

# Offshore LNG Market Update Report To 2016

**The offshore LNG market is a revolutionary concept; combining onshore LNG concepts with offshore environments. The first edition of this report looks at the value of the sector, the drivers for floating liquefaction and offshore regasification and a regional assessment of the market outlook.**

## The Offshore LNG Market:

The offshore LNG market is a revolutionary concept; combining onshore LNG concepts with offshore environments. The concept has been discussed for many decades and has involved moving both LNG liquefaction and regasification terminals onto offshore platforms. There are inherent financial and technical risks associated with offshore liquefaction and regasification, but many of these risks are likely to be overcome. The progress of the offshore LNG market is likely to be driven by technological advancements, gradually improving economic conditions, requirements by energy-consuming economies to diversify sources of supply and expected growth in natural gas demand over the longer term.

Infield forecast that the capital expenditure (Capex) on Floating Liquid Natural Gas (FLNG) and offshore regasification market will total US \$20.2bn in the 2010-16 period. The majority of this Capex is attributable to the more capital intensive FLNG projects. At present, there are no commercially operational offshore liquefaction projects. However, in recent years, a number of proposed FLNG projects have been pursued. These have included Shell's Prelude project (Australia), Woodside's Sunrise project (Australia/Timor Leste) and Petrobras' Tupi pre-salt development offshore Brazil. Operators of these developments are all investigating the potential commercialisation of their respective gas reserves through the use of FLNG technologies.

There are over 2,000 trillion cubic feet (Tcf) of proven undeveloped gas reserves offshore in the world today. Infield has sought to identify those reserves that are most prospective for FLNG developments and in doing so, has identified and grouped fields into prospective development groups. Groups considered most prospective in the short term are found in Tiers 1 and 2. Combined, these tiers consist of 75 development groups and are represented by over 300 fields, equating to over 340 Tcf of gas reserves. Overall, the majority of Tier 1 & 2 potential lies in Australasia, followed by South East Asia, West Africa and Latin America. A range of national oil companies, majors and independent operators are shown as being involved, to a varying degree, in the potential development of FLNG development groups.

Unlike the FLNG market, there are a number of operational platforms in the offshore regasification market. This market alone is forecast to exceed US\$4.4bn in the 2010-16 period. An increase in forecast Capex over this period indicates the large number of proposed global offshore LNG regasification projects. This number has increased significantly in recent years and whilst short term bearish market dynamics may delay the implementation of some of these projects, the more positive view on gas demand in the longer term is likely to be a key driver in the development of regasification projects.

North America once represented the most prospective offshore regasification market. However, following the surge in shale gas production, combined with a fall in gas demand, many projects have been further delayed or altogether cancelled. At present,

Asia represents the region of highest forecast Capex associated with offshore regasification up until 2016. This will be driven by a number of proposed projects in Indonesia, Malaysia, Pakistan, Bangladesh and India. In total, Asian related Capex represents 39% of total offshore regasification Capex in the 2010-16 period.

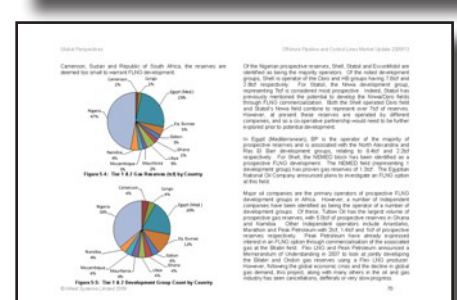
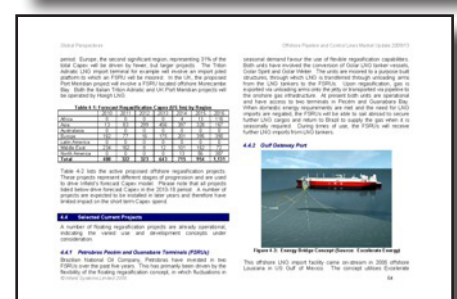
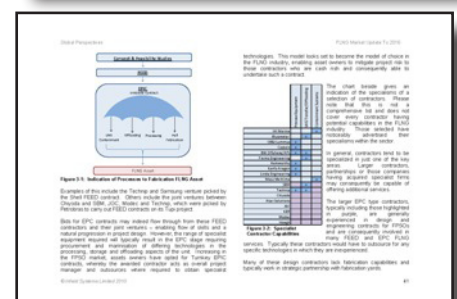
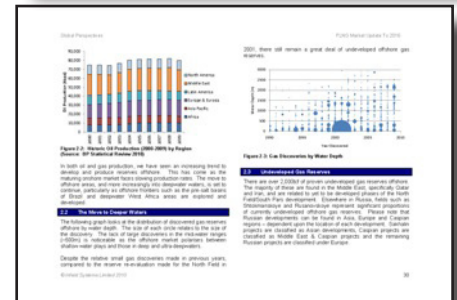
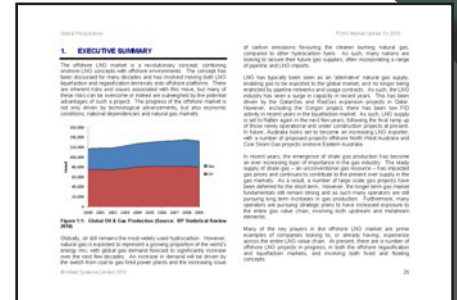
Overall, there are good long term fundamentals for the offshore LNG industry, with prospective FLNG and offshore regasification developments being identified in a number of locations at various water depths. For more information please see the **Global Perspectives Offshore LNG Market Update Report to 2016**.

