IdaTech Overview and History

- Founded in 1996, IdaTech designs, develops, and manufactures extended run critical power fuel cell products for telecommunications and other high reliability applications.

- IdaTech was acquired by Investec, a diversified UK based bank, in 2006 and went public on the London AIM exchange in 2007. Investec owns ~70% of the outstanding shares of IdaTech.

- IdaTech’s Fuel Cell products utilize advanced proton exchange membrane (PEM) technology and proprietary liquid fuel reforming for generating H2 onsite and on demand.

- The company offers 250W, 3kW and 5kW fuel cell products that provide solutions for stationary power applications requiring 100W to 15kW.

- IdaTech has over 90 employees, is headquartered in Bend, Oregon with operations in the U.S, India, Mexico, Asia, and Europe.

IdaTech Infrastructure

**Corporate Headquarters**
- ISO 9001:2008 certified
- Product and technology development
- R&D and prototype development

**Manufacturing Facility**
- ISO 9001:2008 certified
- Volume manufacturing
- Flexible capabilities
- Low cost manufacturing
- Capacity of up to 5,000 units per year
IdaTech’s Core Technologies

- Fuel Reformer
- Purifier
- Fuel Cell Stack

- Strong IP position
- 194 issued patents and 134 pending patents in US and key foreign countries
- Fully integrated systems for fuel reforming and purification with power generation
Fuel Reforming - Multi Fuel Solutions

- Fully integrated fuel reforming and purification
  - Multi-fuel
  - Efficient, simple, compact, reliable
  - Near zero emissions
- Overcomes the hydrogen barrier

24 hours of operation at 5 kW is either:

- 18 Hydrogen Cylinders (138m3)
- 120l of Water/Methanol Mix

<table>
<thead>
<tr>
<th>Application</th>
<th>Typical Fuel</th>
<th>IdTech Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stationary power</td>
<td>Methanol</td>
<td>✓</td>
</tr>
<tr>
<td>Stationary power</td>
<td>Natural gas</td>
<td>✓</td>
</tr>
<tr>
<td>Portable power</td>
<td>LPG</td>
<td>✓</td>
</tr>
<tr>
<td>APU</td>
<td>Diesel</td>
<td>✓</td>
</tr>
<tr>
<td>Military</td>
<td>JP8</td>
<td>✓</td>
</tr>
<tr>
<td>Emissions control</td>
<td>Diesel</td>
<td>✓</td>
</tr>
</tbody>
</table>
Markets and Products
Industry Challenges & Solutions

**Performance**
- Technology advances
- Focus on application
- Design simplification
- Global supply chain

**Capital Cost**
- Target highest value proposition segments
- Identify early adopters
- Gain early certification

**Adoption**
- Reduce onsite reforming costs
- Develop local supply chains

**Hydrogen Infrastructure**
Small, low temperature PEM

- Time to commercial scale
- Price point

- Portable
- Backup / off grid
- Material handling
- Military
- APU
- CHP
- Automotive

Fuel Cell Market View
Initial Target Markets

Critical Power for Wireless Telecom Sites

Target Environment
Cell sites that are susceptible to severe weather, natural disasters, and poor electric grid reliability.

Customer Value
Reliable, extended run backup power solution with low lifecycle and operating costs
Telecom Market Size

- Wireless telecom opportunity
  - $2+ billion/yr spent on DC telecom backup.
  - Expect total ~300,000 base station additions.
  - Expect 2010 total addressable telecom fuel cell market ~25,000 units

- Best fuel cell opportunities:
  - New sites as part of a network deployment
  - Sites where diesel generators are costly or difficult to site
  - Site upgrades where additional batteries are problematic (rooftop)

Sources: In-Stat, 2008; ABI,
Batteries can be:
- Expensive to maintain
- Unreliable after aging
- Temperature sensitive
- Difficult to dispose of

Generators can be:
- Unreliable
- Difficult to site
- Maintenance intensive
- Hazardous fuel spill
- Noisy

Fuel cells are an alternative solution to diesel generators and large battery banks.
Fuel cells can provide unique benefits to traditional sources of power.

