Battery Types and power requirements

- **Sealed lead-acid (SLA)**
  - Cheap and easily rechargeable but heavy.
- **Lithium-ion (Li-ion)**
  - Compact but expensive and difficult to charge.
- **Nickel Cadmium (NiCd)**
  - Moderate life, high discharge rate and economical.
- **Nickel-Metal Hydride (NiMH)**
  - Improvement over the NiCd at the expense of reduced cycle life and lower load current.
- **Lithium Polymer (Li-polymer)**
  - A cheaper, high energy density version of the Li-ion (under development).
- **Reusable Alkaline**
  - Replaces disposable household batteries; suitable for low-power, low-cost applications.
## Comparison of Rechargeable Battery Types

<table>
<thead>
<tr>
<th></th>
<th>NiCd</th>
<th>NiMH</th>
<th>SLA</th>
<th>Li-Ion</th>
<th>Li-Polymer</th>
<th>Reusable Alkaline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy density</strong></td>
<td>40-60</td>
<td>60-80</td>
<td>30</td>
<td>100</td>
<td><strong>150-200</strong></td>
<td>80</td>
</tr>
<tr>
<td><strong>Cell voltage</strong></td>
<td>1.2V</td>
<td>1.2V</td>
<td>2V</td>
<td>3.7V</td>
<td>2.7V</td>
<td>1.5V</td>
</tr>
<tr>
<td><strong>Typical Battery cost</strong></td>
<td>$50.00</td>
<td>$70.00</td>
<td>$25.00</td>
<td>$100.00</td>
<td>$90.00</td>
<td><strong>$15.00</strong></td>
</tr>
<tr>
<td><strong>Cycle life</strong></td>
<td>1500</td>
<td>500</td>
<td>200-500</td>
<td>500-1000</td>
<td>150-200</td>
<td>80</td>
</tr>
</tbody>
</table>

- Example of a Batteries: Which has more energy?
  - A 7.2 V Li-Ion battery rated at 1350mAhr, 9.72 Whr
  - A 6 V NiMh battery pack rated at 1600mAhr, 9.6 Whr
  - A 7.2V NiCd battery pack rated at 1200mAhr, or 8.64 Whr
  - A 12V sealed lead-acid (SLA) battery rated at 900mAh, 10.8 Whr