Comparison of Hydrogen Supply Options

Chengdu, China
Make vs. Buy Analysis
Air Products Onsite H₂ “Buy” Case Provides Lower Unit Price Than “Make” Case

• Energy Consumption: 3-5% Better Efficiency
  - Continuous feedback from 60 SMRs
  - Ongoing development and optimization
  - Focus on long term efficiency/capital trade-offs
  - New technology improvements during contract life
  - Air Products bears performance risk over life of facility vs. make case only at performance test

• Capital Costs: 5–10% Lower
  - Multi-plant execution/Repeat engineering
  - Global/Preferred Supplier Agreements
  - Ongoing value improvements

• Operating Costs: Up to 10% Lower
  - Extensive preventive maintenance program
  - Discounts on large catalyst volumes
  - Plant management and operations labor are integrated into overall area network
  - Shared spare parts
Reliability through Standardization

- **Design**
  - Top Fired Technip Reformer (since 1992)
  - Company Specific Criteria

- **Technology and Hardware**
  - Digital Control System, Transmitters, Valves, Compressors, etc.

- **Execution**
  - In house process, systems, environmental engineering (up-front)
  - Project, construction, start-up and commissioning

- **Operations**
  - Global HyCO Line Management, central support

- **Maintenance**
  - Global HyCO specialists for turnarounds, trouble-shooting
# Risk Matrix Comparison

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Sale of Equipment (Customer Make Case)</th>
<th>Sale of Gas (Third Party Onsite)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Customer</td>
<td>Service Provider</td>
</tr>
<tr>
<td>Design &amp; Construction</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Operating – Cost &amp; Efficiency</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Operating – Performance</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Financing</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Permitting</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Income Tax (national)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Property Tax (if any)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Force Majeure</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Commissioning</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Insurance cost (loss)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Termination</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Regulatory</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Sale of Gas transfers many risks from customer to Air Products
Advantages of Supply of Gas

- **Experience:** Air Products / Technip 35+ reformer projects and operating experience
- **Risk Mitigation:** Air Products is responsible for capital and operating cost risk
- **Long Term Reliability:** Customers benefit from Air Products’ extensive operating experience and reliability features built into our plants
- **Power:** New or upgraded utility systems needed by customers for their projects can be incorporated into the hydrogen plant
- **Resource Flexibility:** Customer capital and manpower are dedicated to their core businesses
Contact Us for Specific Benefits to Your Operation

- To learn more about how you can benefit from the long standing Air Products/Technip Hydrogen Alliance, contact us today!

http://www.h2alliance.com/contacts.htm
Thank You  
謝謝你！
ありがとう！
Obrigado
Bedankt
Grazie
Gracias
Doh Jeh
Terima Kasih