GE's Assessment and Approaches to Material Sustainability

The reduction, recycling, and replacement of at-risk raw materials

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GE's Assessment and Approaches to Material Sustainability

Assessment

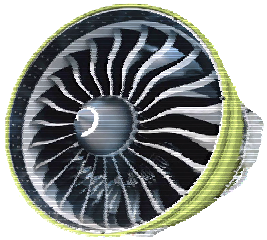
- Introduction to GE material usage
- GE material risk assessment

Approaches

- Our approaches to minimizing these risks
- Technical solutions through multi-scale flexibility

GE

Infrastructure - Technology



Infrastructure - Energy

GE Capital

NBC Universal

NBC BEIJING 2008

hulu

- Aviation
- Energy
- Healthcare
- Transportation
- Enterprise Solutions
- Consumer & Industrial
- Water
- Oil & Gas

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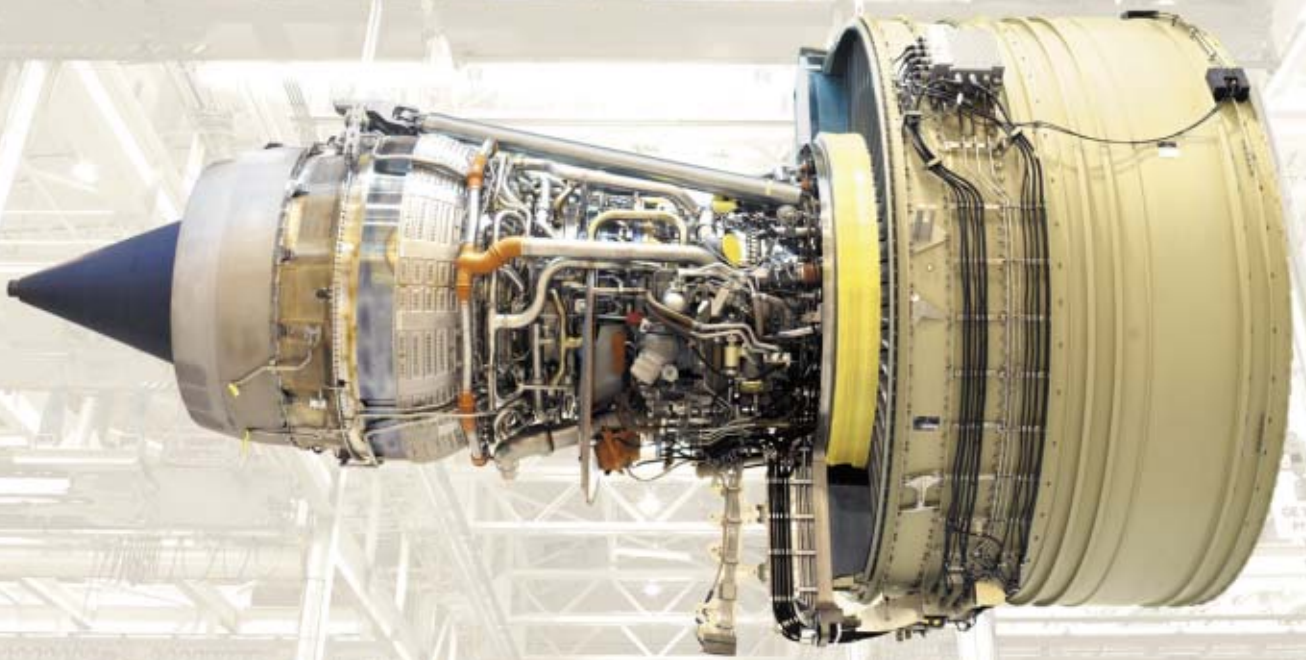
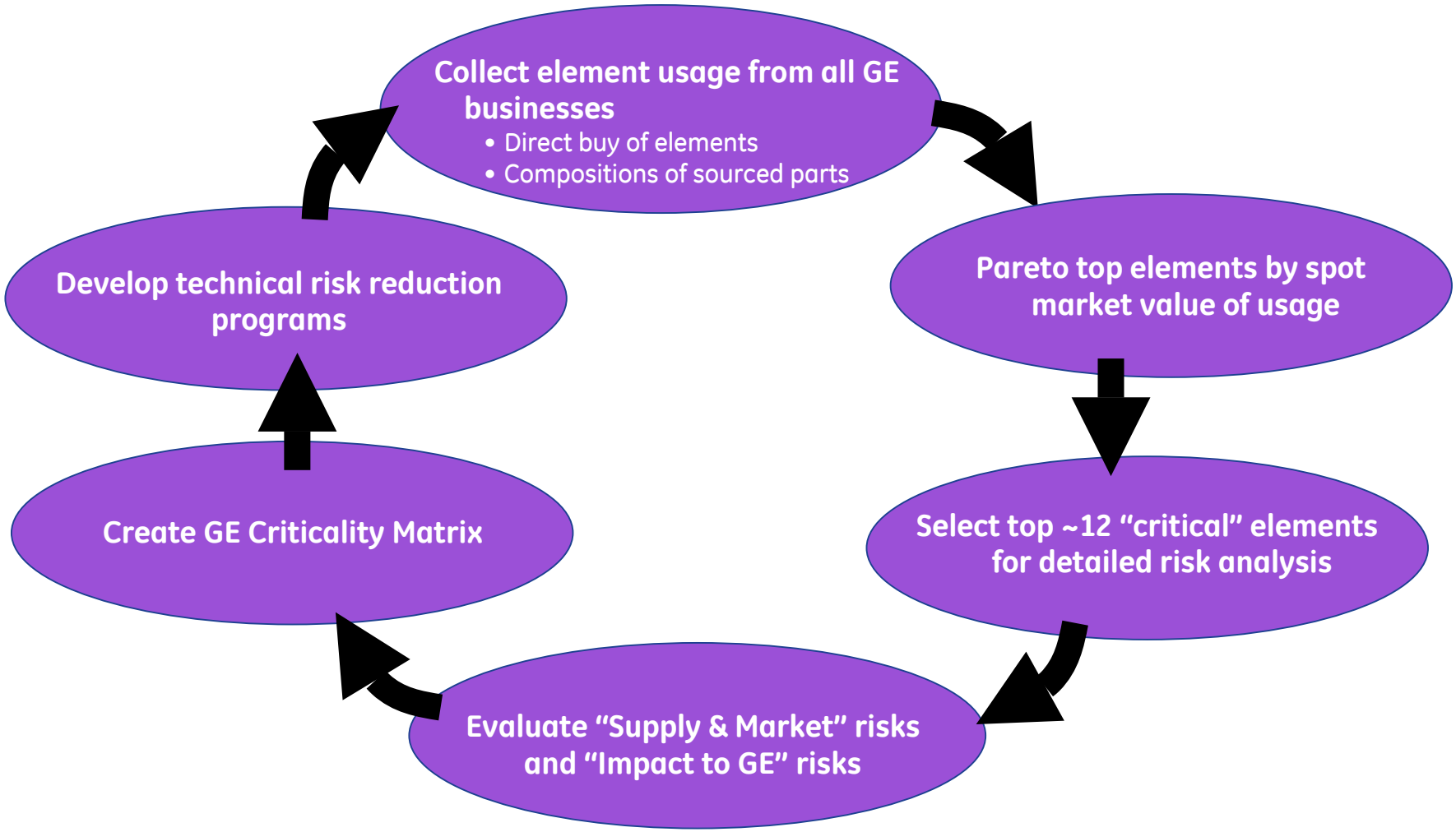
GE Materials Usage

