Review of natural gas hydrates as an energy resource: Prospects and challenges

By: Chong, ZR (Chong, Zheng Rong); Yang, SHB (Yang, She Hern Bryan); Babu, P (Babu, Ponniyalavan); Linga, P (Linga, Praveen); Li, XS (Li, Xiao-Sen)

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Abstract
Natural gas is the cleanest burning fossil fuel and has been identified as a strong candidate for energy resource compared to oil and coal. Natural gas hydrate is an energy resource for methane that has a carbon quantity twice more than all fossil fuels combined and is distributed evenly around the world. Several field trials on energy production from hydrate resources have been conducted, and their outcomes revealed the possibility of energy production from hydrate resources. In this paper, we review various studies on resource potential of natural gas hydrate, the current research progress in laboratory settings, and several recent field trials. Possible limitation in each production method and the challenges to be addressed for large scale production are discussed in detail. Whilst there are no technology stoppers to exploit or produce methane from hydrates, specific technological breakthroughs will depend on the effective management of the sand and water during production, as well as the appropriate mitigation of environmental risks. (C) 2015 Elsevier Ltd. All rights reserved.

Keywords
Author Keywords: Gas hydrates; Natural gas; Energy recovery; Energy resource; Methane hydrates; Unconventional gas
KeyWords Plus: ETHYLENE-GLYCOL INJECTION; STRATIGRAPHIC TEST WELL; ALASKA NORTH SLOPE; OF-THE-ART; METHANE-HYDRATE; CARBON-DIOXIDE; POROUS-MEDIA; BEARING SEDIMENTS; THERMAL-STIMULATION; NANKAI TROUGH

Author Information
Reprint Address: Linga, P (reprint author)

Address:


E-mail Addresses: praveen.lingga@nus.edu.sg; lixs@ms.giec.ac.cn

Funding

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Hide ResearcherID and ORCID

Author | ResearcherID | ORCID Number
------- | ------------ | --------------
Linga, Praveen | E-4980-2011 | http://orcid.org/0000-0002-1466-038X
Babu, Ponnivalavan | E-4937-2013 | http://orcid.org/0000-0001-7438-5722

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### HOT PAPERS FOR (LINGA P)

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#### 1 Citations: 32

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**Authors:** CHONG ZR; YANG SHB; BABU P; LINGA P; LI XS

**Source:** APPL ENERG 162: 1633-1652 JAN 15 2016

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**Field:** ENGINEERING

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Hot Paper Thresholds

**Hot papers** are papers that receive a large number of citations soon after publication, relative to other papers of the same field and age. More precisely, they are papers published in the past two years that received a number of citations in the most recent two-month period that places them in the top 0.1% of papers in the same field.

Sample Report

The following excerpt shows ten two-month periods, beginning with the fourth period (July-August) of 2011. The most recent two-month period is 2013-1 (January-February 2013). This report reveals that a paper in the field of Chemistry is "hot" if:

- It was added to Web of Science in the 4th period of 2011, and it received at least 14 citations in the most recent two-month period.
- It was added to Web of Science in the 2nd period of 2012, and it received at least 12 citations in the most recent two-month period.
- It was added to Web of Science in the 1st period of 2013, and it received at least 3 citations in the most recent two-month period.

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When the header of the last column changes to 2013-2, different numbers can appear in some or all of the columns. Those numbers may be larger or smaller because only citation data from the current two-month period is used to generate the counts in all of the columns.

Be aware that the total number of citations received by a hot paper will likely be higher than the number shown in any one of these columns—which is only the number of citations received in the current two-month period.