

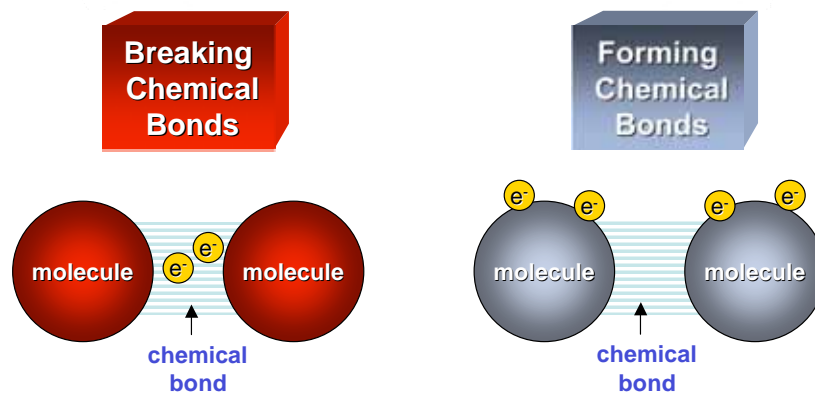
Advanced Electron Beams

Mitch Tyson

**Energy Efficiency Case Study:
A Clean and Efficient Form of Industrial Energy**

October 31, 2007
Clean Technology & Sustainable Industries Summit

Industrial Processes

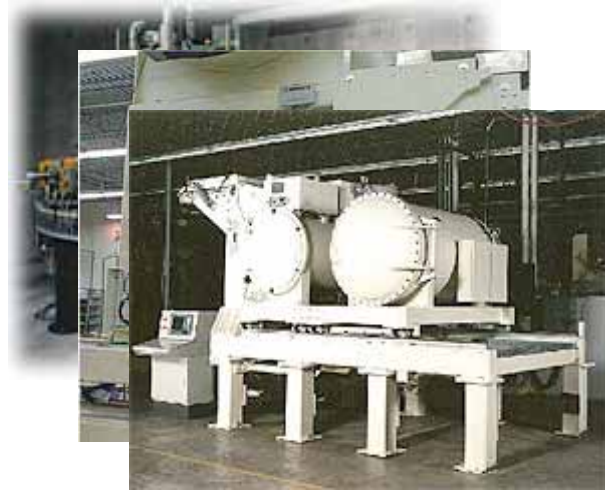


**Electron
Beams**



Traditional Electron Beam Systems

- Large
- Complex
- Expensive



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Advanced Electron Beam Emitter

- Compact
- Modular
- Simple



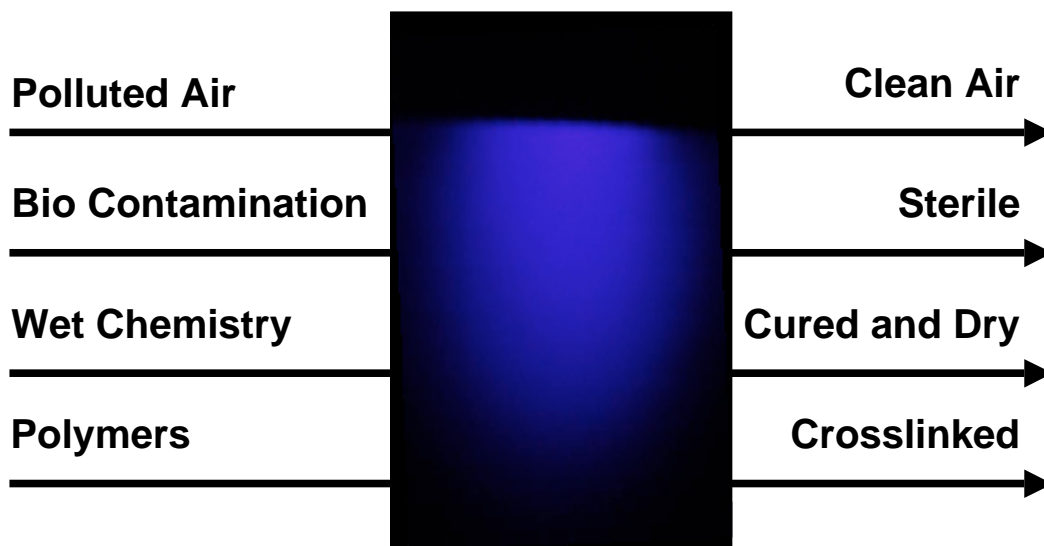
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Electron Beam Emitter



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Electron Beam Transformations



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AEB Emitters and Examples of Systems

Emitters



250mm

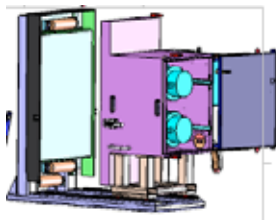


400mm



50mm
(in development)

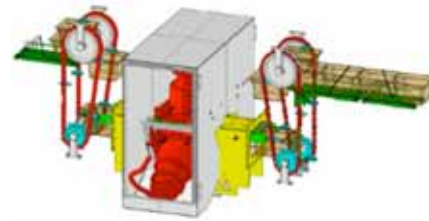
Systems



Webline Curing



Air Treatment



Tub Sterilization

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Applications

Sterilization

Food Packaging



Medical



Air Treatment

VOC



Air Sterilization



Surface Transformation

Printing and Coatings



Industrial Materials



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Electron Beam Benefits



*Example: **Curing System***

Ebeam vs. Traditional Printing Press		
Hourly Cost & Emissions Data		
Item	AEB System	Printing Press
Cost to run	\$2.06/hr	\$32.10/hr
CO2 generated	52 lb./hr	460.4 lb./hr

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In-the-Bottle Electron Beam Application



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Company Overview

- HQ - Wilmington, MA
- 60 employees
- Founded in 1999
- Venture Capital Backed
- Raised \$30 million



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Our Vision

Make e-beam technology a *pervasive industrial process* that will:

- Save energy
- Reduce pollution
- Transform materials
- Simplify manufacturing
- Improve productivity



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Business Model:

- **Challenge:** Many applications/multiple industries
- **Solution:** Light Bulb business model
- **AEB sells to:**
 - OEMs
 - Large end users
 - Systems integrators
- **AEB provides:**
 - Emitters
 - Spares and Service
 - Applications and Eng.Services



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Observations

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Incremental Improvements Versus Disruptive Technology

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Market Adoption
=
Technology Innovation
+
Business Model Innovation

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Driving Forces

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Driving Forces

- Energy costs



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Driving Forces

- Energy costs
- Government regulation



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Driving Forces

- Energy costs
- Government regulation
- Green marketing



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Driving Forces

- Energy costs
- Government regulation
- Green marketing
- **Stewardship**



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Driving Forces

- Energy costs
- Government regulation
- Green marketing
- Stewardship
- **Competitive innovation**



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Better – not just more efficient

- **Faster**
- **Simpler**
- **Easier**
- **More effective**
- **More flexible**



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Thank You

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