Developing World
- Rapid, massive growth
- Unreliable power
- Unavailable power
- Severe climates

Developed World
- Shift to wireless
- Extreme reliability / security demands
- Push for sustainable solutions

Power sources are required that are extremely reliable, remotely controllable, autonomous and capable of extended run times.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Genset / Battery</th>
<th>Fuel Cell</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Remote monitoring</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Operating cost</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Efficiency</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Temperature range</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Weight</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Environmental</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
## Companies Pursuing the Opportunity

<table>
<thead>
<tr>
<th></th>
<th>IdaTech</th>
<th>Relion</th>
<th>Altergy</th>
<th>Dantherm</th>
<th>Hydrogenics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corporate</strong></td>
<td>Public</td>
<td>Private</td>
<td>Private</td>
<td>Private/JV</td>
<td>Public</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td>USA/Oregon</td>
<td>USA/Washington</td>
<td>USA/California</td>
<td>Denmark</td>
<td>Canada</td>
</tr>
<tr>
<td><strong>Typical Power increments</strong></td>
<td>200 W to 15 kW</td>
<td>200 W to 12 kW</td>
<td>200 W to 10 kW</td>
<td>200 W to 2.5 kW</td>
<td>1 kW to 12 kW</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>Air cooled</td>
<td>Air cooled</td>
<td>Air cooled</td>
<td>Air cooled</td>
<td>Liquid cooled</td>
</tr>
<tr>
<td><strong>Reforming capability</strong></td>
<td>Yes, integrated</td>
<td>No, pursuing 3rd party</td>
<td>No, pursuing 3rd party</td>
<td>No, pursuing internal</td>
<td>No</td>
</tr>
</tbody>
</table>
## IdaTech Products

<table>
<thead>
<tr>
<th>Product</th>
<th>3/5 kW</th>
<th>3/5 kW</th>
<th>3/5 kW</th>
<th>2.5/5 kW</th>
<th>2.5/5 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>ElectraGen™</td>
<td>Deployed</td>
<td>Deployed</td>
<td>Deployed</td>
<td>Deployed</td>
<td>Q4 2010 Launch</td>
</tr>
<tr>
<td>ElectraGen™ XTR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ElectraGen™ XTi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ElectraGen™ H2-I</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ElectraGen™ ME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Hydrogen**
- **Methanol-Water**

- Cost reduction (competitive with diesel generators)
- Simplification
- Performance improvement
Enables central dispatch, control, monitoring of thousands of systems via wireless lines
IdaTech vs. Backup Diesel Generator

**Asia Value Proposition**

- **Expanded market with value proposition and no hydrogen fuel constraints.**
  - Very low back up time, battery only sites. Potential retrofit opportunities.

**USA Value Proposition**

- 60X market expansion enabled by next generation value proposition
- Cost competitive with diesel generators
- Superior lifecycle costs, reliability, monitoring and control
- Eligible for mass infrastructure bids (mainstream vs niche opportunities)
## Telecom Backup Power Application

<table>
<thead>
<tr>
<th>Fuel Cell Advantages</th>
<th>Measures</th>
<th>ElectraGen™ ME</th>
<th>Diesel Generator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean</td>
<td>Nitrogen Oxides (Nox)</td>
<td>&lt;0.01 g/kWh</td>
<td>7.5 g/kWh</td>
</tr>
<tr>
<td></td>
<td>Carbon Monoxide (CO)</td>
<td>0.2 g/kWh</td>
<td>8.0 g/kWh</td>
</tr>
<tr>
<td></td>
<td>Particulate matter</td>
<td>0 g/kWh</td>
<td>0.8 g/kWh</td>
</tr>
<tr>
<td></td>
<td>Carbon Dioxide (CO2)</td>
<td>800 g/kWh</td>
<td>1,500 g/kWh</td>
</tr>
<tr>
<td>Quiet</td>
<td>Decibel rating</td>
<td>&lt; 52 dB @ 1 meter</td>
<td>68 dB @ 7 meters</td>
</tr>
<tr>
<td>Efficient</td>
<td>Efficiency (%)</td>
<td>&gt; 30%</td>
<td>10 – 25%</td>
</tr>
<tr>
<td>Low operating costs</td>
<td>Maintenance visits / year</td>
<td>1</td>
<td>2-4</td>
</tr>
<tr>
<td></td>
<td>Theft</td>
<td>None</td>
<td>Fuel &amp; parts</td>
</tr>
<tr>
<td></td>
<td>Reliability</td>
<td>Few moving parts</td>
<td>Many moving parts</td>
</tr>
</tbody>
</table>
Significant Technical Adoption Cycle

