shell Width</td>
<td>mm</td>
<td>700</td>
<td>2150</td>
<td>3500</td>
</tr>
<tr>
<td></td>
<td>Shell Length</td>
<td>mm</td>
<td>4465</td>
<td>9700</td>
<td>15200</td>
</tr>
<tr>
<td></td>
<td>Shell Height</td>
<td>mm</td>
<td>1160</td>
<td>1370</td>
<td>1420</td>
</tr>
<tr>
<td>HT Furnace</td>
<td>Slot Width</td>
<td>mm</td>
<td>700</td>
<td>2150</td>
<td>3500</td>
</tr>
<tr>
<td></td>
<td>Shell Width</td>
<td>mm</td>
<td>4465</td>
<td>9700</td>
<td>15200</td>
</tr>
<tr>
<td></td>
<td>Shell Height</td>
<td>mm</td>
<td>1220</td>
<td>1370</td>
<td>1520</td>
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<tr>
<td>Surface Area LT</td>
<td>m2</td>
<td>18.2</td>
<td>74.2</td>
<td>159.5</td>
<td></td>
</tr>
<tr>
<td>Surface Area HT</td>
<td>m2</td>
<td>18.9</td>
<td>74.2</td>
<td>163.2</td>
<td></td>
</tr>
<tr>
<td>Total Surface Area</td>
<td>m2</td>
<td>37.1</td>
<td>148.4</td>
<td>322.8</td>
<td></td>
</tr>
<tr>
<td>Combined Unit Surface Area</td>
<td>m2</td>
<td>30.8</td>
<td>106.6</td>
<td>216.3</td>
<td></td>
</tr>
<tr>
<td>Percent Reduction from Traditional Design Surface Area</td>
<td>%</td>
<td>83.1%</td>
<td>71.9%</td>
<td>67.0%</td>
<td></td>
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</tbody>
</table>
# LT / HT Furnace Advancements

<table>
<thead>
<tr>
<th></th>
<th>Traditional Line</th>
<th>Additional Insulation in HT</th>
<th>Combination Furnace Design</th>
<th>Furnace Purge Chamber</th>
<th>All Advancements, Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capacity</strong></td>
<td>TPY</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td><strong>Operating Hours Per Year</strong></td>
<td>Hrs</td>
<td>7200</td>
<td>7200</td>
<td>7200</td>
<td>7200</td>
</tr>
<tr>
<td><strong>LT Operating Power</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>123.0</td>
<td>123.0</td>
<td>114.1</td>
<td>117.4</td>
<td>108.5</td>
</tr>
<tr>
<td><strong>Wall Losses</strong></td>
<td>kW·hr</td>
<td>27.0</td>
<td>27.0</td>
<td>18.1</td>
<td>27.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exhaust</strong></td>
<td>kW·hr</td>
<td>16.0</td>
<td>16.0</td>
<td>10.4</td>
<td>10.4</td>
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<tr>
<td><strong>Sensible Heat of Fiber</strong></td>
<td>kW·hr</td>
<td>80.0</td>
<td>80.0</td>
<td>80.0</td>
<td>80.0</td>
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<tr>
<td><strong>HT Operating Power</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>626.2</td>
<td>243.6</td>
<td>566.5</td>
<td>579.6</td>
<td>505.1</td>
</tr>
<tr>
<td><strong>Wall Losses</strong></td>
<td>kW·hr</td>
<td>267.6</td>
<td>243.6</td>
<td>207.9</td>
<td>267.6</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exhaust</strong></td>
<td>kW·hr</td>
<td>103.6</td>
<td>103.6</td>
<td>57.0</td>
<td>57.0</td>
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<tr>
<td><strong>Element / Terminal Losses</strong></td>
<td>kW·hr</td>
<td>93.0</td>
<td>93.0</td>
<td>93.0</td>
<td>93.0</td>
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<tr>
<td><strong>Cooling Water Losses</strong></td>
<td>kW·hr</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Sensible Heat of Fiber</strong></td>
<td>kW·hr</td>
<td>162.0</td>
<td>162.0</td>
<td>162.0</td>
<td>162.0</td>
</tr>
</tbody>
</table>
Peripheral Benefits to Waste Gas Abatement

- Possibility of >50% Reduction in Size of Waste Gas Abatement Unit due to reduction of Oven Exhaust (>50% Reduction in Exhaust Air From Oven)
- Reduction in Total Exhaust Flow from LT / HT Furnaces(s) due to advancements in Carbonization: Lower Line Losses, Fewer Vent Lines
Achievable Targets for the Future
### Achieving Future Improvements: Ovens

<table>
<thead>
<tr>
<th>Evaluation Based On 1500 TPY Capacity - 3000mm Design</th>
<th>Priority</th>
<th>Impact kW-hr Saved</th>
<th>Investment Additions</th>
<th>Investment Reductions</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oven Insulation Thickness</td>
<td>2</td>
<td>78.0</td>
<td>Additional Insulation Costs</td>
<td>-</td>
<td>Low to No Risk</td>
</tr>
<tr>
<td>Oven Exhaust Control and Reduction</td>
<td>1</td>
<td>1360.4</td>
<td>Flow Controls at Oven, Atmosphere Monitoring</td>
<td>Smaller Exhaust Fans, Smaller, Waste Gas Abatement Unit, Smaller Waste Gas Abatement Exhaust Fans</td>
<td>Oven Sealing, Air Distribution and Process Control are Critical</td>
</tr>
</tbody>
</table>
### Achieving Future Improvements
#### LT Furnace

