

It appears that you are currently using Ad Blocking software. What are the consequences? Click here to learn more.

This website uses cookies to ensure you get the best experience on our website. More info

Nanotechnology Physics Earth Astronomy & Space Technology Chemistry Biology Other Sciences

search



Home Physics General Physics November 20, 2017

Physics forecasts for fracking and fuels

November 20, 2017



To generate sand slurry requires a low-pressure manifold to mix water and polymers with sand.

Credit: Tadeusz Patzek

Society's demand for energy relies mainly on oil and gas, which are finite resources. Future technologies could reduce the consumption of energy, but until then, existing resources must be carefully managed. Director of the Ali I. Al-Naimi Petroleum Engineering Research Center at KAUST Tadeusz Patzek is using physics to tackle this challenge by modeling the production of gas from fracking.

Patzek and his coworkers describe two visions of global energy consumption. Optimists believe that human population, energy use and economies can continue to grow exponentially because humans will keep inventing innovative ways to survive. Others, however, note that the Earth imposes clear limits on growth, meaning that energy production will peak before tailing off.

Oil and gas production has indeed reached peaks in the past, but these have been usurped by discoveries of new reserves and technologies for extracting fuels from previously inaccessible areas. The most complex and controversial new process is fracking (hydraulic fracturing) of ancient ocean beds called

| Featured | Last comments | Popular |
|--|---------------|---------|
|  Ancient penguin was as big as a (human) Pittsburgh Penguin Dec 12, 2017 1 | | |
|  New silicon structure opens the gate to quantum computers Dec 12, 2017 3 | | |
|  Upper body strength key factor in men's bodily attractiveness Dec 13, 2017 12 | | |
|  Hyperlens crystal capable of viewing living cells in unprecedented detail Dec 11, 2017 4 | | |
|  Electromagnetic water cloak eliminates drag and wake Dec 11, 2017 7 | | |

[more »](#)

Phys.org

 Follow

Phys.org on facebook

| | | | | | |
|----------------|---------|-------------------|-----------------|---------------|---------|
| Top | Help | Science X Account | Feature Stories | Android app | Connect |
| Home | FAQ | Sponsored Account | Latest news | iOS app | |
| Search | About | Newsletter | Week's top | Amazon Kindle | |
| Mobile version | Contact | RSS feeds | Archive | | |

Their resulting model requires very few parameters to model the diffusion of gas out of fracking wells, and the researchers validated it by accurately predicting the output of 14000 gas wells in the US.

Overall, the study showed that only 10-20% of natural gas in fracking fields is being extracted with today's techniques. This suggests that, while technical improvements could prolong the lifetime of fracking as a useful fuel source, the flood of gas predicted by some industrialists is not yet guaranteed.

Patzek won't state whether he is an optimist or a pessimist regarding fracking. "I am neither," he says. "I am a scientist, and my outlook on nature is governed strictly by the chemistry and physics of the processes at hand. However, I am also an avid environmentalist, and from this perspective, business as usual is ending for humanity."

Patzek and coworkers have certainly shown that physicists have a role in developing new business models for future energy sources.

Explore further: UK oil and gas reserves may last only a decade, study suggests

More information: Michael Marder et al. Physics, fracking, fuel, and the future, *Physics Today* (2016). DOI: [10.1063/PT.3.3236](https://doi.org/10.1063/PT.3.3236)

Journal reference: [Physics Today](#)

0 shares

Provided by: King Abdullah University of Science and Technology

[feedback to editors](#)

Related Stories

UK oil and gas reserves may last only a decade, study suggests

September 19, 2017

The Scottish and UK oil industries are entering their final decade of production, research suggests.



UK government lifts ban on gas 'fracking'

December 13, 2012

The British government on Thursday ended the suspension of the controversial shale gas extraction method known as fracking in Britain.

Simple scaling theory used to better predict gas production in barnett shale wells

November 18, 2013

Researchers at The University of Texas at Austin have developed a simple

Recommended for you



Researchers taking optical device out of the lab and into the clinic to detect cancer at its earliest stages

December 14, 2017

In a paper published in *Nature Scientific Reports*, a team of researchers at Worcester Polytechnic Institute (WPI) has demonstrated how a device that uses beams of light to grip and manipulate tiny objects, including individual ...



Doing without dark energy: Mathematicians propose alternative explanation for cosmic acceleration

December 14, 2017

Three mathematicians have a different explanation for the accelerating expansion of the universe that does without theories of "dark energy." Einstein's original equations for General Relativity actually predict

User comments

validity of ray optics in telescopes 3 hours ago

Liquid boiling and Evaporation 3 hours ago

why is the general theory of relativity so complicated 5 hours ago

How long would it take for gas to leak out of a space box? 7 hours ago

Calculating how to make a homemade capacitor 7 hours ago

[More from General Physics](#)

Please sign in to add a comment. Registration is free, and takes less than a minute. [Read more](#)

Sign in

[Click here to reset your password.](#)

[Sign in](#) to get notified via email when new comments are made.