2008

- For manufacturing companies typically one-half of their Cost of Goods & Services Sold is spent on raw materials, which for GE translates to ~$40 B
- GE uses at least 70 of the first 83 elements on the periodic table



GE's Material Sustainability Risk Assessment Process



Assessing GE Materials Risks

Risk to GE = **Supply and Price Risk** x **Impact to GE**

- GE wide
- Element-by-element

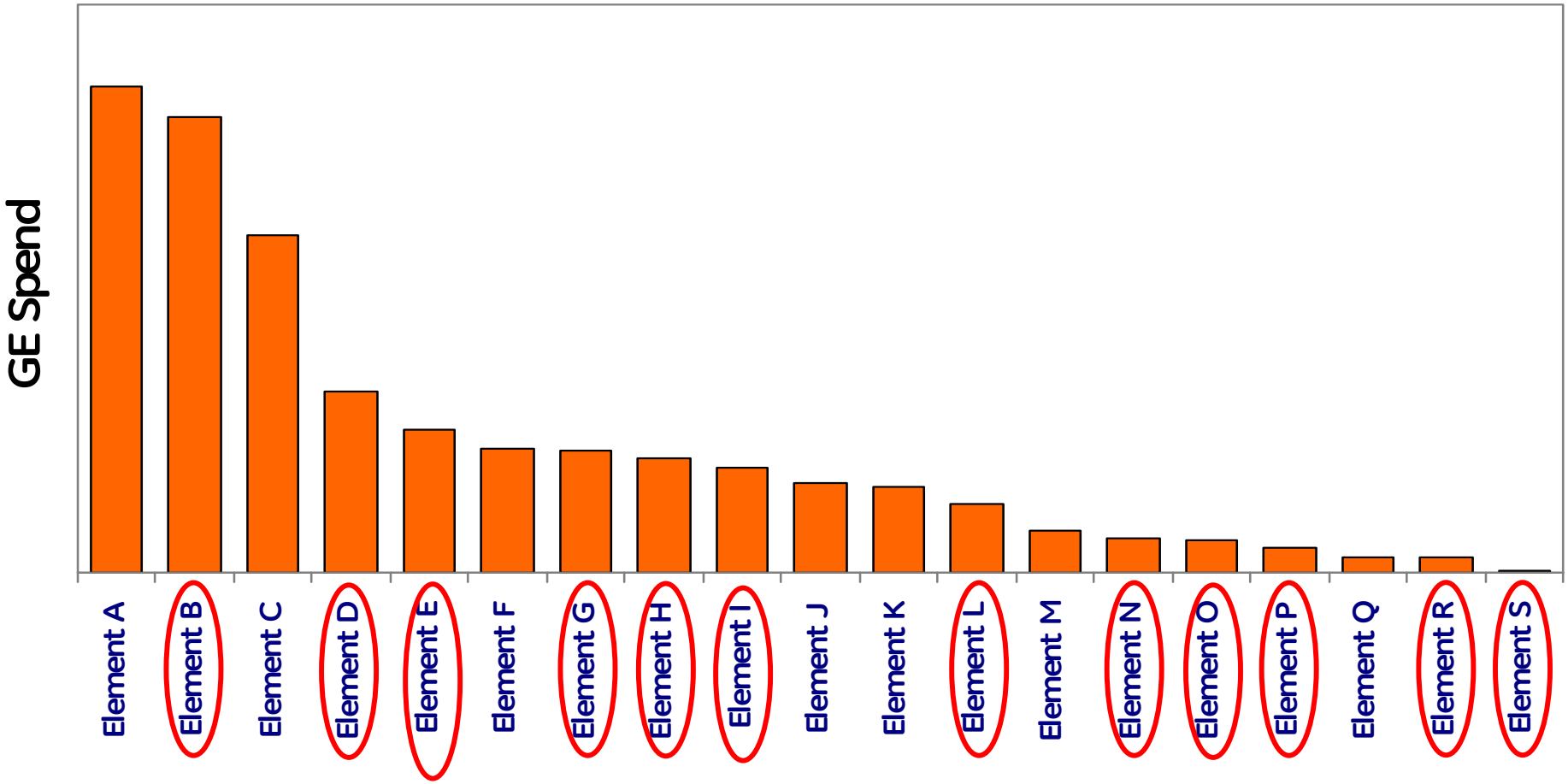
- Demand and supply dynamics
- Price volatility
- Geopolitical risks
- Co-production risks
- EHS risks

External

- Total GE volume
- Impacted GE revenue
- Criticality to products
- Reduction capability

Internal

Top GE Element Spend



12 elements selected for further risk analysis – with emphasis on the minor metals in GE products

Market and Supply risk - definitions

Risk Level	Abundance in earth's crust (ppm)	Sourcing and geopolitical risk	Co-production Risk	Demand Risk	Historic Price Volatility (5-yr period max)	Market Substitutability
Very high	Very rare, <0.01	Concentrated, high risk	Co-produced but extraction method in jeopardy	New applications could significantly increase demand	>500%	No substitutes
High	Rare, 0.01 – 1	Concentrated and/or significant risk	Co-produced and economically insignificant	New applications could increase demand	200% - 500%	Unknown or poor substitutes
Medium	Less common, 1 – 100	Some diversity and/or risk	Co-produced but economically significant	No new apps; growth faster than GDP	100% - 200%	Known substitutes but worse performance
Low	Common, 100 – 10,000	Very diverse and/or stable	Primary product	No apps; growth at GDP	50% - 100%	Known substitutes
Very low	Very common, >10,000	US based	---	No apps; growth less than GDP	<50%	Easy and known substitutes

