

The Biggest Environmental Disaster In the History Of The West Coast Could Be Turned Into The Greenest Energy Solution

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The Biggest Environmental Disaster In the History Of The West Coast Could Be Turned Into The Greenest Energy Solution

These headlines are shocking millions of people across the nation:

[California Declares State Of Emergency Over L.A. Methane Leak](#) (link) California Declares State Of Emergency Over L.A. Methane Leak ... of the most devastating environmental disasters in the history of California," Los ... from his community about pressing the governor to declare an emergency.

[Erin Brockovich: California Methane Gas Leak is Worst U.S. ...](#) (link) In the nation's biggest environmental disaster since the BP oil spill, ... for one- quarter of all California's methane emissions in just one month.

[State of Emergency Declared for Aliso Canyon, California, Because ...](#)(link) An Environmental Disaster Unfolding in CA ... California Gov. Jerry Brown declared a state of emergency Wednesday for a methane leak that ...

[Americas - California governor declares methane gas leak ...](#)(link) California Governor Jerry Brown declared a natural gas leak in a ... Screengrab, Environmental Defense Fund | Infrared footage ... a disaster," said Kelly Huston, deputy director of the governor's Office of Emergency Services.

[California governor declares emergency over Porter ... - CNN.com ...](#) (link) California governor declares emergency over Porter Ranch gas leak ... Southern California Gas Company's actions to stop the leak, track methane ... prior commitment to mitigate the environmental impact of the actual amount ...

[After At Least 2,300 Home Evacuations, Big Methane Leak Causes ...](#)(link) The area has been suffering from the effects of a methane gas leak at the ... The Environmental Defense Fund, which released a shocking infrared ... Others, though, criticized the governor for failing to address California's systemic ... was a disaster waiting to happen, but officials mostly ignored those risks."

Massive volumes of Methane gas are leaking into the air from the Porter Ranch disaster. Additionally, it is not California's only methane leak. It sounds like a sci-fi disaster film but it is a real event and it is happening now. Innovative technology companies have solutions at hand, which can turn the disaster into an upside.

Methane is a chemical. **Methane** (/ˈmɛtheɪn/ or /ˈmi.theɪn/) is a [chemical compound](#) with the [chemical formula](#) CH₄ (one atom of [carbon](#) and four atoms of [hydrogen](#)). It is the simplest [alkane](#) and the main component of [natural gas](#). The relative abundance of methane on [Earth](#) makes it an attractive [fuel](#), though capturing and storing it poses challenges due to its [gaseous](#) state found at [standard conditions for temperature and pressure](#).

In its natural state, methane is found both below ground and under the [sea floor](#), where it often finds its way to the surface and the [atmosphere](#) where it is known as [atmospheric methane](#).^[5] The Earth's atmospheric methane concentration has increased by about 150% since 1750, and it accounts for 20% of the total [radiative forcing](#) from all of the long-lived and globally mixed greenhouse gases (these gases don't include water vapor which is by far the largest component of the greenhouse effect).^[6] Methane [breaks down](#) in the atmosphere and creates [CH₃](#) with water vapor.

Scientists have now proposed that the State Of California let them solve the problem by turning the Methane into clean energy fuel.

Energy production from fossil fuels without emissions of climate-affecting carbon dioxide -- this vision might come true through the research program "Combustion of Methane without CO₂ Emissions." Since late 2012, KIT has been partner in the program that is part of the Earth, Energy, and Environment (E3) Cluster of the Institute for Advanced Sustainability Studies (IASS), Potsdam. "This is the truly pioneering experiment with the ambition of using fossils without CO₂ emissions," said the scientific director of IASS and physics Nobel Prize laureate Professor Carlo Rubbia when visiting KIT today.

Hydrogen represents a promising medium for the storage and transport of energy in the future. However, it is bound in water (H₂O) or hydrocarbons, such as petroleum, natural gas or coal. Consequently, the hydrogen has to be separated first. In the course of conventional separation processes, the climate-affecting greenhouse gas carbon dioxide is formed. Today's worldwide hydrogen production causes about 5% of the global CO₂ emissions.

CO₂-free hydrogen production at KIT will be achieved by thermal decomposition of methane in a high-temperature bubble column reactor. KIT researchers enter entirely new ground. "With this project, we have the opportunity to participate in the development of fundamentals for a completely new energy technology," explains the head of KALLA, Professor Thomas Wetzel. "If feasibility can be confirmed, sustainable production and use of hydrogen from fossil sources that would have affected the climate if they were used conventionally will be possible."

The liquid-metal bubble column reactor to be built up at KALLA in the next months is a vertical column of about half a meter in height and a few centimeters in diameter. The column is filled with liquid metal that is heated up to 1000°C. Fine methane bubbles enter the column through a porous filling at the bottom. These bubbles rise up to the surface. "At such high temperatures, the ascending methane bubbles are increasingly decomposed into hydrogen and carbon," explains Professor Thomas Wetzel. "We will study how much hydrogen can be produced by a smart process conduct."

The KIT liquid-metal bubble column reactor is based on previous work of Professor Carlo Rubbia and Professor Alberto Abánades from IASS. They studied thermal decomposition of methane in a gas-phase reactor. During this gas-phase reaction, however, the carbon formed deposited on the reactor walls. As a result, gas channels were plugged after a short time and no continuous process was possible. "In the reactor planned to be built in cooperation with the IASS colleagues, the shell of the bubbles assumes the role of the wall," explains Thomas Wetzel. "Only when the bubbles burst at the surface of the liquid metal, is carbon released. The reactor wall is constantly renewed." A similar approach was described by researchers in the team of Manuela Serban from the Argonne National Lab, USA, about ten years ago. Since then, however, this process has not been developed any further.

Following the setup of the test reactor, KIT scientists will study various parameters influencing process conduct and potential hydrogen yield this year. Work at KIT will also focus on fundamental scientific aspects, for example, on the identification of reaction paths influencing the composition of the product gas flow and on possibilities of removing carbon from the reactor. In parallel, the scientists will select materials for potential future industrial reactors, study filter technology, and develop probes for a later continuous process conduct.

Karlsruhe Institute of Technology (KIT) is one of Europe's leading energy research establishments. Research, education, and innovation at KIT foster the energy turnaround and reorganization of the energy system in Germany. KIT links excellent competences in engineering and science with know-how in economics, the humanities, and social science as well as law. The activities of the KIT Energy Center are organized in seven topics: Energy conversion, renewable energies, energy storage and distribution, efficient energy use, fusion technology, nuclear power and safety, and energy systems analysis. Clear priorities lie in the areas of energy efficiency and renewable energies, energy storage technologies and grids, electromobility, and enhanced international cooperation in research.

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A California company: THE POWER, (<https://fcpower.biz>) wants to convert the methane to Hydrogen for Toyota's, Kia's and Hyundai's fuel cell vehicles using tubular plasma converters or steam reforming and has asked the State of California for funding to help deploy it's patented, government sponsored technology. So far, KIT, THE POWER, U.C. Berkeley Grad students, Erin Brokovich and others, have not had much luck winding their way through California's administrative log-jams