## Why you should buy this report:

- It is an independent and up-to-date analysis of the offshore LNG sector, including a capital expenditure forecast to 2016 split by region and segment
- The report contains the latest list of proposed FLNG projects according to their proposed field and operator. A list of proposed offshore regasification projects is also included, detailing proposed location and operator
- Infield's unique offshore fields database and independent modelling process has been used to identify prospect gas reserves for FLNG development
- Appraise the report's region by region, country by country FLNG prospects, according to those gas reserves deemed more prospective in the short to mid-term

## Report Contents:

- **Executive Summary** provides a comprehensive overview of the complete market sector
- **Macro Overview** reviews the drivers behind the gas industry including the move to deeper waters, the LNG markets and the potential impact of unconventional gas reserves on gas markets
- **Floating Liquefaction** provides an in-depth review of key trends and drivers in the FLNG industry, including an analysis of forecast Capex spend to 2016, an assessment of technological issues and discussion of working relationships and varying business models being pursued. This section also discusses a number of sample projects proposed on the market at present
- **Offshore Regasification** provides an identification of key market drivers, a description of proposed offshore concepts, an analysis of forecast Capex spend to 2016 and discussion of sample projects
- **Regional Outlook** analyses each Infield region (Africa, Asia, Australasia, Europe, Latin America, Middle East & Caspian and North America), including an assessment of prospective FLNG developments provided by country, reserves and operator



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Purchasers will receive 12 months' free access to an unique data set through InfieldLive. The data set will identify prospect gas reserves for offshore liquefaction development. This data set forms the basis of the model used in the report and groups fields into possible development groups. Groups included are those containing fields within a defined geographic proximity, having the same field operator and having total group gas reserves in excess of 0.5Tcf. The following items are listed for each of the 950 fields within the defined development group:

- Project Group Name
- Operator
- Field Name
- Date / Year On Stream
- Date / Year Discovered
- Depletion Date /Year
- Reserves
- Production Rates
- Location
- Water Depths
- Project Status
- High Temperature / High Pressure

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- (c) "Conditions" means these Terms and Conditions of Business.
- (d) "Confidential Information" means the terms of the Contract and all information (whether written or oral) concerning the business and affairs of Infield or the Client, or any other person, firm, company or organisation which is obtained or received as a result of the discussions leading up to, the entering into or the performance of the Contract and which is either designated as proprietary or confidential or by the nature of the circumstances surrounding disclosure ought to be treated as proprietary or confidential.
- (e) "Contract" means these Conditions and the Schedule attached together with any quotation provided to the Client by Infield relating to the provision of the Service.
- (f) "Contract Date" means the date on which the Contract is entered into, being the date on which Infield accepts an order from the Client for the provision of the Service.
- (g) "Infield" means Infield Systems Limited, a company registered in England and Wales, company number 02596007, whose registered office is at Suite 502, 1 Alie Street, London E1 8DE.
- (h) "Quotation" means the document issued to the Client by Infield that sets out the description of the Service that will be provided by Infield and the Charges that will be charged for the Service.
- (i) "Service" means the service or product which Infield will provide to the Client on a subscription or fee paying basis for the Term, the main features of such Service being set out in the Quotation and any special terms applicable to it being set out in the Schedule attached.
- (j) "Term" means the period commencing on the Contract Date and ending on the date determined under paragraph 5 below.
- (k) "Third Party" means any person, firm or company which is not Infield or the Client. For the avoidance of doubt any parent company, wholly or partly owned subsidiary company or associated company of the Client and any contractor or consultant engaged by the Client is a Third Party for the purposes of these Terms and Conditions and the Contract.