Impact of Restriction on GE - definitions

Risk Level	GE % of world supply	Impacted GE revenue	GE ability to substitute	Ability to pass-through cost increases
Very high	Extremely significant, >X%	>$Y Bn	Very difficult - very unique and no substitute expected	Nearly impossible
High	Very significant 0.25X% - X%	$0.25Y - $Y Bn	Difficult - no known substitute; extensive research	Difficult
Medium	Significant, 0.05X% - 0.25X%	$0.05Y - $0.25Y Bn	Moderate - possible substitutes known but not tested	Partially possible
Low	Low, 0.01X% - 0.05X%	$0.01Y – $0.05Y Bn	Easy - substitute known but not designed in	Relatively easy
Very low	Very low, <0.01X%	<$0.01Y Bn	Very easy - substitute design ready for production	Done automatically

Note: Assessment is done quantitatively, with X and Y proprietary values

Market Supply and Price risk - ratings

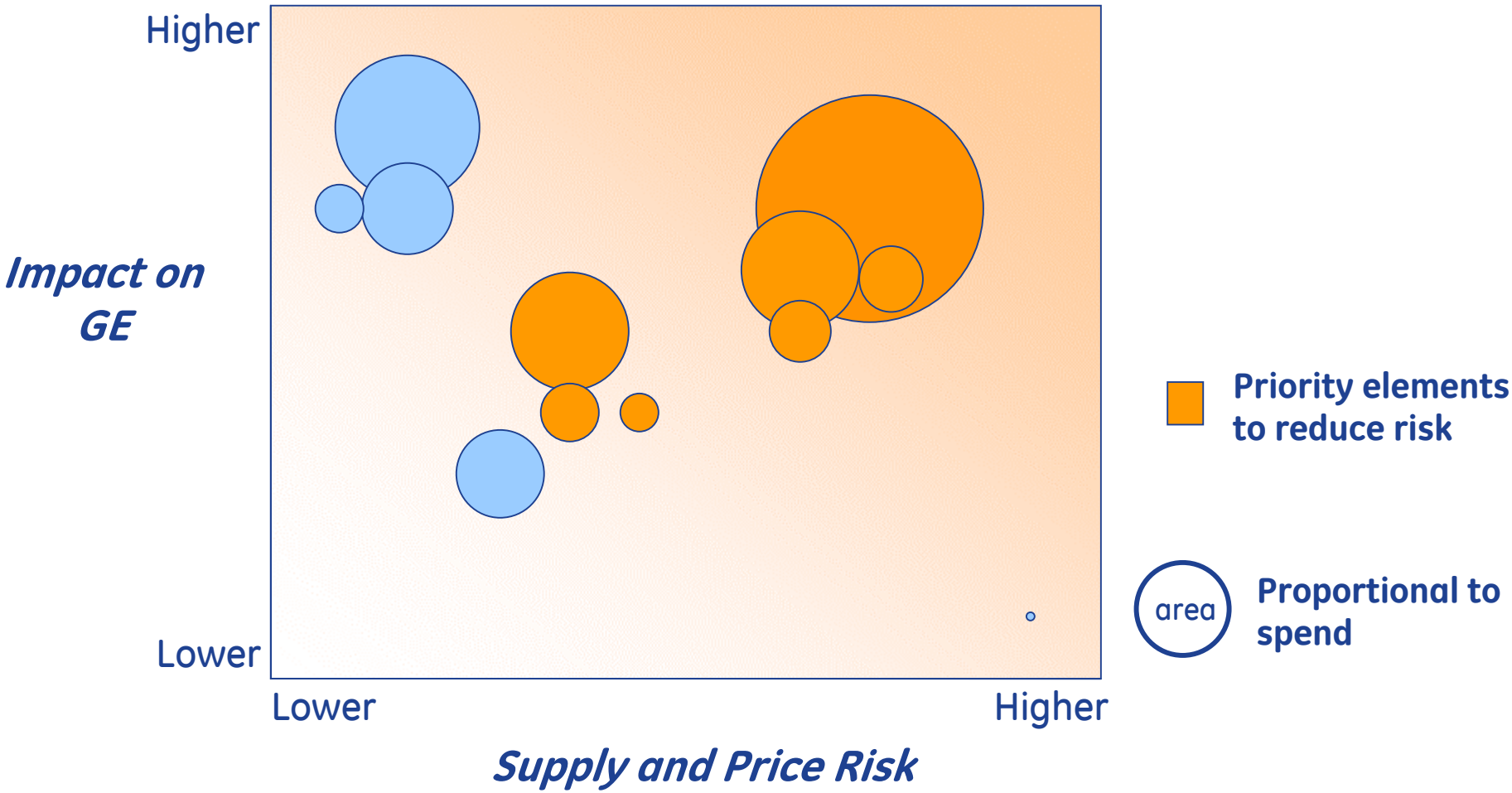
Element	Abundance	Sourcing and geopolitical risk	Co-production Risk	Demand Risk	Historic Price Volatility	Market Substitut-ability Risk	Overall
Element B	Common 2	Medium 3	Low 2	Low 2	Very low 1	High 4	2.3
Element D	Less common	High	Medium	Medium	High	Medium	3.3
Element E	Rare	Medium	Low	Low	Low	High	3.0
Element G	Less common	Low	Low	Low	Very high	High	3.0
Element H	[illegible]	Medium	Medium	High	[illegible]	Medium	3.5

