FLNG projects have continued to mature against a background of low commodities prices and fundamental changes to the LNG commercial landscape. Against this challenging background, FLNG project developers have completed construction of two vessels and taken FID on one further project. Two other FLNG projects are at various stages of completion.

The wide range of technical and commercial solutions being applied or considered demonstrates that FLNG technology is evolving to “weather the challenge” of low oil and LNG prices, and fundamental changes in the LNG market.

Against this diverse background of projects and challenging economic conditions, there are many lessons to be learned from the past years of FLNG project development including development concepts and technical trends, competing technologies, project risks, and design and construction experience. With the first FLNG vessel now on site and in commission, early operational experience will soon become available.

This workshop will provide an update to the technical learning from FLNG projects to date. Workshop participants will gain an understanding of the key drivers of FLNG projects, and therefore the type of developments this technology is best suited for. FLNG is not a single, one size fits all, concept. The workshop will provide an understanding of the range of FLNG development options, their advantages and limitations.

Who Should Attend
This workshop will benefit professionals in operating companies, service providers and academicians who are interested in learning about new technologies, relevant challenges and achievements in the FLNG industry. We expect regulatory agencies, project developers, engineers, FLNG EPC contractors and suppliers, reservoir engineers, commercial staff, project finance providers and technical consultants to participate in this workshop.

Session Highlights
- Trends in the LNG industry
- FLNG project experience: lessons learnt so far
- HSE in FLNG
- FLNG regulatory, contractual, and classification issues
- Competing technologies and innovation
- Life cycle management
- FLNG in the gas value chain
- FLNG technologies and innovation
Ikhwan Yussof, Learnt So Far
smooth operations of the facilities already in operation. smooth execution of their respective projects as well as through. Early operational experiences of these facilities will commissioning experiences that these projects have gone FLNG projects currently undergoing EPCIC stage as well 1300 – 1 430 hrs 1 200 – 1 300 hrs Networking Lunch Session Manager: Jamaludin Takei, Amir Hamzah Ghazali, PETRONAS MONDAY, 20 MARCH 2017 Why You Should Attend • Are global environmental concerns providing an advantage for FLNG? • What is the market niche for FLNG developments? • Are the high costs of onshore LNG plants providing • Local content • Process and performance guarantees • Process technologies (e.g. AGRU, Hg removal, MEG •  Vessel design / naval architecture technologies •  Metering technologies •  Subsea processing •  Novel flow assurance strategies •  Refrigeration technologies •  Concepts of LNG regas types and their requirements •  System location and safety considerations •  The downstream LNG cycle – transportation and other •  Data management •  Operations and maintenance strategies •  Risk assessment and insurances •  Risk evaluation techniques •  Key design issues •  Regulatory and class issues •  Concept evaluation •  Offloading systems •  Process and performance guarantees •  Type of containment systems •  Vessel design and structural issues •  Offloading systems •  Use of FLNG as a business tool •  Lighter OPEX challenges to project sanction are increasingly being addressed by innovative new technologies. Lighter •  Gas handling systems •  Subsea processing •  Plate and frame heat exchangers •  Compressors •  Heat exchange and pressure vessels •  Vessel design / naval architecture technologies •  Refrigeration technologies •  Novel flow assurance strategies •  Refrigeration technologies •  Novel flow assurance strategies •  Refrigeration technologies •  Novel flow assurance strategies Workshop Objectives The workshop will provide participants with an overview of the ways in which FLNG technology is adapting to the current business climate and enable participants to share experience in the development and execution of FLNG projects to date. Preliminary Workshop Schedule 0900 – 0930 hrs Welcome and Introduction Keynote Address Session Managers: Andrew Duncan, Gaffney, Cline & Associates; Amir Hamzah Ghazali, PETRONAS Group Photo / Coffee Break Session 1: Trends in the LNG Industry Session Manager: Jamaludin Takei, PETRONAS Carigali This session will focus on how current trends in the LNG industry are impacting growth and/or creating opportunities for floating LNG technologies in Asia Pacific including both liquefaction and regasification. • Are the high costs of onshore LNG plants providing an advantage for FLNG? • What is the market niche for FLNG developments? • Is FSRU technology opening up new markets for LNG? • Will Mini-LNG solutions become a reality for remote areas of Asia Pacific? • Are global environmental concerns providing an opportunity for the floating LNG industry? Networking Lunch Session 2: FLNG Project Experience: Lessons Learnt So Far Session Managers: Amir Hamzah Ghazali, PETRONAS; Ikhwan Yussof, PETRONAS The focus of this session is on the lessons learnt from FLNG projects currently undertaking EPCIC stage as well as those facilities already in operations. Topics of discussion include design issues, construction execution challenges and commissioning experiences that these projects have gone through. Early operational experiences of these facilities will also be discussed. Discussion leaders will share on their experience in resolving issues faced and ensuring the smooth execution of their respective projects as well as smooth operations of the facilities already in operation. 1430 – 1600 hrs Session 3: HSE in FLNG Session Manager: Suba Sivandran, BMT Fluid Mechanics This session will focus on Health, Safety & Environment (HSE) and Risk & Reliability issues facing FLNG developments. In a cost concerned environment, how can we use Risk & Safety to drive design? Which techniques should we focus upon to ensure safety remains our top priority whilst avoiding over-design? The session will explore how projects should navigate the complex and sometimes onerous nature of HSE and Risk & Reliability studies and integrate them into a meaningful Risk Management Strategy. 1600 – 1630 hrs Coffee Break 1630 – 1800 hrs Poster Session / Networking Reception www.spe.org/go/17WM12
### Preliminary Workshop Schedule