<table>
<thead>
<tr>
<th>Evaluation Based On 1500 TPY Capacity - 3000mm Design</th>
<th>Priority</th>
<th>Impact kW-hr Saved</th>
<th>Investment Additions</th>
<th>Investment Reductions</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce Wall Loss - LT and HT Combination</td>
<td>3</td>
<td>68.6 Total</td>
<td>Investment Cost to Redesign Furnaces for Maintenance Access</td>
<td>-</td>
<td>Maintenance Access to Muffle must be Engineered.</td>
</tr>
<tr>
<td>Sealed LT and HT interconnect Chamber</td>
<td>4</td>
<td>52.2 Total</td>
<td>Investment and Development for Sealed Chamber, Investment and Development of Enclosed Drive Stand. R&amp;D to determine impact of Intermediate Drive Operating Experience</td>
<td>Reduced Nitrogen Consumptions, Reduced Exhaust / Vent Infrastructure, Reduced Waste Gas Abatement</td>
<td>Risk of Enclosed Drive Stand and Operator Access.</td>
</tr>
</tbody>
</table>
# Achieving Future Improvements: HT Furnace

<table>
<thead>
<tr>
<th>Evaluation Based On 1500 TPY Capacity - 3000mm Design</th>
<th>Priority</th>
<th>Impact kW-hr Saved</th>
<th>Investment Additions</th>
<th>Investment Reductions</th>
<th>Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>HT Wall Loss Reduction - Insulation Profile</td>
<td>5</td>
<td>24.0</td>
<td>Additional Insulation Costs</td>
<td>-</td>
<td>Low to No Risk. Existing Designs</td>
</tr>
<tr>
<td>Reduce Wall Loss - LT and HT Combination</td>
<td>3</td>
<td>68.6 Total</td>
<td>Investment Cost to Redesign Furnaces for Maintenance Access</td>
<td>-</td>
<td>Maintenance Access to Muffle must be Engineered.</td>
</tr>
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</table>
## The Near Future Targets

<table>
<thead>
<tr>
<th></th>
<th>Traditional Line</th>
<th>Oven Improvements</th>
<th>Additional Insulation in Ovens and HT</th>
<th>Combination Furnace Design</th>
<th>Furnace Purge Chamber</th>
<th>All Advancements, Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>TPY</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
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<tr>
<td>Operating Hours Per Year</td>
<td>Hrs</td>
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<tr>
<td>Oven Operating Power</td>
<td></td>
<td>3843.0</td>
<td>2682.6</td>
<td>3765.0</td>
<td>3843.0</td>
<td>2604.6</td>
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<tr>
<td>LT Operating Power</td>
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<td>123.0</td>
<td>123.0</td>
<td>114.1</td>
<td>117.4</td>
<td>108.5</td>
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<tr>
<td>HT Operating Power</td>
<td></td>
<td>626.2</td>
<td>626.2</td>
<td>606.2</td>
<td>566.5</td>
<td>505.1</td>
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<tr>
<td>Balance of Unit Operations</td>
<td>kW-hr</td>
<td>1282.9</td>
<td>1082.9</td>
<td>1282.9</td>
<td>1282.9</td>
<td>1082.9</td>
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<td>Estimated Total</td>
<td>kW-hr</td>
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<td>4514.7</td>
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<tr>
<td>Specific Power Consumption</td>
<td>kW-hr / kg CF</td>
<td>28.2</td>
<td>21.7</td>
<td>26.0</td>
<td>27.9</td>
<td>28.0</td>
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<tr>
<td>Operating Power Compared to Traditional Line</td>
<td>%</td>
<td>76.8%</td>
<td>92.2%</td>
<td>98.8%</td>
<td>99.1%</td>
<td>73.2%</td>
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<tr>
<td>Cost of Electricity</td>
<td>USD / kW-hr</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>Cost Per Year</td>
<td>USD / kW-hr</td>
<td>$2,115,050</td>
<td>$1,625,306</td>
<td>$1,949,234</td>
<td>$2,090,339</td>
<td>$2,096,250</td>
</tr>
<tr>
<td>Cost Savings Per Kilogram Produced Reduction over traditional Line</td>
<td>USD / kg CF</td>
<td>$0.33</td>
<td>$0.11</td>
<td>$0.02</td>
<td>$0.01</td>
<td>$0.38</td>
</tr>
<tr>
<td></td>
<td>USD Per Year</td>
<td>$489,744</td>
<td>$165,816</td>
<td>$24,710</td>
<td>$18,799</td>
<td>$566,647</td>
</tr>
</tbody>
</table>
Thank you for your time!

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