**2. APPLICABLE CONDITIONS**

- (a) Unless otherwise agreed in writing by Infield these Conditions shall override and exclude any terms or conditions stipulated, incorporated or referred to by the Client whether in any order or in any

correspondence or negotiations occurring prior to the Contract Date.

- (b) The commencement of the provision of the Service shall be deemed conclusive evidence of the Client's acceptance of these Conditions.
  - (c) Infield's employees and representatives are not entitled to commit Infield to provide the Service on terms differing from the specific provisions of these Conditions unless such employees or representatives are able to produce to the Client authorities so to do signed by a duly authorised director of Infield.
  - (d) The Client agrees with Infield that it will not, and that it will procure that any employee, agent or sub-contractor of the Client will not, directly or indirectly and whether alone or in conjunction with any other person, firm or company, during the Term and for a period of 12 months after the Term has come to an end for any reason, canvass or solicit the employment of or endeavour to entice away from Infield any employee or director of Infield with whom the Client had contact or with whom the Client dealt in connection with the provision by Infield to the Client of the Service.
  - (e) These Conditions and the Contract to which they apply shall be construed and applied in accordance with English law and the English courts shall have sole jurisdiction in any dispute relating thereto.
- 3. THE SERVICE**
- (a) Infield will supply the Service to the Client throughout the Term in consideration of the Client paying to Infield the Charges.
  - (b) The Client will provide such assistance as Infield may reasonably request to assist Infield to provide the Service to the Client and will appoint and notify Infield of a person to be the Client's authorised representative with whom Infield should consult in connection with the provision of the Service.
  - (c) The Client shall not use the Service for any improper or unlawful purpose and the Client shall comply at all times with the terms of the Contract. The Client will use the Service only for its own internal purposes and in any use of data derived from the Service the Client will ensure that its source is appropriately acknowledged. The Client shall comply with any reasonable instructions which Infield may from time to time issue relating to the Service.
  - (d) The Client shall not in any way reverse engineer, disassemble or decompile any data or any part of any data provided by Infield as part of the Service except to the extent and for the express purpose authorised in advance in writing by Infield
  - (e) The Client shall not pass on any part of the Service or any information or analysis derived from the Service to a Third Party without the express written authorisation of a director of Infield. If authorisation is granted to the Client for any part of the Service or for information or analysis derived from the Service to be passed to a Third Party, the Client undertakes to include

the following reference, "Data source: Infield Systems Limited, London."

- (f) Where the Service is supplied to the Client for one specific project it may not be used by the client for any other purpose or project without the express permission of Infield.
- (g) The Client agrees that its use of the Service may be monitored and that Infield may terminate the provision of the Service forthwith by giving notice to the Client if the Service is found to be used otherwise than in accordance with the terms of the Contract and any instructions issued by Infield relating to the Service from time to time.
- (h) In its provision of the Service Infield will exercise all reasonable care and skill but no representation or warranty is given as to the accuracy or completeness of any information supplied nor as to the availability of the Service at all times.
- (i) Infield reserves the right to alter details of the Service at any time and will give as much notice to the Client as is reasonably practicable of any such alteration.
- (j) The Client acknowledges that Infield provides the Service on a syndicated basis and that it will not be provided exclusively to the Client.