#### TUESDAY, 21 MARCH 2017

<table>
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<th>Time</th>
<th>Session</th>
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| 0900 – 0930 hrs | **Review of Day 1**  
Session Managers: Andrew Duncan, Gaffney, Cline & Associates; Amir Hamzah Ghazali; PETRONAS |
| 0930 – 1030 hrs | **Session 5: Competing Technologies and Innovation**  
Session Managers: Lou Khee Fang, PETRONAS; Gareth Lee, RISC Advisory; James Holbeach, Wood Group Kenny  
Against the background of low oil prices, CAPEX and OPEX challenges to project sanction are increasingly being addressed by innovative new technologies. Lighter topsides, more efficient control schemes, fit-for-purpose novel design, new processes and more efficient data are all being used to help deliver projects around the world. FLNG is a fertile breeding ground for such innovative leaps and this session will explore some of the competing technologies, the risks and potential rewards involved in adopting these technologies, and how they contribute to a successful project sanction. Topics for discussion include:  
• Refrigeration technologies  
• Novel flow assurance strategies  
• Subsea processing  
• Advanced Control System design  
• Metering technologies  
• Vessel design / naval architecture technologies  
• Process technologies (e.g. AGRU, Hg removal, MEG regeneration / reclamation) |
| 1100 – 1130 hrs | **Coffee Break** |
| 1130 – 1300 hrs | **Session 6: Life Cycle Management**  
Session Managers: Gareth Lee, RISC Advisory; Muammar Gadhafi Hairudin, SBM Offshore  
The operations, maintenance and sustaining capital expenditure over the life of an FLNG facility is anticipated to be at least as large as the initial capital cost. FLNG facilities will therefore need significant support over their life in the field – something we as an industry have not yet done. This session aims to discuss the technical and commercial considerations of FLNG life cycle management by covering areas such as:  
• Staffing and training  
• Operations and maintenance strategies  
• Data management  
• Uptime, reliability and integrity  
• Risk assessment and insurances  
• Operations and maintenance strategies  
• Staffing and training  
• Risk assessment and insurances  
• Operations and maintenance strategies |
| 1300 – 1400 hrs | **Session 7: FLNG in the Gas Value Chain**  
Session Manager: Alastair Jones, Lloyd's Register Asia  
As global energy consumption is expected to rise (about 35% by 2040), there is a need to put the world on track to limit global warming. More power plants are needed but with anticipated low carbon emission. There is demand for energy and gas is a clean option. LNG has become an important energy alternative to reduce greenhouse gas emissions. Regas ships are presently being considered for many locations around the globe to satisfy the energy demands. The following will be discussed in this session:  
• Why shipbourne LNG Regas / NIMBY  
• Concepts of LNG regas types and their requirements  
• System location and safety considerations  
• The downstream LNG cycle – transportation and other end users |
| 1400 – 1530 hrs | **Session 8: FLNG Technologies and Innovation**  
Session Managers: Lou Khee Fang, PETRONAS; James Holbeach, Wood Group Kenny  
Following from Session 5, this session will focus on new technologies that are specifically driving improvements in FLNG design to enhance technology and operational performance. Many areas of design are peculiar to FLNG thus niche technologies and innovative leaps in design are required to tackle them. FLNG is driving technological improvement in diverse areas from slashing of cryogenic liquids, offloading arrangements, vessel mooring and turret design, control systems to management of maintenance schedules and equipment. This session will explore some such technologies and the issues and associated risks/benefits that are yet to be adequately solved. |
| 1530 – 1600 hrs | **Coffee Break** |
| 1600 – 1730 hrs | **Workshop Summary**  
Session Managers: Andrew Duncan, Gaffney, Cline & Associates; Amir Hamzah Ghazali, PETRONAS |

