Oil Shale Symposium Presentation
Al Lajjun Oil Shale Project – Jordan
Jordan Energy and Mining Limited

Golden, Colorado
October 2011
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1. Background
   • Why Jordan?

2. Project Description
   • Summary
   • Plant and technology

3. Project Status
   • Impact of ‘Arab Spring’
   • Project schedule

4. Investment Considerations
   • Project de-risking
   • Project summary
Background
Why Jordan?

- Abundant oil shale resources
- Development of Oil Shale in Jordan in line with Energy Strategy
- Good and supportive business environment
- Active companies in Jordan oil shale – Shell, Total, Petrobras, Enefit, Saudi’s, BP (gas) Exxon Mobil in 2010

<table>
<thead>
<tr>
<th></th>
<th>Demonstrated Resources B bbls</th>
<th>Proven Reserves B bbls</th>
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<tbody>
<tr>
<td>USA</td>
<td>1539</td>
<td>560</td>
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<tr>
<td>Russia</td>
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<td>Brazil</td>
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</table>
Project Description

ATP Plant China - Fushun
Project Description

Successful Oil Upgrading Test Results

Pilot Plant Oil Upgrading

• Engaged 2 well known Licensors
• To ensure reliability and minimise project risk with respect to producing stable and marketable oil products

Licensor Conclusions:

• Pilot plant test program successfully demonstrated that shale oil can be hydro-processed to finished Euro grade distillates
• Scheme uses commercially proven Isocracking and Isotreating technologies
  “The upgrading process is ready for commercialization”
Project Description
Proven Process Technology

- Proven ATP Retorting Process – Exclusivity to JEML on Al Lajjun
- Engineered and constructed by Thyssen Krupp Group (Germany)
- Waste gases used to power Turbines producing 90 MW of power
- Comparable CO$_2$ emissions with conventional oil sources
- Minimal Water requirements
Project Description
Summary

- Initial production 15,800 bbl/d
- Surface mining and retorting of oil shale
- 40 year concession agreement signed in 2011
- Bankable Feasibility study accepted by government in 2009
- Design to meet World Bank equator principles

- Exclusive use of proven technology with process guarantees
- EPC with performance guarantees provide comfort for scale up
- 2 train production for flexible, reliable operation
- EIA accepted by government in 2009
Public Hearing - Amman
Public Hearing - Amman
Project Description
Successful Pilot Plant test runs

- 4 successful pilot plant runs in 2006, 2008 and 2009
- Independently witnessed and reported
- Oil shale handles well in retort – over 100% of energy and oil products in rock captured and utilised
- No external power or heat resources required
- Overall energy recovery = ~120% Fischer assay
- Range of Refinery ready products produced plus gases for power generation
Pilot Plant Oil Upgrading

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Licensor Conclusions:

- Pilot plant test program successfully demonstrated that shale oil can be hydro-processed to finished Euro grade distillates
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“The upgrading process is ready for commercialization”
• Plant produces high quality, low sulphur products
• Sales of synthetic crude or refined products
• Right to export included in concession agreement
• Minimal brackish water usage for dust suppression

• Commercial grade sulphur as co-product
• Excess power exported to national grid - 35MW
• Spent shale for backfilling or sale to cement industry
• Import natural gas for desulphurisation
Project Status - 2011
Impact of ‘Arab Spring’ in 2011
Jordanian issues affecting the JEML project

- Jordanian desire for energy security grows
  - Supply interruptions costly to Jordan
  - Greater focus on indigenous energy supplies

- Proactive moves to modernise Jordanian constitution
  - Support for King still strong
  - Bringing about change in a measured manner
  - Protests limited in nature

- Government changes resulted in admin delays
  - 3 new cabinets/energy ministers in last 12 months
  - Delays due to cabinet focus on constitutional matters
  - Project support remained strong throughout

- Jordanian government fully supports the JEML Oil Shale Project

  - Concession Agreement approved and now Jordanian Law

  - CA provides long term stability to JEML project
Pilot Plant runs in Calgary
Jordanian Visitors
Visit to Governor of Karak
Project Status - 2011
Project Scheduled Activities 2011

- Sign off Concession Agreement (Q1 11)

- Interim fund raising – (H2 11)

- FEED packages to main contractors

- Further resource development

- Additional staff recruitment and development

Concession Agreement signing ceremony 2011
### 2011 Concession Agreement Fiscals Terms

**JEML/KIO Concession Agreement Fiscal Terms**

- **Production Bonus**
  - $10 million at 2 million barrels

- **Royalty**
  - Sliding scale from 1% – 5% based on oil price – Brent reference

- **Petroleum Tax**
  - Sliding scale from 15%-65% based on ratio of Revenue / Costs

### Royalty Table

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<thead>
<tr>
<th>Oil Price – Brent $/bbl</th>
<th>Royalty</th>
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<tr>
<td>Brent &lt; 60</td>
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<tr>
<td>60 ≤ Brent ≤ 120</td>
<td>(5%-1%)/(120-60)*(Brent-60)+1%</td>
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<tr>
<td>Brent &gt; 120</td>
<td>5%</td>
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### Petroleum Tax Table

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<th>Revenue /Cost</th>
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<td>1.25 ≤ R/C &lt; 5</td>
<td>(65%-15%)/(5-1.25)*(R/C-1.25)+15%</td>
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<tr>
<td>5 ≤ R/C</td>
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Overall lifetime of the mine / proven reserves:
30 years @ 15,000 bpd increasing to 30,000 bpd then to 60,000 bpd by 2024
### Investment Considerations

**$25**
International finding and development cost per barrel of conventional oil

**$1**
JEML finding and development cost per barrel of shale oil

**$70–80**
International required oil price per barrel for new conventional oil projects

**$50–60**
JEML required oil price per barrel for Al Lajjun project
## Investment Considerations

Activities undertaken to de-risk the project

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- Proven resource
- Proven technology
- Attractive economics
- Concession Agreement security
- Stable country
- Financing in progress

**Continually reducing project risk and improving bankability**
Investment Considerations
Summary

Technology
• Scale up of proven technology with process guarantees
• Turnkey construction contract
• Low risk of environmental catastrophe
• Experienced management team

Economics
• Strong project economics
• Attractive returns in a growth sector
• Optionality for export of SCO or finished product
• Compliant with environmental requirements of lending institutions

Regional Considerations
• Strong government support evidenced in the Concession Agreement
• Stable country – all insurance markets open for cover

Follow-on potential
• Upside potential on existing resource
• Replica projects achievable in other locations with oil shale
• Second phase equity raise prior to IPO at operation phase
Thank you