**4. PAYMENT TERMS**

- (a) Unless otherwise agreed in writing the Client will pay to Infield the Charges as specified in the Quotation. Infield will issue VAT invoices for all such Charges.
- (b) If the Client fails to make any payment within 30 days of the due date then, without prejudice to any other right or remedy available to Infield, Infield shall be entitled to cancel the Contract or suspend the provision of the Service, and any amount not paid to Infield by the due date for payment shall bear interest at the rate of 6% per annum above the base rate of Lloyds TSB Bank plc from time to time, accruing from day to day, from the due date for payment until payment is actually made.
- (c) Infield will review its prices at least once in every year and may review its prices more frequently than that. Infield reserves the right to increase the Charges at any time to take account of any increase in the cost to Infield of labour, materials or overheads.
- (d) If the Client requests Infield to provide any additional elements to the Service over and above those specified in the Schedule attached Infield shall be entitled to increase the Charges payable by the Client to take account of such additional elements of the Service provided and such increased Charges shall be payable by the Client to Infield forthwith upon Infield giving notice thereof to the Client.
- (e) All rates and charges specified in any Quotation, these Conditions and the Schedule attached, or in any other documentation, are quoted exclusive of VAT which shall be payable at the rate prevailing

at the time, and unless otherwise specified, such rates and charges are quoted exclusive of delivery charges, bank charges, currency conversions and commissions, import duties, taxes or any other such charges, which are the responsibility of the Client.

- (c) Infield reserves the right to refuse the Client credit and demand payment prior to supply of the Service.

#### **5. TERMINATION**

- (a) Unless terminated under any other provision of these Conditions, the Contract shall continue in force unless and until terminated by either party by giving to the other party at any time not less than three months' notice in writing provided that in the case of the Service being supplied on an annual basis such notice shall expire on an anniversary of the Contract Date.
- (b) In addition to termination under any other provision of these Conditions, Infield shall be entitled to terminate the provision of the Service immediately by giving notice to the Client in the event that the Client has committed a material breach of the provisions of the Contract provided always that in the case of a breach which is capable of remedy Infield shall have identified the breach concerned and requested that the Client remedy it and the Client shall not have remedied the breach within the period of thirty days from being notified of the breach concerned.
- (c) In addition to termination under any other provision of these Conditions, Infield shall be entitled to terminate the provision of the Service where the Client undergoes a change of control within the meaning of section 416 of the Income and Corporation Taxes Act 1988.
- (d) Upon termination of the Contract any outstanding Charges must be paid in full forthwith by the Client to Infield.

#### **6. INTELLECTUAL PROPERTY RIGHTS**

- (a) The Client acknowledges and agrees that all rights, title and interest in the Service, all information supplied as part of the Service and all software and systems used in the Service are owned by Infield and nothing in the Contract shall confer on the Client any right of ownership of the Service, the information supplied or of any such software and systems.
- (b) Infield grants to the Client a licence during the Term to use information provided as part of the Service for the Client's own internal purposes only and subject to the limitations set out in the Quotation. Such Licence may be terminated by Infield at any time by giving notice accordingly to the Client.

#### **7. FORCE MAJEURE**

Infield shall not be liable for any failure of performance of the Service or for any interruption in the provision of the Service for any reason beyond Infield's reasonable control including but not limited to the failure of power supply, strikes or lock out, act of God, war, riot, explosion, abnormal weather conditions, fire, flood, government action, delay by suppliers, accidents, shortage of materials or labour, or computer failure.

#### **8. LIABILITY**

- (a) Save as expressly provided in these Conditions all warranties, conditions or other terms implied by statute or common law are hereby excluded to the maximum extent permissible by law.
- (b) Infield shall have no limit on its liability for death or personal injury caused by Infield's negligence or the negligence of any of its employees acting in the course of their employment or agents or sub-contractors acting within the course of their contracts.
- (c) Subject to paragraph 8(b) Infield shall have no liability to the Client in contract, tort (including negligence or breach of statutory duty) or otherwise howsoever and whatever the cause thereof for any increased costs or expenses, for any loss of profit, business, contracts, revenues or anticipated savings, or for any special, indirect or consequential loss or damage of any nature whatsoever.
- (d) Subject to paragraph 8(b) and notwithstanding anything contained in these Conditions, Infield's liability in contract, tort (including negligence or breach of statutory duty) or otherwise arising by reason of or in connection with the provision of the Service shall be limited to a sum equivalent to the Charges payable by the Client in the year during which such liability arises.
- (e) If in the course of the provision of the Service Infield provides forecasts or data of a forward-looking nature, Infield shall have no liability for the accuracy or completeness of any such data or forecasts.
- (f) In the case of the provision of the Service electronically the Client accepts responsibility for the compatibility of the Service with the Client's systems and at the Client's own risk.
- (g) In the case of the provision of the Service via the Internet Infield cannot guarantee Client accessibility 100% of the time.