### Poster Presentation

All participants are encouraged to prepare a poster for the Workshop. Presentations on both research and field experience are welcomed. Posters, including unconfirmed or partial results, are to be presented at an assigned time and are open for discussion. Posters will be on display for the entire Workshop period.

When preparing your poster:
- Avoid commercialism. No mention of trademarks/product name
- Poster size should be approximately 0.8m x 1.2m (W x H) or size A0 in portrait layout
- Identify topic by title, affiliation, address, and phone number
- Include a brief abstract that summarises the technology to be addressed
- Make the display as self-explanatory as possible
- Place the information in sequence: beginning with the main idea or problem, method used, results, etc. (Draw a plan keeping the size and number of illustrations in mind)
- Keep illustrations simple by using charts, graphs, drawings, and pictures to create interest and visually explain a point
- Use contrasting colours
- Use large print for narrative materials. (We suggest a minimum of 24 points or 3” high letters for the title)

Note that the Workshop Programme Committee will review all poster abstracts/materials prior to display, and reserves the right to refuse permission to display any poster considered to be commercial in nature.

If you are interested to participate, please email your proposed topic with a short abstract (between 200-300 words) to Lesley Chua at lchua@spe.org by 20 February 2017.

The Society of Petroleum Engineers (SPE) is a not-for-profit organisation. Income from this event will be invested back into SPE to support many other Society programmes. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Scholarships, certification, the Distinguished Lecturer programmes, and SPE’s energy education programmes Energy4me are just a few examples of programmes that are supported by SPE.
GENERAL INFORMATION

Documentation:
• Proceedings will not be published; therefore, formal papers and handouts are not expected from speakers.
• Work in progress, new ideas, and interesting projects are sought.
• Note-taking by attendees is encouraged. However, to ensure free and open discussions, no formal records will be kept.

Workshop Deliverables:
• The committee will prepare a full report containing highlights of the Workshop and the report will be circulated to all attendees.
• PowerPoint presentations will be posted online and provided to attendees after the Workshop. Provision of the materials by Discussion Leaders will signify their permission for SPE to do so.

Commercialism:
In keeping with the Workshop objectives and the SPE mission, excessive commercialism in posters or presentations is not permitted. Company logos must be limited to the title slide and used only to indicate the affiliation of the presenter.

Attendance Certificate:
All attendees will receive a Workshop attendance certificate. This certificate will be provided in exchange for a completed Attendee Survey Form.

Continuing Education Units:
This Workshop qualifies for SPE Continuing Education Units (CEU) at the rate of 0.1 CEU per hour of the Workshop.

Travel/Visa:
Attendees are advised to book their airline tickets early. All travellers must be in possession of passports valid for at least six (6) months with proof of onward passage. Contact your local travel agent for information on visa requirements.

Dress Code:
Business casual clothing is recommended. The Workshop atmosphere is informal.

Registration Fee:
• Registration fee ONLY includes all workshop sessions, coffee breaks and luncheons for the registrant. Accommodation is NOT included.
• SPE will provide details of recommended hotels upon receipt of your registration.

Registration Policy:
• Registration fee MUST be paid in advance for attending the Workshop.
• Full fixed fee is charged regardless of the length of time the registrant attends the Workshop, and cannot be prorated or reduced for anyone.

SPONSORSHIP SUPPORT INFORMATION

Sponsorship support of the event helps offset the cost of producing workshops and allows SPE to keep the attendance price within reach of operation-level individuals, those who benefit most from these technical workshops.

Supporters benefit both directly and indirectly by having their names associated with a specific workshop. While SPE prohibits any type of commercialism within the workshop room itself, the Society recognises that supporting companies offer valuable information to attendees outside the technical sessions.

