Market Segments
Germicidal
A Variety of Growth Potential

Potential Growth “Water”

- Waste Water
- Drinking Water
- Pool & Spa Water Treatment
- Water Reclamation
- Aquaculture
- Life Sciences
- Odor Control
- Air Sterilization
- Food Preservation
- UV Curing

Potential Growth “Air & Surface Market”
LSI & LT Downstream Value Chain

UVC

Surface
- UV Curing
- Food Processing

Air
- Odor Control
- Air Sterilization

Water
- Pool & Spa
- Aquaculture
- Life Sciences
  - Waste Water
  - Drinking Water
  - Water Reclamation
**UVC Segment: Water**

- **Waste water** is any water that has been adversely affected in quality by anthropogenic influence.

- It comprises liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture.

- It can encompass a wide range of potential contaminants and concentrations.
UVC Segment: Water

- Water of sufficient quality to serve as **drinking water** purified and disinfected by a self-contained unit from an untreated source.

- Examples include:
  - rivers
  - recycled water reservoirs
  - aquifers
  - etc.
UVC Segment: Water

- UV light in the 185nm range, and ozone gas of low concentration is produced.

- Ozone to combine small insoluble particles that would normally pass through a sand filter, into larger particles that can be effectively trapped by the filter.
UVC Segment: Water

- The process by which water is used in houses and businesses goes down the drain and becomes wastewater.

- Wastewater is then cleaned using, in part, the UVC radiation process so the water can be returned to the environment safely.
UVC Segment: Water

- The farming of freshwater as well as saltwater organisms and plants.

- UV light maintains a healthy operating environment, free of pathogenic micro-organism, which can have adverse effects on the controlled ecosystem.
UVC Segment: Water

- Incorporates sciences and technologies which require a high level of water disinfection.

- Applications for UV include TOC reduction, ozone destruction, and chlorine (or chloramine) destruction.
Potential Growth “Water”

- U.S Department of Agriculture cites the nursery and greenhouse industry as the fastest growing segment of U.S agriculture.

- Produced Water Utilization Act of 2008 (awaits approval from the Senate) encourages the R&D of environmentally sustainable to utilize produce water.

- There are currently 156,000 public drinking water systems in the United States serving 90% of the population.
UVC Segment: Air

- The neutralization of unpleasant odors is usually created as a byproduct.

- Sources of odor:
  - Kitchens (HVAC)
  - Wastewater Plants
  - Water
  - Farms
UVC Segment: Air

- The process of effectively killing or eliminating transmissible agents, fungi, bacteria, viruses, and spores from the air.
UVC Segment: Surface

- The process of treating and handling food in a way that preserves its edibility and nutrition value.

- The LSI application of this process is known as **Food Irradiation**.
UVC Segment: Surface

- Inks consisting mainly of acrylic monomers, with an initiator exposed to strong UV-light, "dry" as soon as they are cured.

- They can be applied to a wide range of uncoated substrates, and they produce a very robust image.
Potential Growth “Air & Surface”

- UV Hormesis can reduce post-harvest losses due to the delayed ripening of fruits and vegetables.
- 550 million dollars of fresh fruits and vegetables were exported from the US year to date.

Source: www.usda.gov
Lamp Classification

- Lamp Size is one way of identifying application and usage.
- Further Lamps Classifications:
  - Amalgam
  - High Output
  - Ozone Producing
  - Spliced – 185nm / 254mm

<table>
<thead>
<tr>
<th>Lamp Sales to Size Ratio</th>
<th>LENGTH in MM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>54%</td>
</tr>
<tr>
<td>202 - 839</td>
<td>27%</td>
</tr>
<tr>
<td>Medium</td>
<td>27%</td>
</tr>
<tr>
<td>G36 (840-1553)</td>
<td>20%</td>
</tr>
<tr>
<td>Large</td>
<td>20%</td>
</tr>
<tr>
<td>G64(1554)-Larger</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
Any Questions?
Thank you for your attention.