#### **9. INDEMNITY**

The Client will indemnify Infield fully against all claims, losses, liabilities, costs (including legal costs) and expenses which Infield may suffer or incur as a result of any breach by the Client of its obligations under the Contract or as a result of any misuse of the Service by the Client.

#### **10. CONFIDENTIALITY**

Each of Infield and the Client shall keep confidential and not use without the prior written consent of the other all Confidential Information of or supplied by the other and shall not divulge the same to any third party except to the extent disclosure of the same is required by law or by any governmental or other regulatory body. Each of Infield and the Client will protect Confidential Information of the other with precautions at least as great as those taken to protect its own Confidential Information. The provisions of this paragraph shall not apply to any Confidential Information which is or becomes public through no fault of the party receiving that Confidential Information or was in the possession of the receiving party at the date of disclosure.

#### **11. NOTICES**

- (a) Any notice which must be given under the Contract must be in writing and may either be delivered personally or posted.
- (b) Notice given by post must be pre-paid and correctly addressed to the recipient company at its registered office.
- (c) A notice delivered personally is deemed served upon delivery.
- (d) A posted notice which complies with paragraph 11(b) above is deemed served on the second business day after the day of posting for UK domestic mail and on the fifth day after the day of posting for international mail.

#### **12. GENERAL**

- (a) Neither party shall assign or otherwise dispose of any part of its rights or obligations under the Contract without the prior written consent of the other.
- (b) The headings are for convenience only and shall not be used to interpret these Conditions.

#### **THE SCHEDULE**

##### **Special Terms relating to the Service**

#### **1. DEFINITIONS**

In this Schedule the following expressions shall have the following meanings:

- (a) "Account" means the registered login specifications for the Client's access to Online Services.
- (b) "Advertisement" means any copy, artwork, illustration, image, words, and/or electronic file promoting the Client's own products and services that is allocated space in or on Infield's websites, printed materials and/or electronic documents.
- (c) "Analytical Services" means bespoke work carried out by Infield Analytical Services team.
- (d) "Data Purchase" means the purchase of an annual subscription to Online Services inclusive of updates.
- (e) "Data Lease Purchase" means the purchase of annual subscription of inclusive of updates for a Term of four years, where the cost of Data Purchase and updates over the four years are split into four equal annual payments.
- (f) "Data Lease Purchase Contract" means a contract between Infield and the Client for Data Lease Purchase.
- (g) "EnergyGateway" means the Internet based mapping and data service located at <http://www.offshoreenergygateway.com>.
- (h) "FileShare" means the Internet based file sharing service located at <http://www.infield.com/fileshare>.
- (i) "InfieldLive" means the Internet based data service located at <http://www.infieldlive.com>.
- (j) "InfieldOnline" means the Internet based data service located at <http://www.infieldonline.com>.
- (k) "Login" means the act of entering a User's unique email address and unique password to Online Services.
- (l) "Online Services" means services accessed through the Internet provided by Infield including but not exclusively restricted to

InfieldOnline, InfieldLive, EnergyGateway and FileShare.

- (m) "Publication" means a printed document or electronic file published by Infield.
- (n) "Timescale" is the period of time in days and/or weeks for a Service to be completed from the agreed start date.
- (o) "User" is the named individual with a named and unique email address who is permitted access to the Client's Online Services Account.

## **2. DATA & ONLINE SERVICES**

- (a) Prices quoted for Online Services and Data are valid for 30 days from the date of the Quotation. Thereafter Infield reserves the right to vary the price at its discretion.
- (b) Infield reserves the right to withdraw any Quotation at any time.
- (c) All quotes are strictly for a single site three user licence unless otherwise agreed.
- (d) Clients opting for Data Lease Purchase will be deemed to have entered into a contract for a term of four years under which the Client will be invoiced on each anniversary of the Contract Date.
- (e) Data Lease Purchase Contracts can only be terminated by the Client paying the balance for the standard purchase of the database or data sets plus the updates since the Contract Date.
- (f) A Client terminating a Data Lease Purchase Contract prior to the fourth anniversary must remove all Infield Data from all servers, hard disk drives, disks, internets and intranets and any other electronic storage system now known or hereafter invented and confirm by Notice to Infield that they have done so.
- (g) For updating of Data and Online Services, renewal invoices are issued prior to the annual anniversary of the Contract Date. To terminate such a contract the Client must give notice to Infield within 14 days of receipt of the renewal invoice.
- (h) Infield reserves the right to change the Online Services at its discretion. Any such change will be notified to the Client.
- (i) The Client agrees that each User of its Online Services Account will be registered and will be issued with the User's own unique password and use the User's unique email address which is the registered domain of the Client as the User's user name.
- (j) The Client agrees that each User is subject to Infield's Terms and Conditions of Business and logging on to Online Services is acceptance of Infield's Terms and Conditions of Business.

