Investing for the future
9th BIEE Academic Conference
European Energy in a challenging world: the impact of emerging markets
St John’s College, Oxford, 19-20 September 2012

Dr Steve Riley, CEO and President UK-Europe, International Power Plc
“Human beings depend on energy for their livelihood. Achieving a sustainable relationship between energy and the environment hinges on technological innovation and our ability to generate and use energy in ecologically sound ways.”

Ged Davis
Energy for Planet Earth
Scientific American
September 1990
Global energy over the last fifty years

Source: BP Statistical Review of World Energy, June 2012
“There is no power more expensive than no power” Indira Gandhi

<table>
<thead>
<tr>
<th>Country</th>
<th>Electricity production (TWh)</th>
<th>GDP ($US Bln)</th>
<th>Electricity intensity (TWh/$USBln)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>365</td>
<td>2432</td>
<td>0.15</td>
</tr>
<tr>
<td>Germany</td>
<td>615</td>
<td>3571</td>
<td>0.17</td>
</tr>
<tr>
<td>Poland</td>
<td>163</td>
<td>515</td>
<td>0.32</td>
</tr>
<tr>
<td>China</td>
<td>4700</td>
<td>7298</td>
<td>0.64</td>
</tr>
<tr>
<td>India</td>
<td>1006</td>
<td>1848</td>
<td>0.54</td>
</tr>
<tr>
<td>Indonesia</td>
<td>182</td>
<td>847</td>
<td>0.21</td>
</tr>
<tr>
<td>Russia</td>
<td>1052</td>
<td>1858</td>
<td>0.57</td>
</tr>
<tr>
<td>Turkey</td>
<td>228</td>
<td>773</td>
<td>0.30</td>
</tr>
<tr>
<td>Brazil</td>
<td>501</td>
<td>2477</td>
<td>0.20</td>
</tr>
<tr>
<td>Mexico</td>
<td>289</td>
<td>1155</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Source: Electricity production from BP Statistical Review of World Energy, June 2012 and GDP from World Bank
Shale gas a ‘disruptive’ technology

- Shale gas recoverable resources – currently estimated at 5,800 tcf in 32 countries compared with 16,000 tcf natural gas
- Estimated production costs - 5.5 to 8.2 US$/mmbtu
- Implications - USA from net consumer to net exporter and releases LNG resources for other countries
- Environmental concerns remain
Renewables deployment growing quickly

Source: BP Statistical Review of World Energy, June 2012
Notes: (1), includes wind, geothermal, solar, biomass and waste
There can be ‘surprising’ developments

Note * - added by the author
Global presence, global opportunities

North America
Houston
Total capacity in operation 14.9GW
Projects in construction 0.4GW

Latin America
Florianópolis
Total capacity in operation 11.5GW
Projects in construction 5.5GW

UK-Europe
London
Total capacity in operation 13.9GW
Projects in construction 0.0GW

Middle East, Turkey & Africa
Dubai
Total capacity in operation 22.1GW
Projects in construction 4.0GW

Asia
Bangkok
Total capacity in operation 9.6GW
Projects in construction 2.9GW

Australia
Melbourne
Total capacity in operation 3.5GW
Projects in construction 0.0GW

Total power capacity
In operation: 75.6GW
Projects in construction 12.8GW

Note: MW gross figures as at December 31st, 2011
## Electricity investments in different markets

<table>
<thead>
<tr>
<th>Merchant</th>
<th>Lower Risk Projects</th>
<th>Higher Risk Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- History of regulatory stability</td>
<td>- History of regulatory changes, with negative impact on participants</td>
</tr>
<tr>
<td></td>
<td>- Reliable forecast of market supply</td>
<td>- Unpredictable demand or supply</td>
</tr>
<tr>
<td></td>
<td>- Stable / predictable fuel prices</td>
<td>- Unpredictable fuel prices (e.g., US Shale Gas)</td>
</tr>
<tr>
<td></td>
<td>- Mechanisms promoting price stability (e.g., capacity payments, caps/floors)</td>
<td>- No price protection mechanisms</td>
</tr>
<tr>
<td>'Contracted'</td>
<td>- Credit-worthy offtaker or guarantee from Credit-worthy Government</td>
<td>- Concerns about credit-worthiness of offtaker</td>
</tr>
<tr>
<td></td>
<td>- Contractual risks are under the control of IPR and in line with our experience (e.g., Operations, Trading)</td>
<td>- Contractual risks are not under the control of IPR or are not in line with our experience (e.g., Dispatch risk)</td>
</tr>
<tr>
<td></td>
<td>- Contractual risks are predictable</td>
<td>- Contractual risks are unpredictable</td>
</tr>
<tr>
<td>General</td>
<td>- Committed Financing in place</td>
<td>- Financing Risk</td>
</tr>
<tr>
<td></td>
<td>- Committed Engineering, Procurement and Construction Contract in place, with back to back penalties with Offtake contract</td>
<td>- Contract Risk</td>
</tr>
<tr>
<td></td>
<td>- No Development Risk</td>
<td>- Development Risk</td>
</tr>
</tbody>
</table>
International Power’s low carbon projects in the UK

- Tidal
- Biomass
- Wind
- Carbon Capture and Storage

Key risk

Increasing technology maturity

Technology Complexity Fuel supply Political
### International Power’s investments in emerging economies

#### Brazil – Hydro

- 3,750MW (gross) hydro project, 50.1% owned by IPR
- 50 units x 75 MW each
- 73% contracted under 30 year PPAs (1), indexed to inflation
- Energy not contracted (net of PPA) to be sold in the free market and/or via future auctions
- Project to start phased commissioning in early 2013
  - River deviation successfully completed in September 2011
  - Fast ramp up to full assured energy

#### Indonesia – Geothermal

- 3 geothermal projects in Indonesia under development (3 x 220 MW)
- 30-year per MWh PPA with PLN(2), backed by guarantee from Indonesian Government
- Baseload technology with Take or Pay Guarantee
- Concessions awarded based on bids in 2010. Tariffs are now fixed
- IPR is about to start exploratory drilling to confirm the resource, requiring significant capital spend
- While the tariff is fixed from 2010, it is not possible to fix construction/financing contracts before the resource is confirmed

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**Notes:** (1), Power Purchase Agreement; (2), Perusahaan Listrik Negara
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“This country needs an all-out, all-of-the-above strategy that develops every available source of American energy – a strategy that’s cleaner, cheaper, and full of new jobs.”

President Barack Obama,
State of the Union Speech
24 January 2012