Impact of Restriction on GE - ratings

Element	GE % of world supply	Impacted GE revenue	GE ability to substitute	Ability to pass-through costs	Overall Rating
Element B	Low	Very high	Very Difficult	Partially possible	3.8
Element D	[illegible]	Very high	Difficult	[illegible]	[illegible]

Quantitative assessment of risks for each element

GE Criticality Diagram



Solutions: Broad Approaches with Flexibility

<table>
<tr><th></th><th>Engineering/R&D</th><th>Manufacturing</th><th>Sourcing</th></tr>
<tr><td rowspan="2">Short term
• Broaden resource base
• Consolidate material usage</td><td></td><td colspan="2">• Volume material buys</td></tr>
<tr><td colspan="2">• Use of re-processed (recycled & scrap) material</td><td>• Diversification
• Hedging</td></tr>
<tr><td>Medium Term
• Recycle manufacturing waste
• Design for recyclability
• Optimize material usage</td><td>• Reclamation/recycling processes
• Manufacturing processes that minimize use of at-risk intermediate materials
• Design products for ease of recycling and re-use</td><td>• Near-net shape manufacturing processes
• Sort & categorize manufacturing scrap to maximize recycle</td><td>• Global sourcing
• Strategic inventory reserves</td></tr>
<tr><td>Long Term
• Redesign materials</td><td>• Develop material substitutions</td><td colspan="2"></td></tr>
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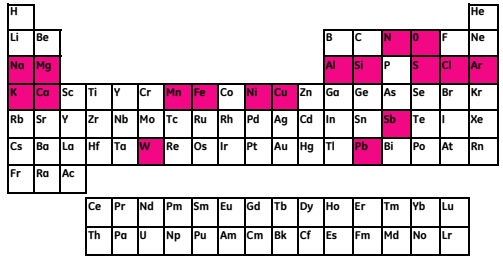
Multiple Solutions at the Product Level

Solutions: Technology Flexibility

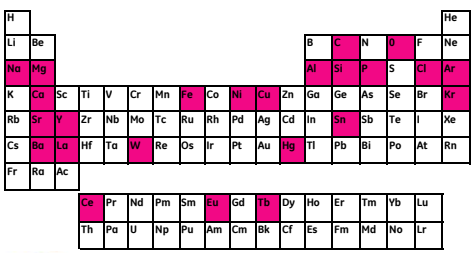
Incandescent Lamps

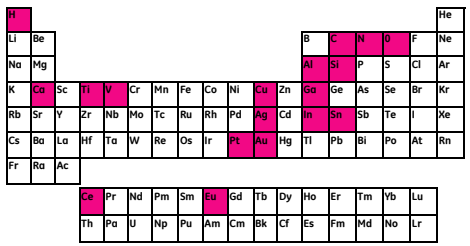


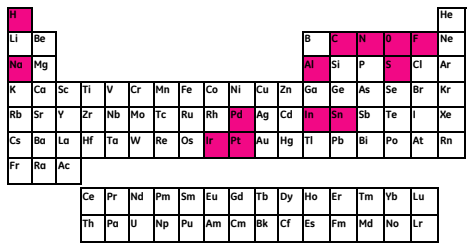
Fluorescent Lamps

White LEDs

White OLEDs







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Multiple Solutions at the System Level