(k) Each User must maintain the confidentiality of the User's password and will not pass it on to any Third Party or to any other individuals or employees in the Client's organisation.

- (l) The Client will appoint one User as the "point of contact" for their Online Services Account. In the event the Client does not nominate an individual then Infield will do so.
- (m) In the event a User believes that his password is known by others he must inform either the Client's point of contact or Infield immediately via electronic mail and new codes will be issued.
- (n) It is the responsibility of the Client to inform Infield of any changes to the list of registered Users and of any misuse of Online Services.
- (o) The Client has the right to cancel the Online Services at any time prior to the point the unique password is used to login to the Online Services, after which the Service is deemed to have started. Due to the nature of the Service the Client cannot cancel Online Services after this point.
- (p) For any Service sent via electronic mail the Service will be deemed to have started as soon as the files have passed through Infield's email exchange.
- (q) Infield reserves the right to cancel Online Services at any time by giving notice accordingly to the Client. In this event Infield will refund the proportion of the remaining subscription paid in blocks of one day.

## **3. ANALYTICAL SERVICES**

- (a) Prices quoted for Analytical Services are valid for seven days from the date of issue. After seven days Infield reserves the right to resubmit a Quotation.
- (b) Infield reserves the right to withdraw any Quotation at any time.
- (c) Timescale is an estimate only and is dependent upon the start date, any existing work/holiday commitments of Infield personnel engaged in the provision of the Service, the availability of any external individuals for interview and delivery of any agreed items by the Client.
- (d) Charges exclude any travel, accommodation and communications expenses, which will be recharged at cost plus a percentage surcharge as set out in the Quotation. Charges also exclude any items of data bought-in from external sources for the work.
- (e) Infield will seek prior approval from the Client for expenditure exceeding £200 on any re-chargeable item in 3(d) above.
- (f) Payment terms are that Charges and expenses will be invoiced at 50% upon

receipt of order and the remaining 50% upon delivery of the final report.

## **4. ADVERTISING SERVICES**

- (a) All advertising is offered on a first come first served basis and is subject to Infield's approval.
  - (b) Infield reserve the right to refuse to publish an Advertisement.
  - (c) Advertisements must conform to the British Code of Advertising Practice and must accurately reflect the product and/or service being advertised.
  - (d) All claims, and statements made in Advertisements must be supported by appropriate evidence and such evidence must be made available to Infield upon request.
  - (e) The Client warrants it has the right to publish the contents of the Advertisement, without infringement of any rights of any third party including, without limitation, intellectual property rights.
  - (f) The publication of an Advertisement by Infield does not constitute endorsement of the Client, its products or services.
  - (g) Space reserved by the Client must be paid in full where the Advertisement is not published due to an act or omission by the Client.
  - (h) Infield will not be liable for any loss or damage caused by amendment, error, late publication or non-publication from any cause whatsoever.
  - (i) Infield will not accept liability for any error on the part of third parties or inaccurate copy instructions.
  - (j) Infield reserves the right to publish the most appropriate copy should copy instructions not be received by the stipulated time.
- ## **5. PUBLICATION SERVICES**
- (a) Publications will be despatched within 24 hours of receipt of payment if in stock.
  - (b) In the event of an item ordered being out of stock, Infield will inform the Client of the lead time for delivery.
  - (c) In the unlikely event that an item is damaged when the Client receives it Infield will replace it at no additional charge.
  - (d) Due to the nature of Infield's publications once the publication has been despatched no refund can be made.
  - (e) Infield reserves the right to despatch Publications only upon receipt of payment in full.

27 April 2009