**Project Objective:**
1. Select five high-impact materials used in the data center industry based on environmental, health and social impacts, and supply risk
2. Quantify the growth of these materials over the next 5-7 year period and compare material growth for two data center types: Data Center 1.0 and Data Center 2.0

**The Data Center Industry:**
- Data center is booming as businesses digitize, and internet and cloud service usage increases
- Significant sustainability issues include energy consumption and material usage
- Infrastructure is built in two ways – large bespoke facilities (DC1.0) and standardized, modular technology (DC2.0)

**Selected High-Impact Materials**

<table>
<thead>
<tr>
<th>Material</th>
<th>Key Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>• Structurally integral part of DC1.0 and DC2.0 building frames • Large environmental impact due to volume used • Limited supply risk for DC’s due to recycling and wide scope of uses</td>
</tr>
<tr>
<td>PVC</td>
<td>• Used throughout DC’s for wiring insulation and structural components • Phased out by some technology companies, including IO • Significant environmental impacts per unit • Very low recycling rates</td>
</tr>
<tr>
<td>Tantalum</td>
<td>• Used widely in electronics for capacitive properties • Conflict mineral mined and smelted in the DRC • Significant environmental impact per kilogram • World demand driven by electronics and IT</td>
</tr>
<tr>
<td>Gold</td>
<td>• Used as a conductor in the electronics industry due to unique properties • Conflict mineral • Extremely high environmental impact per kilogram • Difficult to recycle from e-waste</td>
</tr>
<tr>
<td>Lead</td>
<td>• Primary component of DC batteries due to lack of major size constraint • Significant environmental impacts per unit • Production concentrated in China with significant health effects to worker</td>
</tr>
</tbody>
</table>

**Key Growth Metrics**

- **Number of New Servers**
  - Expected to grow at an annual rate of 7% (IDC)
  - Key growth metric for tantalum & gold

- **DC Square Footage**
  - Expected to grow at an annual rate of 9% (IDC)
  - Key growth metric for steel, lead & PVC in DC1.0’s

**Environmental & Health Impact growth for DC 2.0**

**Recommendations**

- Continue to develop and promote move to standalone modular DC’s that do not need additional housing
- Use influence within supply chain and DC industry to promote reduction of high impact materials, use recycled materials where possible, ensure sourcing from certified non-conflict suppliers and seek alternate materials.
- Push for new techniques within the industry to recycle materials such as gold in a low impact manner
- Ensure DC’s are treated appropriately at end-of-life: recycling as much material as possible and disposing of hazardous materials safely

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