Telecoms Sector Initial Adoption and Sales Cycle

<table>
<thead>
<tr>
<th>Technical marketing</th>
<th>Laboratory evaluation</th>
<th>Field testing</th>
<th>Project development</th>
<th>Project deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td>~20 months</td>
<td>~6 months</td>
<td>~12 months</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Iterative process
- Feature changes
- Industry certifications
- Technical buy-in
- Operational buy-in
- Feature changes
- Mindset / routine changes
- Capex cycle
- Risk-reward tradeoffs
- Service mobilization

IdaTech is certified with 21 telcos, including 5 of the 10 top wireless telecom companies worldwide
Compressed H₂ is a challenge for sites requiring longer duration backup, higher power, and sites not convenient for hydrogen siting and refueling.

30 hydrogen cylinders ≈ 50 hours @ 5kW
**ElectraGen™ ME Overcomes the H2 Barrier**

### 48 hours of Autonomy

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Reformer (Methanol)</th>
<th>Bottled Hydrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>First cost</td>
<td>Up to 50% lower than bottled hydrogen, depending upon runtime.</td>
<td>Competitive at 8 hours runtime or lower.</td>
</tr>
<tr>
<td>Operating cost</td>
<td>Essentially flat, based on fuel use.</td>
<td>Cylinder rental, frequent, high cost refueling beyond low power and low outage applications.</td>
</tr>
<tr>
<td>Logistics</td>
<td>Liquid: 59 gallons = 48 hours, easily stored, transported and refilled. Available globally.</td>
<td>Bulky, nearly 30 cylinders at 110 lbs each required for 48 hours. Specialty chemical with limited availability.</td>
</tr>
<tr>
<td>Footprint</td>
<td>About 40 square feet / 4 square meters.</td>
<td>&gt; 800 square feet / 80 square meters.</td>
</tr>
<tr>
<td>Permitting</td>
<td>None required for less than 60 gallons.</td>
<td>Extensive codes and setback requirements. Regulations vary by locality.</td>
</tr>
</tbody>
</table>

Images are approximately to scale
Hydrogen Storage Setback: 10 feet
IFC and NFPA fire codes

Hydrogen Fuel Cell
Total area: 800 square feet

ElectraGen ME Fuel Cell
Total area: 40 square feet

Over 20X smaller footprint

International Fire Code 3504.2.1
Reformer vs Compressed H2 TCO

100 hour per year run time example

**Fuel Cell**

*ElectraGen™ ME*

- 48 hours on a fill.
- No permitting requirements

**Fuel Cell**

*Hydrogen*

- 10 hours with 6 standard H2 cylinders
- Significant permitting requirements

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**Initial Cost**

<table>
<thead>
<tr>
<th>Years</th>
<th>Initial Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
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<tr>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Cumulative Costs**

- Fuel Cell - ElectraGen™ ME Cumulative Cost
- Fuel Cell - Hydrogen Cumulative Cost
Renewable & Low Carbon Methanol Fuels

1. Derived from natural gas
   - IdaTech’s HydroPlus is derived from natural gas
   - 62/38 methanol (CH$_3$OH) water mixture
   - Distributed worldwide

2. Derived from bio-renewable resources
   - By-product of biodiesel production (certified)
   - Wood and farm waste (certification in process)

3. Captured from industrial processes
   - Capture CO2 from industrial emissions and convert it to bio-methanol using renewable energy (certified)
   - Coal bed methane (from coal mining) used directly to produce methanol
Potential Future Directions
Positive Feedback Cycle

Current position
Achieve 1000's design and cost level
Early adoption, product refinement
Successful early deployments
Improved value proposition (cost and capability)
Product and Market expansion
Investment increases
Sales growth track record
Incumbents invest, partner, acquire
Rivalry increases
New technical innovation

Early adopter deployments become mainstream
Referencing spurs next adopters

Successful early deployments
Achieve 1000's design and cost level
Highly focused on penetrating telecom market to high volume profitable growth

Reformer capability is a key enabler to final step in large scale commercialization

Technology can be leveraged to a wide range of additional products and applications,

…but expansion requires establishing a strong commercial beachhead application
Installations
Latin America
Europe
Thank you!