Sponsorship Categories
Sponsorship categories are offered on a first-come basis. Please contact SPE to enquire and verify the availability of categories. Existing supporters have the opportunity to renew the same level of support for annual workshops.

Sponsorship Benefits
In addition to onsite recognition, SPE will recognise sponsors on the SPE website and in all printed materials for the workshop. Based on the category selected, supporting companies also receive logo visibility on promotional workshop items.

For More Information
For a detailed list of available sponsorship opportunities, including benefits and pricing, contact Lesley Chua at lchua@spe.org.
Society of Petroleum Engineers

SPE Workshop:
FLNG - Weathering the Challenges
20 – 21 March 2017 | Kuala Lumpur, Malaysia

REGISTRATION FORM

SPE Member: □ Yes  □ No

Membership No. ______________________________________________

Name: ___________________________________________________________________________________________________________________
(First / Forename)   (Middle)   (Last / Family Name)

Position: __________________________________________________________________________________________________________________

Company: _________________________________________________________________________________________________________________

Address: __________________________________________________________________________________________________________________

Town/City: ______________________________ Zip/PostalCode:_______________________________ Country: _________________________________

Tel:____________________________________ Fax:________________________________________ Email: ____________________________________

Would you be willing to give a brief (10-15 minutes) presentation _______(Yes/No)? If yes, please attach the topic with a short abstract of your proposed presentation. One of the Programme Committee members will contact you to discuss your presentation.

Important: Registrants for SPE Workshops are accepted on the basis of information submitted by each registrant.

Technical Disciplines (Check One)

- □ Drilling
- □ Completions
- □ Management and Information
- □ Projects, Facilities and Construction

Primary Responsibility (Check One)

- □ Drilling
- □ Economics
- □ Geology
- □ Geophysics
- □ Geophysics
- □ Management
- □ Operation
- □ Production
- □ Reservoir
- □ Surveillance
- □ Other: ____________________

List background and experience. (Use additional paper if required).

List your expectation for the Workshop, so that the committee can tailor a portion of the Workshop to answering attendees' concerns. (Use additional paper if required).

Registration Fees
Please tick appropriate box

<table>
<thead>
<tr>
<th>Super Early Bird Registration BY 1 February 2017</th>
<th>Early Bird Registration BY 1 March 2017</th>
<th>Registration AFTER 1 March 2017</th>
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<tr>
<td>□ SPE Member  □ Non-member</td>
<td>□ SPE Member  □ Non-member</td>
<td>□ SPE Member  □ Non-member</td>
</tr>
<tr>
<td>Workshop (20 – 21 March)</td>
<td>□ US$ 1,500.00  □ US$ 1,700.00</td>
<td>□ US$ 1,600.00  □ US$ 1,800.00</td>
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GROUP REGISTRATIONS AVAILABLE – Please contact us at spekl@spe.org.

Note: Fee includes workshop sessions, workbook, certificate, daily luncheons and coffee breaks. Registration fees does not include accommodation.

Cancellation Policy:

- a) A processing fee of USD150.00 will be charged for cancellation received thirty (30) days prior to the first day of the workshop.
- b) 25% refund will be made for cancellation received between twenty nine (29) - fifteen (15) days prior to the first day of the workshop.
- c) No refund on cancellation received fourteen (14) days prior to the first day of the workshop.
- d) No refund will be issued if a registrant fails to show up on-site.

This form may be used as a company invoice.

Mail completed registration form with remittance and any supporting material to:

Society of Petroleum Engineers
Level 35, The Gardens South Tower, Mid Valley City
Lingkaran Syed Putra, 59200 Kuala Lumpur, Malaysia.
Tel: 60.3.2182.3000        Fax: 60.3.2182.3030
E-mail: spekl@spe.org

Payment by Telegraphic Transfer

□ Telegraphic Transfer (Bank details will be provided on the tax invoice).

Payment by Credit Card

Credit Card Payment will be in U.S. Dollars only

□ American Express  □ MasterCard  □ Visa  □ Diners Club

Card Number ___________ Expiration Date (mm/yy) ___________

Security Code (3 digits on back of card / 4 digits on the front of Amex)

Credit Card Billing Address & Zip/Postal Code

Name of Card Holder

Signature

Note: Forms will not be processed and space cannot be guaranteed unless accompanied by payment for total amount due. unless accompanied by payment for total amount due.